

SUSTAINABLE AGRICULTURAL DEVELOPMENT IN THE MALAWIAN
SMALLHOLDER AGRICULTURAL SECTOR:
A case of Lilongwe district

by

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Abstract

Even though agriculture is the backbone of Malawi's economy, food insecurity has remained a continuous threat among the poor. Until the 1980s, Malawi had been achieving national food security through an extensive system of agricultural inputs and marketing subsidies. However, these subsidies were removed and at the same time, the agricultural credit system collapsed. Consequently, agricultural productivity in Malawi remained low, poverty remained pervasive and food insecurity remains a main constraint to national and household food security. Therefore, the success of the agricultural sector in Malawi is very critical for raising the living standards and for food self-sufficiency. In this vein, the study hypothesized that Malawi can only achieve sustainable agricultural development if its agricultural policies are focused towards intensifying agricultural productivity through active participation of smallholder farmers. The major aim of the study was to contribute towards an improved understanding of how the issues of sustainable agricultural development have been addressed in Malawi and how they have influenced the lives of smallholder farmers. The analysis of the results revealed that even though what was implemented in the 1970s to early 1980s was financially unsustainable, but it provided some solutions to the fundamental challenges of smallholder development in Malawi. However, the liberalisations eroded whatever economic benefits achieved then. Never the less, the re-introduction of the agricultural input subsidies restored back the means of production leading to significant transformation of the country from a net importer to a net food exporter. On the other hand, although the agricultural input subsidy programme is being commended for having helped in achieving food security, the study revealed that the programme requires complementary services of credit, extension, research and market to support it. This will provide an exit strategy, which can enable the producers to sell their produce at higher prices sufficient enough for them to afford agricultural inputs without subsidies.

Keywords: Sustainability, agricultural development, agricultural productivity, food security, smallholder farming, commercial farming, input subsidies.

Declaration

I, MARTHA CHIZIMBA, do hereby declare that this dissertation is my own original work which has never been submitted anywhere for a degree.

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Signature

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Date

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List of abbreviations and acronyms

ADD	Agricultural Development Division
ADMARC	Agricultural Development and Marketing Corporation
ADP	Agricultural Development Programme
AIDS	Acquired Immuno-Deficiency Syndrome
AISP	Agricultural Inputs Subsidy Programme
ASAC	Agricultural Sector Adjustment Credit
APIP	Agricultural Productivity Investment Programme
CBO	Community Based Organisations
DFID	Department for International Development
EDDRP	Entrepreneurship Development and Drought Recovery Programme
EPA	Extension Planning Area
FAO	Food and Agriculture Organisation
FEWSNET	Famine Early Warning Systems Network
FRDP	Fiscal Restructuring and Deregulation Programme
FSNP	Food Security and Nutrition Policy
FUM	Farmers Union of Malawi
GDP	Gross Domestic Product
GOM	Government of Malawi
HIV	Human Immuno-Deficiency Virus
IFAD	International Fund for African Development
IHS2	Second Integrated Household Survey
ILO	International Labour Organisation
IMF	International Monetary Fund
IRDP	Integrated Rural Development Project

ITPA	Industry and Trade Policy Adjustments
MDG	Millenium Development Goals
MGDS	Malawi Growth and Development Strategy
MK	Malawi Kwacha
MOAFS	Ministry of Agriculture and Food Security
MRFC	Malawi Rural Finance Company
MPRS	Malawi Poverty Reduction Strategy
MVAC	Malawi Vulnerability Assessment Committee
NASFAM	National Smallholders Farmers Association of Malawi
NGO	Non Governmental Organisation
NIPDS	National Irrigation and Development Strategy
NSO	National Statistical Office
NFRA	National Food Reserve Agency
OPV	Open Pollinated Varieties
SACA	Smallholder Agricultural Credit Administration
SAL	Structural Adjustment Loans
SAP	Structural Adjustment Policy
SGR	Strategic Grain Reserve
SPSS	Statistical Package for Social Sciences
TAMA	Tobacco Association of Malawi
TIP	Targeted Input Programme
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development

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Dedication

To my loving family

CHAPTER I

INTRODUCTION

1.1 Background to the study

Malawi is a small, landlocked Southern African country with about 83 percent of its total population living in rural areas where subsistence agriculture is the main occupation (International Fund for African Development, 2007). The country has few mineral resources that can be economically exploited. Its key resource endowment is the agricultural land and the abundant labour and as a result the economy is pre-dominantly agricultural based with agriculture alone accounting for over 40 percent of the Gross Domestic Product (GDP) (Ministry of Agriculture and Food Security, 2008b:1). The sector employs about 87 percent of the workforce, and contributes over 80 percent of foreign exchange earnings. Agriculture in Malawi is the single most important source of income as it accounts for 63.7 percent of the total income for the rural poor (Government of Malawi, 2001). Thus, the agriculture sector contributes significantly to both the national food security in aggregate terms and household food security at the lower level.

Given that a large percentage of the Malawian population is rural, rural development occupies a prominent place in the country's development plans. Most of these rural development efforts tend to emphasize on improving smallholder agricultural productivity since 90 percent of the rural population earns their livelihoods from agriculture (Chipande, 1984). Women alone constitute 69 percent of the full-time farmer population (Gilbert et al, 2002). Rural microenterprises, i.e., non-farm related business activities of the rural population at large, are often operated only on a part-time basis outside the agricultural production cycle. Once the agricultural season restarts, these microenterprises tend to dissolve (Discussion paper, Malawi Financial Sector Strategy, 2009).

Overall, the country spends 16 percent of its national budget on agriculture (UNDP, 2005), yet its agricultural production is still unstable, and it is characterized by low and stagnant yields (Government of Malawi, 2006). This is because of Malawi's agriculture is over dependent on rain fed farming which increases vulnerability to weather related shocks due to lack of both physical and capital expenditures. This means low levels of irrigation development and low uptake of improved farm inputs. Over half of the farming household operates below subsistence. Consequently, Malawi has not been able to sustain adequate levels of food production hence it continues to suffer from chronic food insecurity (Government of Malawi, 2006).

This situation has been further exacerbated by the dualistic nature of Malawi's agricultural sector, which comprise of a low input/low productivity smallholder sector and high input/high productivity estate sector. Historically, these two sub-sectors have been delineated by different legal and institutional rules regarding crop production, marketing arrangements, pricing, and land tenure. The estate sector comprises of a much smaller number of large-scale farmers, producing almost entirely for the export market (Kundell, 2008). The estate sector also accounts for about 40 percent of the best arable land area, which is mainly under freehold and leasehold tenure (International Development Association, 2004:2).

Estate / commercial agriculture in Malawi traces its legitimacy from the treaties of cessation signed between the colonial authorities and the local chiefs in the 1800s. The Colonial administrators at that time sought to control the population while promoting extractive agriculture. During this time, the colonial administration was indirectly done by using tribal authorities to articulate colonial policy at the local level. The local leaders were unaware that they were surrendering permanent title over tribal lands through these agreements. In this manner, some of the best lands in the country were permanently surrendered to foreign-based investors. These administrative arrangements were not changed even after the country became independent because the estate sector was relied upon to drive the new nation's export-oriented economy. Thus, customary land was annexed in pursuit of the

outward-oriented export growth strategy, thereby undermining the traditional and customary systems that governed land use. This strategy re-enforced the colonial practice of rural freehold estates based on the English Common law. Thus, the Malawian customary land which was traditionally controlled by chiefs and village headmen was brought into a reservoir of public and private holdings with 99-year leases.

Within the estate sector, foreign-based corporations and investors were the ones who were granted ownership of the freehold land while the leasehold lands were granted to Malawian elites (Sahley et al, 2005:51). Through these policies over one million hectares of customary land were removed from traditional authority. The estate holdings mainly produce primary agricultural export crops such as tobacco, tea, coffee, bananas, macadamia nuts and sugarcane. Overall, the estate sector contributes about 30 percent of agricultural GDP (Ministry of Agriculture and Food Security, 2007:2). It is revealed that as much as 28 percent of the country's available arable land was dormant because most of the Malawian estate holders on 99-year leases lacked the incentives, access to capital or both to make their holdings economically productive (Sahley et al, 2005:52).

On the other hand, smallholder farmers cultivate small and fragmented land holdings under customary tenure with yields lower than in the estate sector (Ministry of Agriculture and Food Security, 2007). Thus, the smallholder sub-sector comprises a very large number of small-scale farmers growing mainly food crops for their own consumption on customary land. Sahley et al, (2005:51) defines customary land as the land which is under a traditional authority and comprises of holdings of a kinship group under the leadership of a headman or chief usually coming from a single lineage or descent group who symbolises kinship unity. In traditional systems, chiefs allocate land based on family needs, lineage affiliations, and evidence of productive utilisation. While these systems are weakening, villagers continue to see them as the legitimate authority over land such that land continues to be fundamentally connected with cultural identity, family and community life.

However, although ownership of customary land passes through the kinship group, the chief may authorize allocation of land to others according to modern practices.

More than 90 percent of the rural population is comprised of smallholders whose cultivation is done on the customary land (IFAD, 2007). The majority of these smallholder farmers have landholdings of less than one hectare (Chirwa, 2007:1). Over 80 percent of this land is planted to maize while smaller average allocations are given to a wide diversity of additional food and cash crops including tobacco and groundnut. Maize is the main staple food crop for Malawi and its accounts for nearly 90 percent of the land cultivated by 97 percent of the farming households. Maize also accounts for 60 percent of the total calorie consumption; roughly, about 175 kilograms per person per year of maize is required to fill this requirement. Overall, the smallholder sector contributes about 70 percent of agricultural production and agricultural GDP (Denning et. al, 2009:4). Tobacco is Malawi's largest export cash crop, accounting for about 60 percent of export earnings, followed by tea and sugar. Production and consumption of animal products is very low. As cropping extends into grazing areas, the numbers of ruminant livestock, especially cattle, have declined (Sahley et al, 2005:51).

Land pressure is very high among the smallholder farmers in Malawi whose cultivation is mainly done on customary land. Kishindo (cited in Sahley et al, 2005:50) states that the average per capita land holding size among smallholder farmers is about 0.23 hectares. He further explains that land pressure has been gravitated by the rapid increase in population with a growth rate of about 3 percent per year resulting in the continued decline in per capital land holding size. This trend began in as far back as the mid 1970s, and it has been continuing without any remedial measures.

The right to distribute land under the customary land tenure is conferred by traditional chiefs. Given the diminishing land holding size, this pattern of land allocation has direct effects on the living standards of the smallholder farmers as they are finding it increasingly difficult to obtain sufficient food to sustain the minimum caloric requirements from the fragmented land. Traditionally, land has been regarded as a key asset for the farmers employed in the agriculture sector as well as for the

people working in the cities who eventually retire back to their ancestral villages and work on the land so as to supplement their pensions. Thus, the increasing land pressure is also a threat to this traditional asset thereby making the households more vulnerable (Sahley et al, 2005:51).

Therefore, without any alternative access to any other land other than the uncultivated hillsides, the smallholder farmers and the landless farmers are compelled to use their small plots of land continuously as well as to expand their cultivation to the marginal lands like the hillsides and grazing land. Cultivation of the marginal lands results in further degradation of the already infertile land. Thus, due to land pressure, the farmers are forced to over utilise their land to unproductive levels, to accelerate clearance of natural forest and to increase cultivation of food crops on steep slopes and other marginal lands to meet their immediate food security needs with no regard to future gains in resource productivity (Government of Malawi, 2007:24).

Malawi's agricultural productivity is primarily labour intensive, which implies that agricultural productivity in the country greatly depends on the timely availability of an effective labour force. However many factors affect labour availability in the country such as age, health status, gender, wages, technology and competition among enterprises. Of great significance is the diversion of the labour force from the smallholder sector to the estate sector. This diversion, greatly affects smallholder agricultural productivity especially because the peak period for labour bottlenecks coincides with the hunger period whereby most rural households run out of food. As a result, the smallholder farmers usually neglect their own farms in search for temporary work on the estates so that they can acquire food for their households either in cash or in kind during the lean period of the year. These high labour requirements, and uncertainty about investment returns, have created a barrier to the adoption of sustainable land management practices. Since the majority of smallholders in Malawi struggle to meet their subsistence needs on less than one hectare of land, agricultural intensification is essential. Yet experience in Malawi has shown that agricultural intensification without appropriate land use and water conservation is unlikely to be economically or

environmentally viable in the longer term. Crop intensification implies growing crops under irrigation farming twice or more in a year so that the farmers maximise utility of their small plots of land. This therefore requires intensification strategies that are linked with conservation efforts.

Agricultural productivity remains low, poverty remains pervasive and food insecurity remains an important constraint at national and household levels. Variability in rainfall is still increasing probably as a result of climate change and the country remains highly prone to periodic floods and drought. Productivity in most crops has not substantially improved beyond the levels of the 1970s (Ministry of Agriculture and Food Security, 2007:20). Given the available technologies, the gap between potential yields and the actual yields are large. In maize, yields may range from below 1 ton/ha (local varieties, no inputs, poor crop management), to around 5 ton/ha (hybrid seeds, fertilizers, good crop management, etc.). Continual cultivation of maize on the same land without addition of organic or inorganic fertilizers leads to low yields, and local varieties of maize show a much lower response to inorganic fertilizer (principally nitrogen) than hybrid and, to a lesser extent, composite or open pollinated varieties (OPVs). Rough average fertilizer response rates have been reported to be in the order of 10 kilogrammes of grain per incremental kilogramme of Nitrogen on local maize, 15 kilogrammes on OPV and 20 kilogrammes on hybrid varieties (Ministry of Agriculture and Food Security, 2007).

There are also indications that as a result of a decline in the productive capacity of soils (adverse changes to hydrological, biological, chemical and physical properties), the maize response to fertilizer has declined. During the 1960s, unfertilized local maize typically yielded about 1700 kilogrammes per hectare, but now such yields have fallen well below 1000 kilogrammes per hectare. Comparisons of yield of fertilized and unfertilized maize between the period of 1957-62 and then in the period of 1982-85, showed declines of 25 to 40 percent in response rates per kg of nitrogen. However, it is not clear to what extent these comparisons have been influenced by rainfall and other variations between these two periods (Ministry of Agriculture and Food Security, 2007).

There are different factors that have contributed to the low maize yields under smallholder farming conditions; one of these factors include low nutrient levels due to insufficient replenishment of nutrients removed in the harvested products. As a result, most of the soils currently being used for crop production are severely depleted in nutrients, particularly nitrogen and depending on location, phosphorus, magnesium, zinc and sulphur. Another factor is the low organic matter levels as a result of tillage, the cessation of former soil-restorative fallowing practices, and the burning of crop residues.

Lastly, maize productivity has declined due to limited infiltration of roots and rainwater, a situation which arise when a dense compacted soil layer or “hoe pan” is formed as a result of continuous cultivation using the hoe to the same depth for the purpose of forming, splitting and reforming planting ridges. This shows that, attaining sustainable productivity increases of the maize based on rain-fed cropping systems require sustainable land management practices that increase organic matter, improve rain infiltration and root penetration, improve crop responses to appropriate fertilizer applications, and reduce erosion. Secondly, it require affordable and timely availability of these fertilizers and improved seed varieties of maize and accompanying legumes as well as improved crop management practices (sowing, weeding, harvesting and post-harvest).

All these challenging factors have resulted in the poor having food security as a major and continuing threat to life. The review of the Malawi Poverty Reduction Strategy (MPRS) revealed that poverty had not changed significantly in the last seven years (Government of Malawi, 2006:7). According to the Malawi Second Integrated Household Survey (IHS2) cited in Government of Malawi (2006:7), the current status of poverty shows that 52.4 percent of the population still lives below the poverty line, with the rural areas being poorer than urban areas. Female-headed households are worse off. Income inequality persists in Malawi with the richest 10 percent of the population having an average per capita income that is eight times higher than the average per capita income of the poorest 10 percent. Approximately 30 percent of the poor moved out of poverty in

between 2002-2006. During the same period, another 30 percent of the non-poor moved into poverty. This suggests that there is continued economic vulnerability in the country (Government of Malawi, 2006:8).

One factor that contributes to this vulnerability is the fact that although 85 percent of the economically active population is employed in agriculture, with only a few exceptions, but agriculture continued to be rain fed. This has rendered Malawi to be highly vulnerable to climatic shocks that have precipitated acute food insecurity with increasing frequency. As a result, over the past 20-25 years, Malawi shifted from being a self-sufficient producer of maize in non-disaster years to being a regular net importer, dependent on foreign assistance to achieve a national food balance. To address these problems, the government embarked on quite a number of development programmes with the aim of transforming and improving the lives of the rural poor. The Malawi Growth and Development Strategy (MGDS)¹ incorporates the fundamentals of an agriculture-led transformation by among other things promoting increased agricultural productivity for food security reasons at both household and national level (Government of Malawi, 2005a).

Up until the 1980s, Malawi had been achieving its national food security through an extensive system of agricultural inputs and marketing subsidies which promoted agricultural intensification. But the fertilizer prices started to dramatically increase after these subsidies were removed and the agricultural credit system stopped. The situations were further worsened when the country started experiencing successive devaluations due to implementation of the structural adjustment reforms. During this time, the Government started embarking on various initiatives to boost agricultural production and alleviate poverty. These included market liberalization in 1994 and agricultural production support programs such as the Universal Starter Pack in 1998 and the Targeted Input Program (TIP) in 2002. These two initiatives involved provision of small packages of inputs enough

¹ The Malawi Growth and Development Strategy (MGDS) is the overarching operational medium-term strategy for Malawi designed to attain the nation's Vision 2020. The main thrust of the MGDS is to create wealth through sustainable economic growth and infrastructure development as a means of achieving poverty reduction.

for a 0.1 hectare of land. The packages were made up of 17 kilogrammes fertilizer which was later increased to 31 kilogrammes, improved maize seed and legume seed. However, the number of smallholder farmers targeted for TIP later declined after the donors reduced support for the programme. As a result many farmers who relied on these packages were negatively affected because they could not afford the high fertilizer prices. Thus, the performance of the Malawian agricultural sector during the first half of this decade had been very weak and highly erratic.

The Targeted Input Program (TIP) was replaced by Agricultural Input Supply Programme (AISP) in 2005. The implementation of the AISP in 2005 marked a return of the agricultural input subsidies to the agricultural policies in Malawi; this was done in defiance of the protests from the donor countries who were of the view that the programme would fuel budget deficits, distort the market and would be very costly to administer. Never the less, the last three seasons of implementing the input subsidy were marked to be exceptionally successful as the country dramatically moved from serious food deficits to a net exporter. This three year sustained bumper maize harvests have been attributed to the favourable combination of above average rainfall and the large-scale subsidized supply of fertilizers and seed contributed to bumper harvests and strong growth in the sector. The combination of these factors brought production surpluses during the past three years.

However, in comparison with the contribution that the agricultural sector makes to the country's economy, it has been noted that the budget share of the Ministry of Agriculture and Food Security is much lower. For instance, in 2006/07, the Ministry received approximately 14 percent of the national budget largely as a result of the growing contribution to the input subsidy program. Unfortunately, over fifty percent of the entire budget of the Ministry of Agriculture and Food Security (MoAFS) was now allocated to this input subsidy program with the highest portion of the remaining chunk being spent on administration. Expenditure on agricultural research and extension as a percentage of GDP has fallen, with extension expenditure declining from 0.6 percent to 0.3 percent in

2001(Government of Malawi, 2002:16). This decline in support to extension services poses questions on the sustainability of the Agricultural Input Subsidy Programme.

The Food and Agriculture Organisation (2008) as well as Mason et al (2008) state that despite the bumper harvest of the past three years, food prices in Malawi have remained 107 percent higher in Malawi as compared to other countries in the Southern Africa. This entails that some people continue to be food insecure due to reasons ranging from abject poverty, geographical location, labour incapacitation due to illness, and adverse weather conditions (Ministry of Economic Planning and Development, 2008). Thus, even the benefits achieved so far through the national input subsidy programme are yet to prove whether the country is finally on the right track to sustainable agricultural development.

Foregoing narratives tend to show that the success of the agricultural sector in Malawi is critical for raising the living standards and for food self-sufficiency as a sustainable source of livelihoods for the entire population at large. It is against this background that this study determined to address the issue of sustainable agricultural development with a major focus on smallholder agricultural policies and strategies which contributes to improved and stabilized agricultural productivity thereby reducing household food insecurity in the rural areas.

1.2 Statement of the problem

Even though agriculture is the backbone of Malawi's economy, its sustainability in the country's rural poor farming communities through agricultural development programmes is yet to be achieved. The major challenge in Malawi's economy is that the bulk of the agricultural produce (about 70 percent) is obtained from the smallholder farmers most of which are vulnerable to prevailing government policies and strategies. In addition, Malawi as one of the least developed countries in the world ranked 162th (United Nations Human Development Index, 2008), still depends on foreign aid for most of its development programs including agriculture. In the past decade alone, foreign aid in

form of loans and grants amounted to 14 percent of Malawi's gross Domestic Product" (IFAD, 2007). Most of this aid goes to agriculture and food security programs; this donor support in the agricultural sector has been through multiple projects and programs so as to address the problem of household level poverty (particularly food security).

Despite having many agriculture and food security programmes, the country has not yet achieved sustainable agricultural development. In fact, Malawi's development strategies and policies have always centred on agricultural development, but the impact of these policies has been limiting. Records show that, since the late 1980's, Malawi's agricultural productivity has been experiencing a downward trend (Government of Malawi, 2001:13) such that the country has been unable to maintain adequate levels of food production. Even in the face of these challenges, the government's goal has still been to increase agriculture's contribution to economic growth by increasing production for food security as well as agro-processing and manufacturing for both domestic and export markets (Government of Malawi, 2006:14). This has resulted in increased efforts in implementing agricultural development programmes.

The challenge, however, is to make these agricultural development programmes sustainable so that there is improvement in the lives of the poor. Empirical evidence tend to show that for any development to achieve high level of food production and become self-sustaining, it will have to include the rural areas in general and the agricultural sector in particular (Todaro and Smith, 2009:462). This requires employing strategies that should be sufficient enough to generate the level of economic activity among smallholder farmers. Such strategies include sustainable poverty reduction and lessening continued dependence on foreign aid for food security through empowering the socially and economically poor farming communities. Thus, sustainability in agriculture development programmes can be achieved if the government provides strategies that build the local capacity and that empowers the smallholder farmers to sustain high levels of agricultural productivity.

Therefore, the study hypothesizes that unless national agricultural policies in Malawi are focussed towards intensifying agricultural productivity through active participation of smallholder farmers, sustainable agricultural development would not be feasible.

1.3 Objectives of the study

The major objective of this study was to contribute towards an improved understanding of how issues of sustainable agricultural development have been addressed in Malawi and the extent to which they have impacted the lives of the smallholder farming community. In order to achieve this broad objective, the study attempted to address the following specific objectives:

The study analysed the major agricultural development policies and sustainability strategies which have been employed in the country in the last three decades and the extent to which these policies and strategies contributed towards sustainability of agricultural development programmes in general and food security in particular.

Major challenges that affect sustainability of agricultural development programmes among smallholder farmers in Malawi were also analysed.

Lastly, suggestions were made regarding the strategies which can be employed to promote sustainability of agricultural development programmes among smallholder farmers in Malawi.

In line with these objectives, the study attempted to answer the following research questions:

What major agricultural development policies has the Malawi Government employed in the past three decades?

To what extent have these policies contributed towards sustainable agricultural development and food security at household level?

What have been the major challenges against the attainment of sustainable agricultural development among smallholder farmers in Malawi?

What policy options are there for Malawi to achieve sustainability of agriculture development among smallholder farmers in Malawi?

1.4 Significance of the study

This study contributes towards an understanding of food security issues in Malawi thereby informing the design of more effective strategies and policies that would enhance agricultural productivity among small-scale farmers in Malawi. This is crucial considering the fact that Malawi is a landlocked country with very negligible amount of mineral resources that are economically worth exploiting, hence, the major economic base evolves around agriculture, specifically smallholder agriculture.

The study contributes in analysing an agricultural policy that sustains high levels of agricultural productivity given the decline in commercial estate activities and the decreasing smallholder farm sizes due to rapid population increases hence fragmentation of customary land. In the past, the development of commercial estate agriculture was the backbone of agricultural development such that the Government subsidised commercial estate agriculture while small-scale farmers were neglected. By so doing, the Government contributed to urban sector development.

The study expects to contribute not only to the already existing body of knowledge but also on how the policy environment created by the government affects the sustainability of agricultural development programmes in the smallholder sector. Consequently, this study provides additional insights and understanding to the government, the private sector, Non Governmental Organizations, policy makers, farmer organizations and various other stakeholders in the agricultural sector in Malawi about the agricultural transformation in the country. The government and policy makers will further benefit through various agricultural policy option suggested by the research

1.5 Delimitation of the study

The study recognises that smallholder-farming households possess special economic characteristics that make them interact with the state in ways that differ from commercial estate farmers. As such, the sustainability of agricultural development in Malawi is evaluated by essentially analyzing the policy environment and the government strategies in which these smallholder farmers operates.

The main source of information in this study was the primary data obtained from a survey, which was conducted in the sampled areas of Lilongwe district in Malawi between the months of August and September 2009. Nevertheless, reference materials from the Ministries of Agriculture and Food Security, cooperating partners and other articles on related works were also used for triangulation purposes.

Even though the major focus of the study was on the current status of smallholder agricultural development programmes and their sustainability, but other development approaches that were employed in the past, for the past three decades were also alluded to because they contribute the present situation in one way or another. However, due to limited time and financial resources, the study employed nomothetic model of explanation, which is a probabilistic approach to causation whereby a few considerations are used to provide general explanations for a wider population. In this case, the technique was applied by selecting the survey sample from Lilongwe district only to provide a general explanation for smallholder farmers in Malawi as a whole.

The discussion in this study was limited to agricultural policies as such policies that affect the entire economy were only consulted in so far as they influenced the agricultural policies. The agricultural policies examined in this study mainly include the three categories of state interventions. Firstly, state interventions at price level and trends of farm inputs and farm outputs; secondly, interventions in the institutions involved in either in the marketing of agricultural commodities or in the delivery of

farm inputs or technology and thirdly, interventions in technology creation and its transmission to farmers.

1.6 Conclusion and outline of the study

The ideas discussed in this study revolve around the basic theory of rural development in general and agricultural development in particular. However, at the heart of this study, priorities and conditions for improving agricultural sustainability are examined in line with approaches of promoting agricultural policies and strategies. The Malawian scenario is introduced by narrating the socio-economic environment in which agricultural development is carried out in Malawi. Agriculture development in general and smallholder farming in particular is regarded as the major tool of achieving economic development as well as food security in the country. This phenomenon poses the major development challenge in Malawi.

As part of the background of the study, the dualistic nature of agriculture in Malawi was presented as constituting of the estate and smallholder sectors. The chapter highlighted the fact that although smallholder sector contributes about 70 percent of the agricultural GDP but it has always been marginalized in the country's agricultural policies; instead the policies favoured export-oriented growth through estate /commercial farming. This scenario resulted in high poverty level with food security being the major challenge as most of the small holder farmers failed to meet their minimum food entitlements.

Several policy changes have been put in place to increase smallholder agricultural productivity to achieve household food security, the most current one being the Agricultural Input Subsidy Programme. However, whether or not agricultural sustainability will be achieved through this policy stance remains to be proved. Problem statement, objectives, justification and delimitations of the study were also presented in this chapter.

Chapter two, analyses the rural development issues at international level by mainly spotlighting the dominant paradigms of rural development and their evolvement up to the present time. The chapter critically examines the impacts of the paradigms on agricultural development and its sustainability in developing countries (particularly in Africa) in relation to global economic order. The theoretical concept of sustainable agricultural development is also thoroughly discussed in this chapter.

While the focus in chapter two is on agricultural development in African developing countries, however, chapter 3 gives particular attention to agricultural development in Malawi as a country. The issues of food security and sustainability are highlighted in line with the dominant rural development approaches at any given time in the country's agricultural development process.

Methodological procedures which include sampling, data collection and analysis are the major theme of chapter four. Outcomes and results of the study are discussed in detail in chapter five. Finally, in chapter six, recommendations for achieving agricultural sustainability developing countries are provided and conclusion as to what approach can best be applied to attain sustainable agricultural development are also made.

The next chapter critically discusses the dominant rural development paradigms that have guided development programmes in the developing countries. Particular attention will be given to the impact these development theories had on agricultural development which is the main development agenda in the rural regions. The chapter will conclude by incorporating the concept of sustainable agricultural development in smallholder farming.

CHAPTER II

THE THEORY AND PRACTICE OF RURAL DEVELOPMENT: AGRICULTURAL DEVELOPMENT

The agricultural sector still plays an indispensable role in the economic development strategies of most developing countries in the Sub Saharan Africa. Over 65 percent of the population in these countries are rural dwellers who survive on subsistence farming but still they do not have enough food to meet their basic needs. The poverty levels in these Sub Saharan African countries are high due to the stagnation of the economic life of the rural areas (Todaro and Smith, 2009:454). A comprehensive understanding of the economic transition of the agricultural systems in the developing countries is therefore required to better understand the current agricultural scenarios and to forge a way forward.

Little cited in (D'haese and Kirstein, 2003:22) states that until the 1950's, very little was written on the role of agriculture in development. Never the less, most governments' policies and agricultural development programmes in developing countries have principally been influenced by a variety of rural development ideas as they evolved over the years. These ideas include the modernisation approach, basic needs approach and the integrated rural development, among others. All these affected agricultural productivity levels because agriculture has always been recognized as a key sector for economic development (D'haese and Kirstein, 2003:22).

Accordingly, agriculture can make a major contribution to overall development because most of the resources are available at relatively low opportunity cost. Therefore, the major task of agriculture in development was recognized as being the mobilization of resources and increasing efficiency in production. An increased production is needed because any increase in the population and per capita income leads to an increased demand in food of a better quality. Even establishment of a non-agricultural sector requires a high input of resources, which mostly comes from agriculture. Johnston

and Mellor cited in (D'haese and Kirstein, 2003:24) also recognized agriculture as a provider of food and raw materials for other sectors, as an earner of foreign exchange and as a source of demand for other sector's output, among others.

However, Delgado (1995:1) points out that the choices in African agricultural strategies have been influenced by dominant paradigms of agricultural development from the colonial era to the mid 1990s. Delgado (1995:3) identified growth and industrialisation as being the primary objectives of the early phase of commercialisation via cash cropping, with equity considerations appearing in the 1970s and conservation in the 1990s. Intermediate stages include emphasis on basic human needs in the 1970s, and a series of paradigms related to structural adjustment in the 1980s. This chronology illustrates the parallel evolution of dominant development paradigms (that is, modernizations, integrated rural development, liberalization as well as sustainable agricultural development) and the thinking about agriculture. Therefore, the thinking about agriculture has almost always reflected development ideas more generally.

Based on this understanding, this chapter of the study provides a brief discussion on the evolution thinking of rural development and how it has influenced agricultural development in developing countries. To achieve this, the chapter critically discusses the dominant rural development paradigms that have steered development programmes in the developing countries. Particular interest has been given to the impact that these development theories had on the sustainability of agricultural development specifically in the developing countries of the Sub Saharan Africa. Thus, the chapter discusses the concept of sustainable agricultural development in smallholder farming. Since sustainable agricultural development is the major focus of this study, the chapter explains in detail the various interpretations and understandings of sustainable agricultural development as well as how sustainability of agricultural development can be measured. Consequently, this narration provides more insights into the present rural development dilemma. The chapter concludes by laying down the conceptual frame work of the study.

2.1 Theoretical review of rural development approaches in developing countries

Development is a multidimensional process of economic, political, social and institutional change (Lewis, 1965:8). As such, the empirical understanding of economic history illustrates the ways in which the complex social and economic forces interact on the political terrain thereby hindering the development process. The interactions of these factors have affected various approaches in development economics through the years. An example of the effect of social forces is the emergence of the capitalist class, which emerged due to sociological problems. There are many ways in which governments affects the process of capital accumulation and these gives a good illustration of the effects of political forces in the development process. The effect of economic forces is best demonstrated in countries where the only form of unemployment assistance is the charity of relatives. In these countries, the agricultural or commercial employers are still expected to keep their labour force in one way or the other on humanitarian grounds although such a move is uneconomical.

Therefore, since societies are dynamic, an understanding of how various economic development paradigms have influenced development in developing countries is necessary to provide a better understanding of the various scenarios. For this reason, the accounts below, attempts to highlight the mainstream narratives and tries to explain the turning points from one to another. These accounts include theories, themes and policy thrusts that have been influential in rural development ever since the 1950s.

2.1.1 The modernisation approach

The dominant development paradigm in the 1950s to 1960s was mainly focused on growth through industrialization which had its roots in the dual-economic theory of development also referred to as the Lewis Model (Lewis, 1954:139-191). This model is a structural change model that explains how

labour transfers in a dual economy and it narrates the growth of a developing economy in terms of labour transition between two sectors which are the subsistence sector and a capitalist modern sector. Lewis (1954:147) defines the capitalist sector as that part of the economy which uses reproducible capital and pays capitalists for the use thereof. On the other hand, the subsistence sector represents all that part of the economy which is not using reproducible capital, hence unproductive. Output per head is lower in the subsistence sector than in the capitalist sector, because it is not fructified by capital (this is why it was called unproductive. It is assumed that as more capital becomes available more workers can be drawn into the capitalist from the subsistence sector, and their output per head rises as they move from the one sector to the other.

Thus, in the Lewis model, the process of development depends on the transfer of surplus labour from the subsistence sector characterized by zero marginal labour productivity to the capitalist sector (Lewis, 1954:141). The model further assumes that in many developing economies an unlimited supply of labour is available at a subsistence wage. This is especially supposed to exist in those countries where population is so large relative to capital and natural resources such that there are large sectors of the economy where the marginal productivity of labour is negligible, zero, or even negative. In such economies, there is the existence of such “disguised” unemployment in the agricultural sector, which demonstrates in each case that the family holding is so small that if some members of the family obtained other employment the remaining members could cultivate the holding just as well. The price of labour, in these economies, is a wage at the subsistence level. The supply of labour is therefore “unlimited” so long as the supply of labour at this price exceeds the demand. Lewis (1954:142) stipulates that in this type of situation, new industries can be created, or old industries expanded without limit at the existing wage since shortage of labour is no limit to the creation of new sources of employment.

Consequently, a ‘capitalist’ sector develops by drawing labour from a non-capitalist ‘subsistence’ sector. The existence of ‘surplus labour’ in the subsistence sector ensures that during an extended

period wages in the capitalist sector remain constant because the supply of labour to the capitalist sector exceeds demand at this wage rate. The surplus of output over wages is captured by the capitalists as profits. Within the capitalist sector, growth occurs as the share of profits in national income rises and are directed to profitable investment. Therefore, the unlimited supplies of labour ensure that capital accumulation is sustained over time and the dynamics of the economic forces at play lead towards economic transformation.

However, when eventually the reservoir of surplus labour in the 'subsistence' sector is exhausted, and wages in the subsistence sector begin to rise, the wages in the capitalist sector are pushed upwards thereby reducing the profit levels. Thus, the process of capital accumulation slows down. At some point in the process, the transfer of labour from the subsistence to the capitalist sector comes to reflect sectoral differences in the marginal productivity of labour, eventually leading to an integrated labour market and economy. At the end of this process of structural economic transformation, both wages and profits are determined by marginal productivity. Thus, the unlimited supplies of labour in the context of a dualistic economy, explain the sustained process of capital accumulation which provides the foundation for the process of economic transformation towards a homogeneous economy.

Ranis and Fei (1966:4) further developed the Lewis model and referred to Lewis's subsistence and capitalist sectors to as the agricultural and industrial sectors respectively. Based on this theory Ranis and Fei (1961:533) narrates that the transition process through which an under-developed economy can move from a condition of stagnation to one of self-sustaining growth. This is achieved through expansion of the capitalist or the industrial sector as it is nourished by the supplies of cheap labour from the subsistence /agriculture sector.

The assumption in the model was that people in the rural subsistence sector do not produce goods and services that contribute to the economy and therefore people from this part of the economy constitutes the surplus labour which can be taken out into the high productivity modern industrial

urban sector without any loss of productivity in the former (D'haese and Kirstein, 2003:22). The Ranis/Fei and the Lewis economic models assumed that unlimited supplies of labour available at subsistence wage in the agriculture sector possessed negligible prospects for rising productivity or growth. Therefore, the agricultural sector could only play a passive role in the process of economic development by supplying resources to the modern sector of the economy until the latter expanded to take its place (Lewis; Fei and Ranis cited in (Ellis and Biggs, 2001:440).

The dual-economic models also focus on the process of labour transfer and the growth of employment as well as output in the modern sector. However, both the transfer of labour and growth of employment are assumed to be brought about by output expansion. Output expansion is determined by the rate of industrial expansion and accumulation in the modern sector. Lewis (1954:152) assumed that the profits in the industrial sector are re-invested; as the industrial sector grows, workers from the rural areas are drawn to satisfy the growing needs of the modern-industrial sector since more workers in the urban areas increase output hence incomes and profits.

The model further stated that the extra income would increase the demand for domestic products while increased profits would fund increased investment. This rural urban migration eventually creates a growing supply of savings, which could finance the formation of an increasing stock of industrial capital. The models further narrated that as the growing capital stock raises the marginal product of labour in the industry, it becomes profitable to draw workers from agriculture thereby offering the economy a self-generating growth (Zeitlin, 2007:8).

The central problem in the Lewis's theory of economic development was 'to understand the process by which a community which was previously saving and investing 4 or 5 per cent of its national income or less, converts itself into an economy where voluntary saving is running at about 12 to 15 per cent of national income or more' (Lewis 1954:155). However, the answer which Lewis gave to this problem drew on the historical experience of Western industrialised countries and on the ideas of the classical economists to provide a dualistic model of the development process.

It is, therefore, very clear that the Lewis model corresponds much to the historical experience of economic growth in the West but overlooks some very important features in the developing world. For instance, the fact that urban growth drives economic growth can easily lead to the neglect of the agriculture by government and yet most people in developing countries live in the rural areas where incomes are very low. In addition, profits mostly tend to be invested in labour saving mechanizations instead of agricultural inputs or employing more workers in agriculture, this leads to rural-urban migration, which actually outstrips available jobs in most developing countries.

The Lewis model considered the subsistence agriculture sector as a labour pool and not a motor of development. With this worldview, little attention was given to agricultural development, and the primary focus of rural intervention was on community development, that was largely on social welfare interventions (Broadbent, 1990:49). Community development was a precursor to rural development, which had its origins in the United States of America (USA) for municipal planning in the 1930s. The USA launched a large American supported community development programme in India in 1952 after which the idea began to expand to other countries, but it reached its peak during the 1950s (Holdcroft cited in (Ellis and Biggs, 2001:444).

In Africa, Community Development became a part of the Ujamaa Villages established in Tanzania by President Julius Nyerere (Nyerere, 1968:338). In Tanzania, Community Development had some success in assisting with the delivery of education services throughout rural areas but it also had its controversies. According to Bonny and Dibua (2003:66-69), the Ujamaa failed to address the rural development question due to the following reasons: Firstly, the idea to start the villages did not come from the peasants themselves hence it failed to gain the necessary acceptance from the majority of the peasants. Secondly, the government used coercion to ensure mass villagization thereby militating against the effective operation of the villages. Thirdly, government aid, which was given as incentives for the peasants to move into the Ujamaa villages resulted in the overdependence on the government, thereby leaving the villages extremely vulnerable when the assistance finally

stopped. Lastly, a practice known as '*kulak ujamaa*' worsened the situation and it gave a more detrimental blow to the success of the Ujamaa villages. In this practice, a number of the rich peasants who attained positions in Ujamaa villages or who forged links with local bureaucracies began to use the villages to further their own gains (Shivji, 1994; Raikes, 1975 cited in (Bonny and Dibia, 2003:68) . Thus, the Ujamaa villagization did not seek to fundamentally restructure the rural economic base from the colonial-oriented production structure. Consequently, community development approach met with mixed success as it was criticised for failing to deal with agrarian issues and for not reforming the rural power structure. Accordingly, most international organizations and National governments do not use this approach (Broadbent, 1990:49). However, the modernisation approach addressed the question of poverty more directly; hence, it became the dominant paradigm around this time.

One of the outcomes of the modernisation theory was modernisation of agriculture. Lewis (1965:122) mentions that one of the major problems of agricultural development in developing countries centres on the backward agricultural systems which are characterised by lack of scientific knowledge, poor equipment, inefficient marketing, insecure tenure, uneconomically small-scale operations as well as over population. Specifically, Lewis (1965:123) acknowledges that the most difficult of all the agricultural problems is the small size of holdings in peasant countries of usually less than one hectare. He then recommends that such countries must go through an agrarian revolution to come up with some form of large-scale agriculture, working on large areas with machinery but without hired labour. Large-scale agriculture requires fewer people per acre than smallholdings and hence where the countryside is overpopulated and where there are no enough new lands reclaimable by drainage or irrigation, an agricultural revolution should go hand in hand with providing new employment opportunities outside agriculture. Thus, an agricultural revolution and an industrial revolution should always go together, such that the former release labour which the latter

draws off the land. This is why government of developing countries have to put into their agricultural programmes projects for industrialisation (Lewis, 1965:124).

Thus, in addition to the manufacturing industry, during the modernisation period, the modern sector was also considered to contain large-scale 'modern' agriculture plantations, estates, commercial farmers and ranches as propounded by Lewis. Because of this view, in the 1960's the dominant development paradigm changed with the thinking about agriculture as a focus. Although emphasis was still on national income as a measure of development but it was perceived that agriculture could contribute to growth (Johnston and Mellor, 1961; Johnston, 1970 cited in (Ellis and Biggs, 2001:440). Consequently, a more positive attitude was greatly cultivated by the spread of the green revolution, first in Mexico and later on in India.

Thus, the green revolution evolved as a part of the modernisation of agriculture whereby the principal goal of rural development was seen as the promotion of agricultural productivity through delivery of modern, effective packages of inputs and services. For example, Griffin (1979:2) notes that the expression green revolution may suggest two different things. Firstly, it may refer to a broad transformation of the agricultural sector in under-developed countries as well as reduction in food shortages and elimination of agricultural bottlenecks to overall development. Secondly, it may refer to specific plant improvements, notably the development of high yielding varieties of food grains such as maize, rice, and wheat. These high yielding varieties are used in combination with other technologies such as use of chemical fertiliser, irrigation technologies, and other labour saving technologies. Usually, this is takes place on large farms.

Taking into consideration all these definitions, the green revolution can be termed as the period in which modern science and technology began to have major impact on agriculture through increased agricultural production and resulted in large continuing increases in land and labour productivity (Stevens, 1977:3; Lele, 1989:7).

The green revolution approach was associated with large-scale state investment in infrastructure, research, and support for the adoption of new technology. An important underlying proposition included the existence of economies of scale in agriculture, i.e. that large farms could make more efficient use of resources and modern technologies than small farms (Ellis and Biggs, 2001:441). This view led many governments and donors to finance special programmes for agriculture in high-potential areas. This shows that green revolution emphasized on commercial estates but little emphasis or no attention was given to small-scale farming.

The green revolution demonstrated that agricultural productivity would increase rapidly if the right combination of seeds, inputs, and water were provided. A good example is the Asian green revolution which began in the 1960s with improved access to fertilizer through state supported subsidies, rural credit and improved infrastructure contributed to strong productivity growth in rice and wheat. Asian governments also supported the uptake of new technology through research and extension, and intervened in the market through price support with the development of fertilizer-responsive, high yielding varieties of both crops. The green revolution projects are widely credited for helping to avoid widespread famine and feeding billions of people. A good example is India which particularly registered great success with the green revolution such that famine which was once accepted as inevitable in India has not returned since the introduction of green revolution agriculture (Clive, 2007; Broadbent, 1990).

The green revolution even managed to stimulate growth of other sectors in some Asian developing countries. For example in India, the green revolution provided an enormous stimulus to small manufacturing firms in the country to supply agricultural implements to wheat farmers in Punjab. In Pakistan, there was also similar growth of agriculture related industries particularly of firms producing diesel engines and irrigation pumps (Kaneda and Child cited in (Griffin, 1979:254).

Kaneda and Child cited in (Griffin, 1979:255), further state that the linkages between the two sectors of agriculture and manufacturing were more developed in Taiwan where agro-industries achieved an

advanced stage of growth, both in supplying inputs to the agricultural sector and in processing the sector's outputs. In addition, other industries also developed to provide consumer goods to the rural population. The Taiwan experience can serve as a good example to compare with other developing countries elsewhere in the world, especially because it gave special attention to small and medium farms. Hence, the need to understand how the country managed to achieve what is possible under the green revolution.

There are various reasons for the success of the green revolution in Taiwan. To begin with, the country gave a high priority to agriculture in the 1960s, which created a potential demand for manufactured inputs. Secondly, an agrarian reform was implemented which resulted in lower rents, abolition of absentee landlordism and a more equitable distribution of land and hence income. These outcomes in turn created a broader market for industrial consumer goods in the rural areas. Thirdly, farmers associations were strengthened thereby ensuring that farmers would have no difficulty in marketing their products or obtaining material inputs. In this way, physical flow of commodities between the two sectors was reduced. Fourthly, within the industries, emphasis was placed initially on small and medium sized firms which used labour intensive techniques of production. The rapid expansion of these industries was associated with rapid growth of employment opportunities in the urban areas and reduced pressure on the countryside to retain labour. Consequently, real wages rose quickly in both sectors, the absolute number of people engaged in agriculture began to decline in 1968-69, income equality was reduced and the urban-rural wage differential practically vanished (Government of the Republic of China cited in Griffin, 1979:255). Taiwan experience therefore indicates what can be possible under the green revolution.

In contrast to the Asian experience, African states were less successful. Although there were positive results in some of the African countries implementing the green revolution, but generally the results were not sustained due to a number of reasons such as widespread corruption, insecurity, lack of infrastructure and general lack of will on the part of governments. Consequently, the donors led by

World Bank, started to argue for the abolition of state-led interventions including subsidies which led to dissolving or privatization of government-supported institutions (Denning et al, 2009:3). The Bank, in its 2007 Synthesis report attributed this policy failure on the African continent to high and unsustainable fiscal and administrative costs, governments' weak capacity to implement programs, and governments' inability to take account of the diversity of production systems and farmers' needs (World Bank Synthesis report, 2007).

Generally, the implementation of the green revolution, just like any other economic policy, creates conflict of interests at various levels in most developing countries (Griffin, 1979:256-259). In the case of green revolution, the first level of conflict of interest is at international level. At this level, conflict of interest can be present between countries that wish to export agricultural machinery and agro-chemicals and those countries that wish to safe guard domestic employment. Secondly but also most importantly evidence indicates that arising from implementation of green revolution are domestic in origin. This is because of the fundamental division that occurs between those who own property and those who do not. In addition, there tend to be conflict of interest between the agricultural sector as whole and those of the non-agricultural sector / the industrial sector. This is especially true where the rural areas are squeezed in order to extract resources which can be used for investment and consumption elsewhere.

Thus, the argument against the green revolution is that technical change in the rural areas leads to greater specialisation, division of labour and a greater social differentiation. In other words, in the course of the green revolution, the assumption that the rural community is divided into two groups, landlords and peasants, tends to be undermined. In addition, even the peasantry ceases to be a homogenous class; hence, conflict of interest arises not only between the landed elite and the peasantry as a whole but even within the peasantry itself.

Ellis and Biggs (2001:440), summarises that the major problems of the modernization projects were that development was very much localized and the focus was on large farms, irrigated areas and

superior cereals dependent on costly inputs. Development in the “modernisation” period was based on the direct transfer of capital and technology from high-income countries to the third world countries by applying a diffusion model.

Steven and Jabara (1988:130) points out that the diffusion theory, which was a central theme of the green revolution, on its own does not lead to clear agricultural strategies. Diffusion processes can only help farmers significantly if they include effective extension and communication on new and more effective agricultural information; thus although extension is very crucial, but during this period it was the weakest link.

The thinking behind the modernization approach was that farmers in the developing countries would increase yield significantly through adoption of technology from industrialized countries. In general, projects within the green revolution spread technologies which already existed but had not been widely used outside of the industrialised nations. These technologies included pesticides, irrigation projects and synthetic nitrogen fertilisers and high yielding varieties. Citing at least the case of Asia, agricultural production increases could be attributed to irrigation, fertiliser and seed development; thus while agricultural output increased as a result of the green revolution, the energy input into the process also increased at a greater rate such that the ratio of crops produced to the energy input decreased overtime.

Thus, the green revolution techniques are heavily reliant on chemical fertilisers, pesticides, and herbicides some of which must be developed from fossil fuels, making agriculture heavily reliant of petroleum products. In view of this, some authors fear that a future decline in oil and gas production would lead to a decline in food production or even a “Malthusian”² catastrophe (Goodwin, 1978). Therefore, the green revolution raises concerns that it is unsustainable with regard to the fact that

² A Malthusian catastrophe, sometimes known as a Malthusian check, is a return to subsistence-level conditions as a result of agricultural (or, in later formulations, economic) production being eventually outstripped by growth in population (Goodwin, 1978).

humanity is currently in a state of overpopulation with regards to the sustainable carrying capacity of the earth (Borlaugh, 1970:10).

The modernisation theory on which the green revolution is based assumed that while economic growth might enrich a certain class, it would improve the welfare of the poor communities through a trickle down process. Because of this view, the impact of the green revolution indeed varied from record-setting agricultural growth in limited areas, often irrigated lands, to little or no impact in other areas, particularly in drier, un-irrigated regions. In areas where growth occurred, small farms were often by-passed (Stevens, 1977:3-4). This location specificity of the agricultural practices was the greatest constraint of this top-down approach.

The transition from the traditional agriculture in which inputs were generated on-farm, to the green revolution, which required purchase of inputs lead to wide spread establishment of rural credit institutions. Smaller farmers often went into debt, which in many cases resulted in loss of their farmland. Because wealthier farmers had better access to credit and land, the green revolution increased class disparities.

Furthermore, because some regions were able to adopt green revolution more readily than others (for political or geographical reasons) were, inter-regional economic disparities increased as well. Many small farmers were hurt by the continued dropping prices resulting from increased overall production. The new economic difficulties of smallholder farmers and the land less workers led to increased rural-urban migration. The increase in food production led to cheaper food prices for the urban dwellers, and the increase in urban population also increased the potential for industrialisation (Stevens, 1977:21-22). Thus, the focus during this time was much on production and not distribution.

As observed by many authors, the modernisation approach in general corresponds much to the historical experience of economic growth in the West while the green revolution in particular was, at its most basic sense, a product of globalisation. This was evidenced in the creation of International Agricultural Research Centres, which shared information with the transnational funding agencies

from groups like the Rockefeller Foundation, the Ford foundation and United States Agency for International Development. Additionally, the inputs required in the green revolution agriculture created new markets for seed and chemical corporations, many of which are in the United States of America.

Mackee (1992:2) argues that, this paradigm promoted the top-down view of development which used capitalist and state socialist models of development. Interventions based on modernisation models basically conceived the local residents as passive receivers of decisions made outside of their communities. This meant that local people were not involved in preparing and implementing development interventions. White et al (1994) state that by using these top-down approaches, governments decided what was best for agricultural population without giving them any sense of ownership in the systems that were introduced. These approaches absolutely assumed that the knowledge of governments and agencies was correct, and that indigenous populations either did not know or had incorrect beliefs.

Since the modernisation programs were imposed from above the villages, they created a sense of dependency as the communities felt that innovations did not belong to them but to the government. Consequently, they expected the same government to fix things when they went wrong. There was no empowerment of the targeted population, which did not have any choice to reject recommendations or introduce modifications to interventions. This lack of participation was thus regarded as being responsible for failure of different agricultural programmes (Mackee, 1992:5). The modernization projects undermined the importance of local knowledge and the benefits of interaction between local cultures and foreign ideas. All this led to unsustainable development among the rural poor.

2.1.2 The integrated rural development approach

The failure of many of these conventional development projects and programs and growing poverty around the world brought a shift away from the modernisation paradigm of development. Tapson cited in (D'haese and Kirstein, 2003:26) states that even though economic growth had occurred in some places due to the implementation of the modernization projects; but the trickle-down theory which accompanied these projects failed to deliver. Growth was accompanied by a rapid polarization of income levels between the rich and the poor. People began to acknowledge that although inequality is an inevitable outcome of economic growth; however it needs not to be a permanent outcome. Observers criticized this pattern of development for neglecting poverty and unemployment such that attention began to move away from Gross National Product (GNP) per capita as a measure of development, towards more complex indicators which took poverty into account.

In reaction to these inadequacies, the issue of equity assumed an importance it had not previously enjoyed and the principle of redistribution was suggested; technology transfer and economic growth principles began to be seen as part of a top-down prescriptive form of development (D'haese and Kirsten, 2003:26). Consequently, the bottom-up view which was not only concerned with production but also distribution was introduced. Greater emphasis was placed on the opinions of the intended beneficiaries in defining what real development is.

This view of development accepted that the beneficiaries too had a crucial role to play in the process of their own development. However, Ellis and Biggs (2001:440) argue that this paradigm shift came about with two important ideas. Firstly, it had the rural poor as a target group on whom development was to be focused. As a result, there was a change of focus from large/ medium farms to small farms because now small-farm agriculture was considered as the very engine of growth and development. Secondly, it acknowledged that poverty results from a series of causes which necessitate that rural development should involve a large number of inter-related activities. Hence, rural development should be integrated. Rural development and poverty alleviation became synonymous; therefore,

integrated rural development emerged as an extension of the alleviation of poverty and basic needs approaches to the problem. Thus, the Integrated Rural Development approach emerged in the period between the 1970s and 1980s.

According to Ellis and Biggs (2001:440) the international agencies at this time were concerned with 'alleviation of poverty' adopted by World Bank and the 'basic needs' approach to rural development which was adopted by the International Labour Organization. The International Labour Organisation raised the profile of unemployment, under-employment, and the role of the informal sector. Redistribution became an important theme such that many aid programmes began to take poverty more seriously (Chenery et al, 1974:6-7). The concern with poverty led to a better understanding of basic needs and to multi-sectoral programmes designed to operate across a range of productive and non-productive sectors.

The basic needs approach states that at its most fundamental level, development should include satisfying minimum levels of material needs such as consumption of food, shelter and clothing, and the access to such essential public services such as portable water, sanitation, public transport, health and education (Samater, 1984:2-3). The appeal for this concept was so real as it was based on universal human values and equity. Therefore, wherever the basic needs concept was adopted it was most commonly incorporated into a set of actions that collectively became the integrated rural development approach (D'haese and Kirsten, 2003:26).

Most African countries adopted the integrated rural development projects (IRDPs) which were the main vehicles for aid in the rural sector during this period (DFID, 2007). The integrated rural development projects were characteristically donor funded and had a multi-sectoral remit. The main aim of these projects was to improve the incomes and standards of life of the large number of people in an area. Enthusiastically supported by the World Bank, integrated rural development projects typically consisted of synergistic interventions in agriculture, health and transport; however agriculture was the main sector. Agriculture often covered such sections as agricultural extension,

research, marketing, input supply, credit and small-scale irrigation schemes. On the other hand, health and transport mainly looked at provision of water supply infrastructure and rural roads respectively. The intention was to embrace all the main sectors within a given rural sector. In all these programmes, beneficiaries were consulted to make sure that people at the grass root were well accommodated to take part in development. Governments or parastatal institutions and the project management teams involved in implementation were all brought together. The human element was a key factor in the integrated rural development projects.

However, IRDPs were very ambitious in their nature; because they undertook a great variety of activities, they became too expensive as they required increases in the recurrent expenditure of the government to provide necessary services. Firstly, as reported by DFID (2007) in many projects using IRDP, farm output did not increase as expected. It was also observed that the economic rate of return substantially reduced such that objectives presented at appraisal were not achieved.

Secondly, the oil crisis in 1979 together with subsequent recession and fall in commodity prices also dealt a deadly blow to the integrated rural development projects. The financial seriousness which followed was a major cause of the debt crisis but also highlighted the difficulty in funding the recurrent costs of large social programmes like these. Therefore, the major reason for the collapse of the integrated rural development projects was that the recurrent budgets of the government were unable to bear the burden of expenditure required by these projects after the donor agencies turned their backs on them.

Thirdly, despite occasional expressions in favour of participation, the IRDPs were classic bureaucratic undertakings which were conceived centrally often outside the country and they were also implemented from above. The planners already pre-determined rural needs and failed to recognize the central role of institutions and local leadership. The sought of participation that occurred in the IRDPs was manipulated in that the communities were only involved in achieving the

objectives set by the planners. It is clear that even the focus in these projects still placed the rural poor in the role of the recipients in the development process (D'haese and Kirstein, 2003:27).

The IRDPs also encountered management complexity challenges because the variety of activities that came under IRDPs became very great and difficult to manage. The information and knowledge capabilities of the administrators were overwhelmed as they tried to do so much from above. Donor funds flowed into many government departments but without any integration as each one was doing its own things. Thus, coordination among these departments proved to be a complex undertaking for the central planning government systems ((Upholf, 2000; Binswanger, 1986 cited in (D'haese and Kirstein, 2003: 27).

It became even very difficult for the evaluators to demonstrate benefits with large number of activities undertaken. In financial terms, it became impossible to justify the continuation of IRDP investments. Ellis and Biggs (2001) narrates that many pilot projects using the integrated rural development approach only succeeded as a result of the intensive use of the human resource devoted to organization, management and technical assistance. Even though the concept of these projects was good, however, the ways in which they were implemented made it very unlikely that they could succeed. These shortcomings of the integrated approach necessitated a second paradigm shift in the rural development discourse and this is the centre of discussion in the next section.

2.1.3 The liberalisations and small-scale centred farming

The mixed experience with integrated rural development programmes led to the development of a detailed critique of the approach. Among other things, the critique highlighted the failure to involve local people properly in a participatory process and the failure to build capacity as the major shortcomings. In other words, people were identified as the missing element in these development

efforts. Additionally, the extremely centralised, blue print approach to programme design left the implementation agencies unable to respond to the demands of the local people.

Subsequently, development agencies retreated from supporting the integrated development programmes and the national governments failed to continue providing the support to the IRDPs. This left development practitioners to start looking for new opportunities to support rural development and hence the focus shifted to people-centred development. The focus on people initiated a whole set of development approaches collectively known as participatory development. The participatory development approaches led by Chambers (1983) and others, was important in applying participatory ideas to small-scale development in a manner that would allow the poor to be informed participants in development, with external agents acting mainly as facilitators and sources of funds. Further support for this development approach came from the progressively strong critique of development, that is, from the post-development perspective such as Escobar (1995) as well as Rahnema and Bawtree (1997). All these academics argued that top-down perspectives were both disempowering and ineffective. They argued that macro-economic development is not the answer to development but small-scale centred farming. In addition, Ashley and Maxwell (2001:413-414) state that the current rural development debate need not to emphasize just on participation, but governance with particular emphasis on democratic decentralisation. In the same vein, they argue that though participation is a prominent feature in poverty reduction and rural development, but it is better understood as an issue of governance. Therefore, although governance is part of participation, the study favours governance because communities want to manage their own themselves and not to be managed by others.

Participation refers to the involvement by local populations in the creation, content and conduct of a program or policy designed to change their lives (Jennings, 2000:1). As such, participatory development is characterised by a reversal of the top-down approaches to bottom-up. Because it depicts a change from development characterized by external technologies and national level policies

to a participatory development process that empowers rural dweller to take part in their own communities, Ellis and Biggs (2001:443) also refer to participatory approach as the grassroots or process approach. Stark (2005:8) notes that the participatory process has several stages/levels namely, networking, cooperation, coordination and collaboration. Collaboration is the highest and the most difficult level of working with others in a participatory manner and it is more formal than networking, cooperation and coordination.

The participatory approach has two fundamental principles. Firstly, it acknowledges the validity of indigenous technical knowledge and the ability of the poor themselves to contribute to solutions of the problems they confront hence interventions need not to be planned on the basis of exogenous analysis as it may be unrelated to the local situation. Secondly, the participatory approach acknowledges that the participants for rural development and technical change in agriculture are the farmers themselves, and the communities to which they belong. The participatory development approach also acknowledges that the farmers are rational decision makers in the context of their constraints and opportunities with good reasons for doing whatever they do. Their practices reflect the information available to them, the resources they can mobilize, their technical skills, and their physical and institutional environment. It would thus be incorrect to express value judgement on their practices according to some external expertise and other standard criteria (D'haese and Kirstein, 2003:38).

With participatory approach to development, growth was regarded as essential, the private sector was the main engine for development, and government was regarded as the provider of strategic policy and investment support for infrastructure, service delivery and marketing (Ellis and Biggs, 2001:443). With participatory development approach, there was little enthusiasm for large-scale and integrated rural development programmes that characterised the 1970s; instead small-scale credit programmes became the popular following the Grameen Bank model. Grameen Bank is a poor-

focussed grassroots institution involved in disbursing small loans for self-employment purposes to landless women in Bangladesh (Bostein, 1995:40-47).

The United Nations Development Programme's first Human Development report (1990) on poverty and the World Development report (1990) on poverty helped to redefine the development paradigm, putting people's poverty back at the centre of the development agenda. Since the majority of the poor live in rural areas, this view turned the spotlight back onto agriculture and rural development. However, even though the official perspective in rural development was once more focused on production, but government intervention was kept to the minimum due to the change in attitude of the donor agencies about development assistance. Therefore, development oriented NGOs became the only alternative for channelling development aid due to the prevalence of weak states and declining markets in the third world countries.

Makoba (2002:2) summarises this transition by stating that the declining foreign aid to national governments and the failure of large-scale development projects funded by the multilateral agencies and the third world governments, resulted in a shift towards people-centred programs and NGOs participating in the development process. Thus, the donor community's concern with people centred development projects led to considerable rethinking about cost-effectiveness and the impact on the beneficiaries. The donor agencies began to favour new and innovative development strategies including the participatory development approach.

NGOs appear to be well suited to adapt the use of new and innovative strategies because of their small scale, flexibility and wide-ranging capacity to mobilise resources and to organise people to solve their own problems. The new development strategies, which were considered to be "people friendly" needed to engage grassroots energies, resources, talents and required to perceive people as active participants of their own development (Makoba, 2002:4). Participatory development considers rural development as a participatory process that empowers rural dwellers to take control of their own priorities for change, hence major donors started to view NGOs as potential and effective agents

of development assistance especially targeted to benefit the poor, women and children (Ellis and Biggs, 2001:443).

The advent of participatory development in Sub Saharan Africa came with the era of structural adjustment as a dominant paradigm which was associated with large-scale liberalization, reduction in the role of the state, market–determined prices, the removal of quantitative restrictions, promotion of private sector / privatization and decentralization policies. Decentralisation at the very basic level entails the deliberate and parallel government efforts aimed at promoting greater power and autonomy in decision making for local communities which offers genuine opportunities to improve outcomes at that level (D’haese and Kirstein, 2003:36). The previous development approaches failed to involve local people properly by failing to build their local capacity due to the greatly centralized nature in their design, which left the implementation agencies unable to respond to the demands of the communities.

Community participation in the selection, execution, supervision and financing of project investments ensures that investments respond to true perceived needs and generates cost savings and increased accountability at local level. Participation in priority setting and design of projects enhances organisation, either of the local community, group or even the household, facilitates participation and increases cost effectiveness. Investments have greater sustainability when the communities and or households contribute to financing in a cost-sharing arrangement and when there is increased beneficiary participation. Thus, beneficiaries’ own participation in the financing of projects generates a sense of ownership and a willingness to share responsibility for the future operation and maintenance of investments.

Kavinya et al (1994) highlight further that, participation needs to be present in all stages of development projects. Communities should be encouraged to participate in decision-making, implementation, and evaluation of projects. This gives a sense of involvement in their lives and communities, and provides them with a sense of ownership and skills that they can use beyond the

timetable of development projects. Community empowerment is one of the main contributions of participatory theories to development and this is achieved only if community members critically reflect on their experiences and understand the reasons for failure and success of interventions. (Bradford and Gwynne, 1995). Community empowerment leads to effective governance of rural development programmes at local community level which is a push towards rural prosperity (Stark, 2005:1).

Sustainability is also promoted when the communities themselves assume greater responsibilities to influence public investment expenditure at local level. Supervision, both during and after project implementation, is an indispensable determinant of success and sustainability. It has to be reinforced at all levels and involves local entities closest to the communities' particularly municipal councils and NGOs. Experience from a number of developing countries suggests that the programmes of decentralisation accompanied by a parallel effort to promote greater power and autonomy in decision making for the local communities can offer genuine opportunities to improve outcomes. In addition, growing evidence suggests that appropriately empowered and trained rural governments can make an important contribution to rural development.

Importantly to note is the fact that for rural people, the institutional situations they confront are more complex and varied. They comprise of a wide range of central and sub-national government agencies, parastatal organisation, non-governmental institutions among which are the religious, cultural, political, social welfare and economic organisations. All of these groups have their own 'rules of the game' and individual objectives. Therefore, for decentralised system to work effectively cooperation is required at local level between formal governmental institutions and the range of less formal non-governmental organisations and community based organisations (CBOs).

The involvement of NGOs, CBOs as well as the individuals themselves is increasingly being seen as indispensable part of participatory process that fosters consensus building. It is the interface between these formal and informal institutions that the practical implementation of decentralisation works

effectively (D'haese and Kirstein, 2003:37). However, caution needs to be taken in decentralised systems because it has been observed that decentralisation without clear efforts to strengthen rural institutions and enhance participation of rural people carries a high danger of urban-bias and prolonged rural incapacitation in the development process.

To overcome these threats in decentralised systems, Stark (2005:1) notes that the difference between a flourishing and a stagnating (incapacitated) rural community depends on how effective that community is able to govern itself. To begin with, proper community-based collaboration is identified as the first ingredient for effective governance of a rural community in a participatory development process. Community-based collaboration here is defined as a process by which citizens, agencies, organisations and businesses in a rural community make formal and sustained commitments to accomplish a shared vision. The community can be able to collaborate across various sectors present in that community which could include public sector, private sector, and even non-profit groupings. On the other hand, the community could also collaborate across its political boundaries.

An example of collaboration could be villages in a given geographical area engaged in irrigation farming who are faced with a problem of river siltation due to destruction of the environment in the catchment area of that river. These particular farmers from across different villages within that catchment area, both upstream and down stream, could collaborate to engage in catchment conservation measures for that river. However, to successfully implement this catchment conservation initiative, all stakeholders will have to be involved. These include all Water User groups such as the irrigation farmers, fish farmers as well as various forest users among others. This means collaboration will cut across the boundaries of this community but it will also cut across various sectors that are benefiting from this river catchment area.

Secondly, Stark (2005:3) informs that effective community governance in a participatory development process requires sustained citizen engagement. This involves welcoming new voices in

the community which includes the under-represented individuals such as the youth and women. Successful community renewal always springs 'from within' when the people who care about a community join together in vicious determination to revive their civic and economic fortunes. Altafin (1991) notes that the participatory approach accomodates all participants in development (including the poor) as actors with a differing understanding of the processes of change in which they are involved.

In addition to welcoming new voices, sustained citizen engagement also requires visioning a different future for the community by using a bottom-up process (Stark, 2005:12). Thus, successful communities do visioning from the bottom-up; this means acknowledging the fact everyone has a say but no one owns the process. A meaningful visioning process equips ordinary people with sufficient knowledge and tools to reasonably chart a different future. Participation, therefore, generates diversity as local people play a part in interpreting, applying, and sometimes inventing methods themselves (Chambers cited in (D'haese and Kirstern, 2003:6).

However, all visioning needs to turn around the dynamics of strategic planning. Meaning that the community needs to start the process gradually by evolving from the big picture visions, to community goals, to concrete projects. By bringing people together to collaboratively construct a vision for future, ideas become reality faster and with greater consensus. However, there is need to take caution about visioning in order to balance the tough, big picture work with achievable projects. Thus, the participatory approach to development stimulates critical thinking and stresses the process unlike the specific outcomes associated with modernization (Altafin cited in (Development Initiative, 2003:6).

An example of sustained citizen engagement could be a case of the irrigation farmers in a specific location. These farmers could envision prosperity for their area through irrigation farming. Using participatory processes, this community could engage their youths by encouraging them to study various aspects of irrigation such as irrigation agronomy, water management, processing and

marketing. This area will thus be developed by the input of these educated and professional youths who will be ploughing back to the community.

Finally, it can be argued that by using participatory development process a community could leverage its resources to flourish. This is achieved through analysing the community's competitive advantage by focussing on its strengths, strengthening the competencies of its local leaders, engaging the key intermediaries for that community and by investing in their local capital (Stark, 2005:3).

Since each rural community or region is unique, Porter (2004:63) notes that rural economic development must focus on the unique strengths of each area, rather than concentrating on remodelling basic weakness. Thus, even though many rural areas share the same common social problems but no single development strategy suits all of them. Successful development policies or strategies are region-specific, meaning they build on what is unique and a source of value to the residents within the region. This fundamental ingredient of governance can be accomplished without surrendering a community's individual identity.

By early 1990s, every major bilateral development agency emphasised participatory policies. However, the implementation of participatory development approach has not lacked critics. Thus, while vindicating some of the views of participatory theories, the study also recognises the critics of the approach.

Buhler (2001:3) as well as Cleaver (2004:68) argues that despite their declared emphasis on flexibility, improvisation and experimentation, but in practice, participatory approaches to development have been criticised of being too formulaic. Participatory process put strong emphasis on techniques, on the development of toolboxes, manuals, checklists and menus of participatory practice in order to secure real participation. Considerable emphasis is placed on 'getting the techniques right' and on the role of the facilitator. Critics suggest that such an approach, although it provides useful field tools, but it overemphasises the public participatory event. It also tends to be used as a substitute for ongoing procedural understandings of social and economic dynamics. Thus,

in practice, these approaches have the tendency to endorse formal arrangements and methodologies which fail to take sufficient account of the complexities of peoples' real lives.

There is also a common tendency in development practice to assume that clearly defined communities exist, that their living together generates trust (and social capital) and that where apparent differences between community members exist these can be uncovered and overcome through participatory processes. Local knowledge and action is considered as 'a good thing' and communities as (potentially) continually resourceful. Critics suggest that such views misunderstand the complexities of people's networks and affiliations, that they over-romanticise the effects of living together and that they underplay both the deeply inhibiting effects of structural poverty and the enduring inequities reproduced through local power relations (Cleaver, 2004:72). Others raise questions about what actually happens within participation and consensus-building activities. Cooke cited in (Buhler, 2001:2) cautions against the assumption that the outcomes of such activities are essentially legitimate. He suggests that participation can result in making decisions that are more risky such that no one agrees, or that rationalises harm to others, and that can be used cautiously or otherwise to manipulate group members' ideological beliefs.

Cooke and Kothari cited in (Cleaver, 2004:8) argue that rather than empowering people at the grassroots, participation may simply provides alternative methods for incorporating the poor into the projects of large agencies which essentially remain unaccountable to those they are supposed to serve. In other words, they argue that participation is simply another means of pursuing traditional top-down development agendas which gives the impression of implementing a more inclusive project of empowering the poor and yet excludes them.

Another major concern about participatory approaches is that they are usually constrained by time and budget restrictions; therefore token approaches to participation may be substituted for ongoing and open-ended support to local level decision making processes. Critics suggest that development agencies have often viewed participatory approaches as quick fixes to secure local

consultation/representation and have underestimated the time, resources and long-term inputs needed to support real change.

Cleaver (2004:68-76) further argue that participation creates certain ambiguities which can give rise to contradictions. These contradictions partially undermine the coherence of the participatory approach in its treatment of issues like power and the nature of the community. Participatory approaches fail to recognise that communities are not necessarily harmonious and that participation may actually deepen divisions. Servae (1996:23) actually admits that participation does not always entail cooperation or consensus. It can often mean conflict and usually poses a threat to existing structures.

Participatory approaches have also been heavily criticised for overlooking the elite capture of participatory processes (by local leaders, the wealthy or more educated residents), and for neglecting the constraining effects of social structures on poorer, weaker and more marginalised people who feel unable to participate to the same extent. In addition to identifying some of the power blind approaches to participatory practice and events, critics suggest that the impact of participation on inequality, poverty and empowerment is frequently assumed rather than proven.

Social marketers argue that the participatory approaches are too idealistic and they fall short of offering specific practical guidelines and offering recommendations with limited impact. These shortcomings are particularly pronounced when funds for development communication are short and funding agencies are interested in obtaining cost-effective results not just at local but also at national level. These critics feel that individualism rather than community, and conflict rather than consensus lie at the centre of participatory models developed in the West. Thus, they argue that participation promotes division, confusion, and disruption that do little to solve problems. As a result, the approach may also privilege the powerful and active members of the community at the expense of the community as a whole.

Other critics feel that participatory approach does not fit into some political cultures elsewhere. For instance, non-democratic societies might be wary to participate out of fear of retaliation. Moreover, people might be manipulated into participating and this would violate local autonomy thereby creating the possibility that community members might not be interested in taking an active role. Participatory approach in this case does not offer the chance not to participate but implicitly coerce people to adopt certain attitudes.

Most participatory approaches are implemented through project structures and by their nature, projects are clearly delimited enterprises defined by quantifiable costs and benefits, with time limited activities and budgets. Within projects, there is a tendency to emphasise the visible manifestations of community participation (through structures such as local committees, associations and assemblies) and to limit the focus only to those aspects of people's lives of concern to the project. Critics suggest that the project's focus on efficiency of outcomes often leads to the neglect of longer term understandings of social processes, of the local dynamics of decision making and of the reasons for people's 'partial enrolment' in project activities.

Others argue that participation also ignores the expediency of such cases as epidemics and other public health cases which may also positively contribute to development. Going through the grass root decision-making process is slower than centralised decisions and this is not advisable in cases that require prompt solutions. Participation might be along term strategy but has shortcomings when applied to short-term and urgent issues. Thus, community participation is the proper approach for rural governance if rural development is to be attained.

2.2 Sustainable agricultural development

The critics of participation cautions against the danger of romanticizing and essentialising the grassroots approach (Cleaver, 2004:68). Other criticisms of the participatory approach allude to tokenism, myths of communities as coherent and cohesive (Nicolson and Schreiner, 1973) and elite capture of local power as pitfalls that may compromise the effectiveness of the approach (Crook, 2003:77). While acknowledging these short falls, it is yet undeniable that the sense of ownership that participation provides is the key to sustainable development and as such, no other strategy can replace it. In view of this, the study suggests that such pitfalls justify the role of the developmental state hence the need for the two to complement for poverty eradication and indeed agricultural transformation to be realized.

Besides all these critics, the era of participatory development came with another new idea in rural development which was concerned the environment and its sustainability. The World Commission on Environment and Development (1987) acknowledges that the concern about sustainability indeed presents another recent shift in development thinking. Just like the basic needs strategy, the emphasis under sustainability is on improving the livelihoods of the poor. However, this approach argues that the lasting improvements cannot occur in developing countries unless the strategies which are being formulated and implemented are environmentally and socially sustainable. This means that the strategies should be able to maintain and enhance the natural and human resources upon which development depends (Conway and Barbier, 1990:19).

On one hand, this requires national policies, regulations and incentives to induce economic behaviour that yields optimal benefits in both the short and long term from the world's endowment of natural renewable resources. On the other hand, Conway and Barbier (1990) further states that this requires development projects which are both ecologically sound and consistent with indigenous social values and institutions. To achieve this, it is argued that both local knowledge and the full

participation of beneficiaries in the development process are required. This sub-section therefore endeavours to discuss in detail the conceptual aspects of sustainable agricultural development.

2.2.1 Sustainable agriculture

The term sustainable agriculture can be defined from several perspectives; hence, its interpretation is open depending on the angle from which it is being viewed. For instance, agriculturists equate sustainable agriculture with food sufficiency, which in a way represents a desire to consolidate and build upon the achievements of the green revolution. Thus, it embraces any means towards an end. To environmentalists, the means are very crucial such that, sustainable agriculture represents a way of providing sufficient food and fibre that complements and enhances natural resource endowment of forests, soils and wildlife. To an environmentalist therefore, sustainability means responsibility for environment and stewardship of natural resources. On the other hand, sociologists view sustainable agriculture as a reflection of social values, as such; it is defined as a development path that is consonant with traditional cultures and institutions. Finally, economists view sustainability as an aspect of efficiency, not only in the short run but it also encompasses the use of scarce resources in a way that benefits both the present and the future generations. All of these goals are desirable.

While it is relatively straightforward to attain one or two such goals in a project, Conway and Barbier (1990:43) further argue that it becomes practically and progressively difficult as more and more objectives are included in programme and project designs. Thus, there are trade-offs in terms of labour, time, skills and capital, for the project and programme implementers as well as for the farmers themselves. This means choices have to be made such as productivity at the expense of equity or sustainability at the expense of productivity.

In this study, sustainability has been viewed within the context of overall agricultural production; meaning that for its success, agriculture depends on the exploitation of natural and human-made

resources using human skills and labour. The outputs of this exploitation are products in the form of food or fibre and their production. These products together with those of non-agricultural goods and services help to secure both national economies and the livelihoods of individual households. Therefore, sustainability of the resource base needs to be addressed in agriculture production systems. Due to the obvious implications on sustainability, a conventional distinction between non-renewable and renewable resources is required.

Non-renewable resources are those that are basically exhaustible and hence they cannot be indefinitely sustained; these include resources such as fossil fuels which drive farm machines and produce agro-chemicals. Therefore, benefits from current exploitation of non-renewable resources can only be sustained if the profits are invested in such a way as to provide sustainable long-term returns. Such investment may be in industrial technologies, or in human skills, or in technologies for sustainable renewable resource exploitation.

On the other hand, most natural resources on which agricultural production depends are potentially renewable. These include the soil and its nutrients, water which is directly or indirectly derived from rainfall, the diversity of wildlife together with a greater variety of ecological processes including the capacity of the environment to control pests and diseases. Natural resources have been destroyed or exhausted to the limits in some countries through utilising them as sources of profit for investment in other productive activities. This is especially the case in the frontier countries such as Brazil and Indonesia (Conway and Barbier, 1990:29).

In most developed countries, the limits to which these natural resources can be exploited have been superseded through intensive application of capital and technology as well as through importation of new materials and foodstuffs from the rest of the world. On the contrary, developing countries are recognising that they cannot afford technological investment, nor do they have dependent countries which they cannot exploit. At the same time, even in the developed countries it is becoming increasingly clear that many of the technological solutions, such as pesticides and artificial fertilisers,

have high and unexpected costs and more importantly they are themselves in many aspects not sustainable. Therefore, substituting a technological input for a renewable resource does not necessarily improve sustainability. However, a prudent strategy would be able to husband renewable resources in such a way as to provide a long-term sustainable base for production (Conway and Barbier, 1990:29).

Another way of establishing whether a particular agricultural production system is likely to be essentially sustainable is to consider the local community or individual farm by classifying the available resources into those that are internal and external (Francis and King, 1998:67-75). Internal resources are the resources available within the farm or community and immediate environment. They include rainfall, biologically fixed nitrogen nutrients from lower soil strata and biological pest control based on indigenous natural enemies. These are naturally renewable and thus, have the potential to be used on a sustained basis indefinitely through sound methods of farming.

In contrast, external resources have to be obtained from outside the farm or community and they include irrigation water from a distant source, synthetic nitrogen fertiliser and chemical pesticides. Most non-renewable resources used in agricultural production such as fossil fuels and their by-products are external resources. Consequently, the dependence on external resources which are not provided or obtained “free of charge” means that the farming household must generate a surplus of production, cash or something else of value with which to exchange for the resource. In addition, the cost of acquiring the resource and its supply are not directly controlled by the household or even the farming community. Even where there may be no direct monetary cost to obtaining the resource, there may be a real cost incurred by the household such as time.

Dependence on external resources is not only costly but also tends to make production more vulnerable to external stresses and shocks, such as changes in costs and supply of these resources. In the long term, such dependence may also lead to fundamental changes in the farming systems that make it more vulnerable to impulses of local environment. This is one of the reasons for the failure

of the adoption of green revolution packages of hybrid seeds, fertilisers and pesticides in resource poor environment. Such packages are often less suited to these environments compared to the lower yielding, yet better adapted, internal resources used in traditional farming systems.

Resources, such as labour, capital, machinery and management can either be internal or external to the farm. When these resources are primarily internal – for example family owned and operated farm- the households have greater degree of control over decisions concerning allocation of resources and their long-term management. The integrated development systems (cited in Conway and Barbier, 1990:36), states that production is directly related to the degree of control; it tends to be the highest on land which is cultivated by farmers who own the land and lowest on lands tilled by informal tenants on a contractual basis. Landowners who cultivate their own land or participate in the management of the land rented to informal tenants, have greater incentives to manage it sustainably. In contrast, on their own, informal tenants are unlikely to take interest in the long-term productivity of the land they are working on.

2.2.2 Agricultural sustainability as a determinant of agricultural development

Conway (1987:95) defines sustainability as the ability to maintain productivity, whether of a field, farm or nation, in the face of stress or shock. A stress can be increasing salinity, erosion, debt; each is frequent, sometimes continuous, relatively small, predictable force having a large cumulative effect. A shock could be a major event such as a new pest or a rare drought or a sudden massive increase in input prices. In other words, a shock is a force that is relatively large and unpredictable. Following stress or a shock, the productivity of an agricultural system may be unaffected, or may fall and then return to the previous level or trend, or settle to a new lower level, or the system may even collapse altogether.

Sustainability, therefore, determines the persistence or durability of a system's productivity under known or possible conditions. It is a function of the fundamental characteristics of the system, that is, the nature and the strength of the stresses and shocks to which it is subject as well as the human inputs which may be introduced to counter these stresses and shocks. An example could be related to a common input like biophysical subsidy, in form of fertiliser application which is intended to counter the stress of repeated harvesting. In this case, sustainability is maintained only by renewed fertiliser application.

Another common form of input is a control agent such as a pesticide to counter pest or disease attack. In this case, sustainability may necessitate repeated pesticide application, but an alternative strategy may be the introduction of a biological control agent, such as a parasitic wasp, which may permanently alter the basic sustainability characteristics of the system so as to prevent the need for further intervention. This exemplifies the process of building sustainability in a system, thus, substituting internal resources for external resources. Controlling pests by pesticides can be sustainable provided the pesticides are affordable and used selectively. However, the value of introducing a biological control agent is that it exploits a renewable natural resource (parasite or predator), hence it is relatively cheap and basically a sustainable process. Other agricultural technologies that have high potential for sustainability includes intercropping, crop rotation, agro forestry, green manuring, integrated pest management, among others.

2.2.3 Other determinants of agricultural development: productivity, stability and equitability

Besides sustainability there are also other criteria of measuring agricultural development and even development as a whole; these include productivity, stability and equitability. Among these, productivity is the most commonly used measure of agricultural performance. Productivity is defined as the output of valued product per unit resource input (Conway and Barbier, 1990:39). The basic

resource inputs include land, labour and capital. Productivity could be measured as yield or income per hectare, or total production of goods and services per household or nation. However, a large number of different measures are possible depending on the nature of the product and resources being considered. Yield may be in terms of kilograms or any other consumables product. Alternatively, yield may also be converted to value in calories, proteins or vitamin or to its monetary value at the market.

Stability of production either from month to month or from year to year is another measure of agricultural development. Conway and Barbier (1990:42) defines stability as the consistency of productivity in the face of small disturbing forces arising from the normal fluctuations and cycles in the surrounding environment. This environment could be physical, biological, social or economical variables that lie outside the agro-ecosystem under consideration. The fluctuations may be climate or market demand for agricultural products. Stability may be measured by the coefficient of variation in productivity determined from a time series of productivity measurement. Since productivity may be static, rising or falling, therefore stability will reflect these variations in the trend.

The manner in which production is being shared is referred to as equitability. Equitability can be defined as the evenness of distribution of the productivity of the agricultural system among the human beneficiaries. It refers to the distribution of the total production of goods and services, or the net income of the agro-ecosystem under consideration, for instance the field, farm village or nation. The beneficiaries may be the members of a village or national population. Equitability may be measured using the Lorenz curve, gini-coefficient or other related index. However, because available measures of equitability reflect different value judgements, it becomes difficult to define equitability in a positive sense. Therefore, equitability is often the evenness of distribution of productivity among human beneficiaries according to need. In most cases, equitability is affected not only by the distribution of products but also by the distribution of costs. Thus, equitability refers to the

distribution of net benefits. Since productivity involves significant external costs, these have to be included in computation of equitability.

All players in the development process namely policy makers, project designers, implementers including the farmers themselves, need to clearly understand these indicators of agricultural development as normative goals so that trade-offs should similarly be clear and understandable. These indicators occur equally for farmers in their day-to-day decisions and for nations in determining agricultural development strategies and policies. Throughout history trade-offs have been made in policies and strategies, others sacrifice sustainability in their quest for higher productivity while in other situations equitability and sustainability are achieved at the expense of productivity. These trade offs are also recognised in development policies that have been pursued in developing countries over the past four decades. For instance, large-scale irrigation projects can increase productivity at the expense of sustainability and equitability. Similarly too much emphasis on equitability can inhibit productivity; for instance, in the adoption of resource conserving technologies where pest control is done using a biological control agent could be more sustainable but the farmer may have to accept lower and more fluctuating yields.

2.2.4 Productivity, efficiency and sustainability

The complexities involved in trade-offs can be well illustrated by considering the concept of efficiency. The concept of efficiency varies in meaning among different practitioners. For instance, biologists and agronomists may view efficiency as being consistent with the broad definition of productivity, which is output over input, where outputs and inputs are measured in physical or biological units (Spedding et.al cited in (Conway and Barbier, 1990:44). Thus, maximum efficiency / productivity occur either when output alone or the output per unit of input is maximised.

However, economists distinguish between this definition of efficiency, which they refer to as technical efficiency, and the economic efficiency, which is also consistent with the broad definition

of productivity except that the inputs and outputs are defined in monetary terms (Ritson, 1988:97-112). Thus, maximum economic efficiency is equivalent to maximum profit. However, there are varying perceptions on whether economic efficiency is compatible with sustainability with some saying it is and some saying it is not.

World Bank cited in (Conway and Barbier, 1990:44) states that there is no conflict between efficiency and sustainability; this literally means that, any use of renewable resources which leads to exhaustion of those resources is not efficient. Obviously, this is true with reference to technical efficiency where if total output declines, then both efficiency and sustainability falls. However, this is not true with economic efficiency, 'optional extinction of renewable resources suggests that under certain conditions economic efficiency is wholly consistent with renewable resources being exhausted within a limited period of time' (Fisher, 1981:381). Therefore, economic efficiency is only compatible with sustainability under some conditions.

There are always trade-offs between economic efficiency and sustainability. Quite often the rate of recovery or regeneration of natural resources provides a sustainable level of profit which is too low, on the other hand, if the farmer needs to maximise profit each year then he has to accept the damage being done to the resource then take the profits and invest them else where. Pursuing efficiency at the expense of sustainability may be accepted under the following condition; firstly, if the regenerative capacity of the resource is low enough and the future is heavily discounted, then it is economically efficient to exhaust the resource. Thus, higher discounted net returns are obtained through exhausting the resources as quickly as possible and investing the proceeds in other assets whose value will increase much faster. Secondly, if the cost of production is low enough, or the value of each unit of product is higher, then it may also be economically efficient to exhaust the resource quickly. Never the less, even with these conditions, trade-offs are likely to be affected by other considerations, like the need to preserve a minimum stock of the resource for future generations.

However, the economies of developing countries are overwhelmingly dependent on agriculture and hence natural resources, therefore these conditions are unlikely to hold unless the limits have to be tightly set. This is because degradation and depletion of renewable resources impose such high costs on agricultural development such that even economic efficiency in both the short term and the long term is bound to be impaired (World Bank cited in (Conway and Barbier, 1990:44).

2.2.5 Measurements for agricultural sustainability

As already mentioned in this study, the most frequently used measure of agricultural productivity is yield. For instance in crop production, this is generally expressed as grain yield per crop. However, in most cases, this is an inadequate measure of sustainability because it ignores secondary products such as straw, it ignores input use other than land, and it ignores externalities, all of which should be included in a sustainability measurement.

Inputs are relevant to sustainability; however, a system that requires increasing inputs to maintain constant outputs overtime is unsustainable. In view of this, Barnett et al (1995:9) point out that a better measure of productivity rather than yield would be Total Factor Productivity because it recognises use of inputs. Total Factor Productivity is an index of total output relative to an index of total inputs. It recognises use of all inputs including seeds, water labour, traction, pesticides, fertilisers, microorganisms, and others. Thus, Total Factor Productivity reflects the relationship between outputs and managed inputs.

However, Barnett et al (1995) point out that Total Factor Productivity has its own weaknesses as a measure of sustainability. He argues that this measure does not take into account externalities, which are the inputs, and outputs that are external to the production decision-making units. The externalities are economic units external to those who decided on the inputs and who receive the output from a production process. Thus, some inputs are managed, meaning that they are provided by those

decision makers whose behaviour is intended to control the system of interest. In the same way, outputs are taken as desired yields, but when production results in some undesired outputs like ground water pollution or other unrecognised products that move off the land, then externalities are said to be at work. In this way, external outputs of one economic unit may become external input to another, for example, river siltation which can occur because of upstream riverbank cultivation.

In the case cited above, Herdt and Lyman (cited in Barnett et al, 1995:10) regards the total social factor productivity (TSFP) as a more inclusive measurement than the Total factor productivity since it not only accounts for managed inputs but for the externalities as well. Thus, outputs include those obtained on site, such as grain and erosion of fields, and those obtained external to the site such as water pollution, change in pastoral scenery and pesticides residues. To measure sustainability using this approach, it is necessary to measure the flow of inputs and outputs across the boundaries of the system overtime, taking care to include inputs and outputs, and to aggregate each set so as to produce a single measure of input and a single measure of output. To achieve this various inputs must be converted to some common unit of measurement. However, in controlled projects where inputs are constant, yields are closely related to TSFP index, but not on typical farms where inputs are constantly changing.

Another measurement of sustainability is the ecosystem health, this measure is used when a good criterion for resource base quality can be identified and measured. Good measures are those which can reflect whether a system will be productive over a long period. Thus, good indicators of ecosystem health are regarded as good indicators of sustainability. Although there is no universally accepted set of ecosystem health measures, some mostly those reflecting various soil properties are broadly accepted. These include soil organic matter, soil water quality, soil structure, soil microorganisms, soil PH. These may all change because of the inputs applied and the outputs removed. Soil erosion is important, but it can be reflected as an 'output' from the system notwithstanding a negatively valued output.

Alteiri cited in (Barnett et al, 1999:10-11) acknowledges that there are still problems with some indicators of the eco-system health; therefore, this study could not focus much on the use of eco-system health approach as a measure of sustainability. However, a non-decreasing trend in yield in total social factor productivity is necessary enough to call a system sustainable. In addition, the ecosystem health indicators require that they remain at acceptable levels. Thus, if the measurements problems can be solved both ecosystem health and the output/input aspects can be evaluated for any system, if the two approaches are equally valid and consistent, any ecosystem that is 'healthy' should have a non-decreasing trend in the total social factor productivity and vice versa. Lastly, because sustainability is about the future, both measurement approaches require prognostication of what the observations mean for the future productivity. The total social factor ratio implicitly assumes that the past trends are a good indicator of future trends and that good eco-system health trends are a good indication of future performance.

2.2.6 Sustainable agriculture for development

The incorporation of sustainability of agricultural production as a development objective requires clear recognition and understanding of trade-offs involved together with other objectives. For instance, during the green revolution, maximising agricultural yields was the paramount objective, but this was attained without sufficient attention to sustainability and stability of production, or to how the benefits were to be distributed. However, it is evident that it is not very easy to combine high sustainability with high productivity, stability with equity. To achieve this it would require severe trade-offs which also requires clear recognition and analysis.

There is also need to recognise that the problems confronting the sustainability of agricultural systems are linked across hierarchical levels, which are local, national as well as international. Local production systems are tied by markets, agro-ecological zones and regional production areas, which are in turn linked to the national level and to the outside world through international trade. Thus, the

shifts in world prices or in national agricultural policies can exert powerful influences on the livelihoods of farming household. Similarly, changes in global climates, droughts and floods, pests and disease outbreaks, and other large-scale natural calamities have profound impact on local production. In the opposite direction, numerous decisions of the individual household in pursuit of scarce livelihoods, cumulatively affect the agricultural production of nations as a whole. For this reason, interventions at one level will not necessarily have beneficial effects on another. Therefore, agricultural production cannot be based solely on genetic engineering, macro-economic policy or farming systems research. Instead, the uniqueness of each production system in the agricultural hierarchy and the hierarchical linkages between the different levels mean that the problems confronting sustainable agriculture must be tackled in a concerted fashion, at all levels - local, national and international.

Finally, proper analysis of sustainable agricultural development requires a consideration of the trade-offs between sustainability and other development objectives within as well as among different levels of agricultural hierarchy. For instance, macro-economic goals of stimulating increased productivity of an agricultural commodity must not only be weighed against the overall natural objective of sustaining agricultural development, but also against the impact of such policies on sustainability, equity and stability of local production systems. Equally, development of new farming systems to overcome an environmental stress at the local level must take into consideration overall national objectives if they are to be adopted successfully. Hence, the sustainability of agricultural development will depend on the analysis of each level in the linkage between the local, national and international levels, each in its own right and in relation to other levels above and below it.

2.2.7 Priorities and conditions for improving agricultural sustainability in developing countries

The sustainability of agricultural development in the developing countries is crucially dependent on the international relationships and world trade. Declining commodity prices and terms of trade coupled with problems of debt, exchange rate and financial instability are serious constraints to orderly or rapid development. World Bank cited in (Conway and Barbier (1990:59) underlines the fact that growing populations also places fundamental stress in developing nations and this factor compounds the effects of adverse international relationships. As a result, there are increased total food demands which exceed the growth of food output in all developing regions. Thus, as the per capita food production continues to decline, many developing countries also continue to be dependent on food imports, and in some instances external assistance to meet domestic consumption requirements.

The lack of food security in developing countries arises from a lack of purchasing power on the part of the nations and households rather than from inadequate global food supplies. Food security is defined here as the access by all people at all times to enough food for an active healthy life (Leonardo, 1986:38-39). The roots of most solutions to overcoming chronic food security will have to be sought at the national level; these may include policies to ensure sustainable increases in food production in low-income food deficient developing countries among others. However, there are also serious constraints at the international level which are equally crucial and need to be resolved; these include poor purchasing power of developing countries and their lack of financing of food purchases. Thus, individual developing countries have little control over their external environment and they are highly vulnerable to a range of external stresses and shocks. These shocks arise from adverse developments in the world of agricultural markets and trade, and those from adverse developments in the world of economy as a whole (Conway and Barbier, 1990:61).

Even though the constraints at international level appear formidable but as to whether they become binding depends, largely, on the national policies and strategies which the developing countries adopts. If national agricultural strategies and targets fail to take account of the conditions required for sustainability and equitability, especially the need for proper resource management, the long-term prospects for agricultural development may be seriously undermined. Among key issues that need to be considered in appropriate agricultural strategies and targets for developing countries include; exports versus food crop productivity, large versus small-scale farming, the role of marginal versus more favourable agricultural lands, the role of external assistance and the role of the private versus the public sector. Either explicitly or implicitly, all these raise problems of natural resource management or environmental degradation on one hand, and social justice, distribution and participation.

Sustainable agriculture ultimately depends on the individual day-to-day actions of the farmers and their families in pursuit of a variety of strategies aimed at securing their livelihoods. Therefore, it is inevitable that the major proportion of developments funding and effort goes to executing projects whose primary focus is an identified group of farmers in a particular area to help them satisfy their needs in ways that are efficient and sustainable. Although the complexity of farms, households and livelihoods is a daunting prospect for the designers and managers of development projects; however their solutions lies in the use of relatively quick, multi-disciplinary techniques of analysis and appraisals. The most compelling solutions lies in involving farmers and their families themselves in the design, selection and management of innovation intended to improve their lives (Chambers, 1983). This is because; the farmers live with the complexities of their physical and social environment and even with the need to make difficult trade-off decisions on a daily basis. In addition, they have a deeper and more insightful understanding of their own situation.

There is also substantial evidence of the capacity of farmers to respond positively to innovations and new opportunities if they see the benefits in both the short term and the long term. In addition,

farmers are experimenters and innovators in their own right. Literature has quite a number of sophisticated experimentation among farmers. For farmers, experimentation is seen as an end in itself, which might or might not have practical consequences. It is therefore a wonder that development experts often forget that much of the agricultural innovation in the West came from farmers themselves.

Until very recently, farmer participation has been largely confined to on-farm trials. These trials have simply been the reflections of a technology push Farm Systems Research and Extension approach in which farmers are little more than the experimental field assistants, labouring on experiments on their own farms. Never the less, there have been conscious attempts to increase the true level of participation through farmer participation in research.

2.3 Conceptual framework for the study

The major objective of rural development in developing countries is improvement in rural levels of living standards achieved primarily through increased farm incomes, output and productivity. However, for the majority of African people living in agriculture-based economies, subsistence farming on small plots of land is still the way of life (Todaro and Smith, 2009:454). The basic variable input in this type of farming is the farm family. Unfortunately, this relatively low-productivity subsistence farming which characterize most traditional African agriculture is no longer able to meet Africa's subsistence requirements. This has come about due to population density increases hence decline in farm sizes in most countries such as Malawi. In addition to the farm size constraint, the growth of towns, the penetration of the monetary economy, soil erosion, deforestation of the marginal lands, have all made subsistence agricultural practices no longer viable. Since land has become increasingly scarce and land degradation has increased in scope, the need for other non-human productive inputs and technologies has grown especially in the densely populated regions. He

warns that for African countries in general and Sub Saharan Africa in particular, dependence on unimproved seeds sown on unfertilized and rain-fed field is a worsening problem given both the depletion of soils and the unreliable rainfall. The region has suffered the most from its unreliability to expand food production at a sufficient pace to keep up with its rapid population growth. Because of this, African per capita food consumption fell dramatically during the 1980's while dependence on food imports increased.

Considering all these limitations, this study argues that what is needed now is a modernized smallholder agricultural sector which embraces the current innovation and technology through use of hybrid seeds, mechanization, fertiliser, agro forestry, irrigation, and many more. However, this requires that the policy environment created by the state should be able to promote use of these innovative technologies through active participation of the smallholder farmers for attainment of sustainable agricultural development. Participatory processes have the advantage of reversing the "top-down" development to "bottom-up" development which is good for community empowerment and sustenance of development programmes. Likewise, public policies and social institutions should promote active public participation of the smallholder farmers who are better able to make the final trade-offs as to whether to adopt those new technologies or not.

The study asserts that agricultural policies should incorporate small farmer participation in their promotion of modern agriculture at local level. This would help various players (public, private and non-profit) at that level to collaborate in development programmes thereby ensuring sustainability. With a conducive policy environment in place, the communities would be able to envision a different future for their locality as they welcome and integrate new voices in decision-making. Apart from the farmers themselves, other important new voices could be the private sector and NGOs; through whose involvement in promoting to modern agriculture the communities would be helped to leverage their local resources by analyzing their competitive advantage, strengthening their own

competencies, engaging key intermediaries in their locality and investing in their local capital (Stark, 2005:3).

Through participation the smallholder farmers would be empowered to govern their agricultural environment better, leading to participative planning and action. By so doing, it is not the reality of the outside technology transferred and imposed on farmers that matters, but rather their own reality is expressed, shared, and strengthened; this leads to increased agricultural productivity. This final reversal in the development process is more of the reality that counts to the local people than that of outsider professionals and it is therefore an important key to a successful and sustainable agricultural development framework for the smallholder farmers.

2.4 Conclusion

This chapter provided a theoretical underpinning of the rural development approaches which have been used since the 1950s. The narratives in this chapter showed that rural development has continuously changed in its approach depending on the ruling theoretical perspectives at a particular time. The modernisation approach which focussed on large-scale farm interventions and innovative technologies, were the first development economics theories to be promoted from the 1950s to 1960s.

The chapter also looked at the integrated rural development approaches to rural development which came on the scene in the 1970s. These approaches came with the first paradigm shift in the rural development discourse which was a shift from focussing on large-scale state interventions to small-scale farms. Thus during this time, agriculture was regarded as the very engine of rural economic growth.

Later on, the 1980s came with the liberalisations during which second paradigm shift occurred. This was a shift from top-down development approach which intrinsically believed in trickle down effect

of development from the centre to the periphery, to a grass root or process approach which believed in bottom-up approach to development. The new approach regarded rural dwellers as participants in their own development not just recipients. One of the ideas of rural development that came with participatory approach was the concept of the environment and sustainability in the implementation of development work. The study then thoroughly discussed the how central to rural development is the issue of achieving sustainability in agricultural development through sustained high level of productivity. Various policy options with a direct bearing to achieving agricultural sustainability were also highlighted.

In the next chapter, the study goes on to discuss in detail the agricultural development programmes in Malawi with a particular focus on the smallholder sector. Various policy options that have been employed in the past and their impact on smallholder farmers have also been assessed. Special focus has been given to the impacts of the agricultural policies on the household food security situation of the smallholder farmers in particular and the rural population as a whole.

CHAPTER III

AGRICULTURAL DEVELOPMENT IN MALAWI

Malawi's development policies and strategies have heavily been biased towards agricultural production, and achieving national food security has been one of the objectives of agricultural strategies since independence. In Malawi, national food security is mainly defined in terms of access to maize which is the main staple food. Over the past 20-25 years, Malawi shifted from being a self-sufficient producer of maize to being a regular net importer, dependent on foreign assistance to achieve a national food balance (Government of Malawi, 1999:9). In response, the Government embarked on various initiatives to boost maize production and alleviate poverty. These initiatives included the market liberalization (1994) and agricultural production support programs such as the Universal Starter Pack (1998), and the Targeted Input Program (2002), which was replaced by Agricultural Input Supply Programme in 2005. The combination of favourable rain and inputs subsidies raised maize harvest to record levels in 2007. Until this time, the country remained vulnerable to food supply shortfalls linked with poor rainfall and nutrient deficient soils. This chapter, therefore, provides a review of these policies and strategies. In addition, the study also analyses the impacts of these agricultural policies and strategies on agricultural production in general and food security in particular.

3.1 The smallholder agricultural sector development in Malawi

3.1.1 Smallholder farming in Malawi

Approximately 31 percent of the total land area of Malawi is arable land while 31 percent is marginal land and 37 percent is unsuitable for productive agriculture (Government of Malawi, 1999:9). About 70 percent of the arable land is under customary land tenure system and it is mainly cultivated by smallholder farmers using traditional farming systems. This study adopts the definition of

smallholder farmer by Ruthenberg (1980), who considers smallholder farmers as farmers who produce for their subsistence food requirements on their holdings, and whose food supply from the farm to the household is organised according to the needs of the household depending on the phase of family development. Thus, in a farm system, a household forms a distinct labour supply unit with the amount and kind of labour made available varying depending on the family cycle.

The rights to cultivate and transfer on customary land in Malawi, is conferred by traditional chiefs. Due to the rapid increase in population (3 percent per annum), customary land has become more fragmented and landholding sizes per family have declined. Approximately 72 percent of the smallholder farmers cultivate less than 1 hectare of land, with 41 percent of these cultivating less than 0.5 hectares. Worse still, the average landholding size for households within the less than 0.5 hectares category is 0.28 hectares. Only 6 percent of the smallholder farmers cultivate more than 2 hectares (Government of Malawi, 1999).

Due to the land pressure problems, many smallholder farmers' land holdings became too small to support the families that live on them while some rural households were effectively rendered landless. As a result, fallow periods for restoring soil fertility greatly reduced in the smallholder farming systems and hence cultivation expanded to marginal and less productive lands. This has led to severe deforestation, soil erosion and general degradation of the natural resource base.

Land degradation, defined as the ecological degradation of productive land and water systems, affects about 30 percent of Malawi's population (Sahley et al, 2005:51). Poverty and population pressure are major factors that contribute to the acceleration of land degradation process. On the one hand, poverty encourages farmers to mine their soils; on the other hand, high rural population density accelerates clearance of natural forest and increased cultivation of food crops on steep slopes and other marginal lands. This further contributes to a net average loss of top soil such that the mean crop yield losses attributed to land degradation are estimated to range from 4 to 11 percent. The World Bank estimates the annual discounted value of land degradation losses to be over 20 percent of the

agricultural GDP (Sahley et. al, 2005:52). The major problem here is that most smallholder farmers place a much higher value on achieving immediate improvements in food security compared with future gains in resource productivity.

Another consequences associated with the level of poverty is that at current market prices of inputs and outputs, adoption of higher productivity technologies is simply impossible for the poor given their low purchasing power. National Survey data (NSO, 1998) shows that less than 50 per cent of smallholder farmers use hybrid or improved maize seeds and less than 35 per cent of farming households use fertilizers. Thus, the absence of widespread adoption of more productive agricultural technologies has also resulted in land degradation due to continuous cultivation, soil erosion, deforestation and limited technology adoption on land and water management.

The methods of cultivation on these small land holdings among smallholder farmers remain traditional and non-mechanised. Several studies in Malawi have shown a positive relationship between technology adoption (e.g. fertilizer use) and land sizes among smallholder farmers. There have been several government efforts promoting the adoption of fertilizers, hybrid seeds and modern methods of farming and the provision of price incentives through progressive market reforms. However, to some extent, the diminishing land holdings contributed to weak response to the supply of these technologies.

Malawi's agricultural productivity is predominantly labour intensive, meaning that to a large extent agricultural productivity in the country depends on the timely availability of an effective labour force. However many factors affect labour availability in the country. One of the major factors affecting labour availability in the smallholder sector is the diversion of labour force from the smallholder sub-sector to the estate sub-sector. The low capital investments in the country's estates, results in the sector's demand for cheap labour; this has been encouraged by the government controlled wage and price policies which distorts the opportunity cost for labour to support the estate sub sector's demand for cheap labour. These policies also results in low household incomes hence

food insecurity, orchestrated by a high demand of casual labour on the estates during peak period, which happen to coincide with months of food insecurity (November to February). Other factors that affect labour availability include age, health status, gender, wages, technology and competition among enterprises; all these reduce labour availability in the smallholder sector and hence perpetuate the vicious cycle of poverty.

Apart from labour, smallholder farmers also face other bottlenecks related to capital, transport and market infrastructure. In relation to capital, the smallholder farmers are faced with a credit dilemma. This is because most of the credit facilities offered by most financial institutions in the country are inaccessible to smallholder farmers. Even the micro-financial institutions which exist do not provide specialised and low-cost services to agriculture.

Infrastructure and infrastructure services are critical in facilitating agricultural development through reduction in transaction costs. The role of infrastructure has also been asserted in rural livelihood systems. Ellis cited in (Chirwa et al (2006:4) notes that roads have multiple effects of reducing the spatial cost of transaction costs in resources and outputs; facilitate the movement of farmers between places offering different income-earning opportunities; create markets; and serve as an important vehicle for the transfer of information in the absence of telecommunication facilities. Investments in rural infrastructure and rural services are often not under control of rural households, and are typically provided by the government as public goods. Nonetheless, the quantity and quality of social and economic infrastructure and rural services make a big difference to the viability of rural livelihoods.

Empirical studies provide support for the vital role of infrastructural services in agricultural development. Zeller et al cited in (Tchale et al (2009:3) in a study of smallholder agriculture in Malawi, confirmed that the household's transaction costs in accessing the nearest state market outlet for agricultural inputs and outputs has a negative influence on the share of area cropped with hybrid maize. Thus, access to agricultural markets and related improvements in rural infrastructure and

marketing institutions are essential for adoption of new technology and transformation of subsistence-oriented smallholder agriculture. Obare et al (2003:1362) state that inadequate road infrastructure imposes significant burdens on cost-minimising smallholder farmers; and farmers faced with high farm-to-market access costs commit less land, fertiliser and machinery resources to production in Kenya.

Malawi being a land locked country incurs high transport costs in importing major agricultural production and intermediate inputs such as seed, feed, fertiliser and agro-chemicals; these are necessitated by the lack of local industrial capacity for import substitution manufacturing. In addition, the development of infrastructure particularly in rural areas is far from being optimal with most of the rural road network in a poor state. As a result, the poor access roads to points of production and under developed transport system raise the cost of hauling inputs as well as produce to and from the market, thereby reducing farmers' and traders' profits. Thus, Malawian producers and traders are highly taxed on their cargo due to inefficient transport system.

Access to other infrastructural services such as telecommunications, electricity and potable water remain limited in Malawi. The second integrated household survey shows that only 2 percent of rural households have access to electricity, 0.2 percent has access to fixed line telephones and 0.9 percent has access to mobile phones (Government of Malawi, 2005b). Thus, the challenge is to achieve high accessibility rates for infrastructural services among the rural population given the low base.

In addition, markets and market infrastructure are not only inadequate but are also under-developed relative to a large number of smallholder farmers and the variety of commodities in the country. Inadequate market structures, including storage facilities, increase farmers risk to product deterioration and pilferage. Limited market outlets and the lack of competition in the marketing of non-traditional crops such as soybeans, paprika and other spices all stifles farmers' efforts to diversify away from tobacco (the main cash crop). Lack of aggressive marketing strategies and limited information base reduces farmers' competitiveness and premium received on both traditional

and non-traditional commodities. Unfair pricing mechanism characteristic of a thin livestock market, lack of animal health services and facilities, and rampant cattle theft are other major concerns for farmers throughout the country.

3.1.2 Major policy changes in the development of the Malawian agriculture sector

Since the attainment of independence in 1964, there have been several major policy changes in the agricultural sector in Malawi. Most studies show that the performance of the Malawian economy and the agricultural sector was much better in the first fifteen years of independence, a period that was characterized by active state interventions. The early post-independence policy stance involved significant government intervention in the smallholder agricultural sector in production, extension, technology development and marketing of agricultural produce just as was the case during the green revolution period. During this period, agricultural inputs were subsidised by the government as the food security policy was synonymous with national maize food self-sufficiency. This being the case maize was produced in sufficient quantities to meet the national needs.

During this time, maize prices were predictable, centrally and jointly set by the Ministries of Agriculture and Finance through the marketing parastatal, the Agricultural Development Marketing Corporation (ADMARC). This parastatal was created in 1971 but it evolved from the colonial Farmers Marketing Board. In addition to holding a monopoly on inputs such as fertiliser, seeds and farm implements, this parastatal was also the sole trader of maize and a buyer of the last resort to the smallholder farmers. ADMARC would sell back the produce in the event of shortfalls. At its climax, the parastatal operated warehouses which located every 8 to 10 kilometres apart all across the country. It was only after the 1980 crisis that maize prices in Malawi were raised with the aim of stimulating maize production.

During this time, growth across the agricultural sector was highly uneven, with smallholders playing a minor role. By then, government was also driven by the desire to rapidly achieve accelerated growth so as to reduce dependence on foreign recurrent budgetary support. The government was not sure on whether such an agenda would be achieved through smallholder-led agricultural development. Therefore, as was common with all modernisation projects during this time, even the Malawi government policies and strategies were focussed on large-scale agriculture. Thus, the dualistic nature of the agricultural sector was biased in favour of estates at the expense of smallholders. This bias took many forms, one of which was that customary land was annexed from the smallholder sub sector; over a million hectares of customary land was leased as Malawian owned estates. Smallholders were legally prevented from growing important high value crops (burley tobacco, tea and sugar were reserved for the estate sub sector). Even though, the export-driven growth was impressive but there were concerns about the failure of the small holder sector, the majority of whom were reduced to being just producers of food and low value commodities.

The development of the estate sector as a backbone of agricultural strategy in Malawi was in a way a dispensation of political patronage because political leaders and top civil servants were encouraged to purchase estates based on credit from ADMARC or banks with political backing and consent of the local chief or headman. This dispensation of patronage through estate farming further annexed communal land as the privatisation and individualisation of communal trust land was embarked on. In this manner, the growth in estate farming was facilitated by ADMARC's huge profits during this growth period since it dealt with purchase and resale of peasant produce, and the sale of modern agricultural inputs to smallholder farms. The profits came from the forced taxation of the smallholder farmers and later used to finance the development of the estate sector. Thus, not only was land taken away from the smallholder sector to the estate but the smallholder sector was also made to finance the development of the estate sector.

The privatisation of communal land was further reinforced by reinforcement of the “master farmer” or “progressive farmer” approach to agricultural development locally known as the “*Achikumbe*”³ scheme. This strategy assumed that agricultural development would be achieved through the trickle-down effect of agricultural technologies through the “master farmer” approach (hereafter referred to as the “*Achikumbe*” scheme). This scheme provided agricultural information and inputs to a select number of what were considered as enterprising and promising communal farmers who would in the process be given leasehold over the land they occupied. The rationale was that such “demonstrations” farmers would induce spread effects or positive externalities by having their neighbours emulating them. Surprisingly, this system was utterly criticised during the colonial period by nationalists since it was inequitable in that such farmers were actually subsidised through taxation of their poorer neighbours. However, in the post-independence period this approach was rationalised in classic capitalist ideology as complementing the estate farming and as a progressive force among the communal farmers.

Essentially, the “*Achikumbe*” were small-scale farmers engaged in commercial agriculture. Such farming necessarily implied the enlargement of farms and use of hired labour. This approach further strengthened the bimodal structure of agriculture and it also represented a greater differentiation among the smallholders. The majority of the smallholders outside the “*Achikumbe*” remained subsistence farmers who peripherally engaged in cash cropping. Much effort by the government was given to commercial agriculture; for instance, commercial estate agriculture was subsidised through substantial investment in infrastructure to facilitate the distribution and transportation of agricultural produce, inputs research and information. While most sophisticated research information was produced by government for use by estate farmers and “*Achikumbe*”, smallholder peasants were

³ The “*Achikumbe*” farmers can be likened to the “kulak class” or “yeoman class”. These are middle class farmers. The origin of this class dates back to a class of British lesser free landholders in the late 14th to 18th century who were a class below the gentry but with political rights. Fowler, H.W and Fowler, F.G (eds). 1972. *The Concise English Dictionary*. Oxford: Clarendon Press.

relegated to listening to agricultural radio programmes and reading pamphlets or encouraged to emulate the “*Achikumbe*. This differentiation of the smallholder farmers into two classes made the “*Achikumbe*” the dominant force in food production who were capable of increasingly producing the food surpluses purchased by ADMARC. It is this group that had been succeeding since it was given all government attention and resources while the condition of the rest of the peasant masses engaged in smallholder farming on communal lands had been deteriorating.

The bias in favour of estates was further worsened by exploitative marketing of their produce; smallholder producers of export crops were paid less than the export parity price by the state marketing board-ADMARC (Agricultural Development and Marketing Corporation) with most of the resulting profits channelled into the development of the estate sub sector. This was a form of taxation on the smallholder farmers as they were relied upon to provide a marketable surplus of the staple food, maize, to feed estate and urban workers. All this resulted in widespread poverty. Thus, the country was self sufficient in maize, however, at household level there was suffering in the forms of household poverty and food insecurity. This reflected the country’s agricultural strategies which lacked effective food security policy (Quinn cited in (Sahley et al (2005:14).

Thus, although, the economy was experiencing growth, but there was no significant structural change as prescribed in the Lewis model which the country had employed. With the Lewis model of development, there was supposed to be a structural change with time from agricultural dominated to industry/manufacturing. However, by 1979, the country was still predominantly an agricultural economy structurally meaning that the agricultural sector had failed to play the key role assigned to it in the Lewis model. The standard of living of the majority had not improved which meant that the benefits of the growth were unequally distributed and only benefited a few. The benefits of growth of the 1970s were not only unequally distributed but they accrued abroad as well because of the country’s dependence on the international economy. It is the leakages that result from the

dependency relations that crucially nullify the operation of the Lewis model in spite of increasing domestic accumulation by the “saving” and “investing” capitalist class.

Development agencies, particularly the World Bank were concerned with the little attention given to the smallholder farmers and under the rationale of attempting to accomplish equity. As a result, they began experimental schemes through the integrated rural development programmes. By then, the smallholders were exploited both at the point of production and in the realm of circulation. Thus, the IRDPs essentially entailed the coordination of concentrations of the peasant farmers in a manner that allowed them to exploit infrastructure, inputs, information and extension manpower that had been provided through aid funds.

At that time, there were growing concerns of addressing equity issues as well as basic needs of the populace. Consequently, just like many other African Marketing Boards, ADMARC came under fire in the 1970s and 1980s for rent seeking, corrupt practices and for subsidising the industrial sector through cheap urban staples while denying farmers the real price for their produce (Bates cited in (Sahley et al (2005:46). Thus, the proponents of the Structural Adjustment Programmes found similar reasons to reform ADMARC in Malawi. They cited the following reasons; its market infrastructure was inefficient requiring heavy subsidies thereby draining the national treasury and it created disincentives for the private sector’s entry into the maize market (Rubey cited in (Sahley et al (2005:9).

Following the economic crisis experienced in the late 1970s, which resulted from external shocks such as the rising interest rates and fuel prices, droughts, regional political instability and deteriorating terms of trade; the implications of Malawi’s external dependency was exposed in the economic crisis which the country experienced in 1980/81 whereby among other things the country was required to import maize. Other income transfers from the domestic economy to external sources during this crisis occurred in form of increased debt servicing and repayment of loans with a bunching up of maturity dates, increased transportation costs, increased transfers for imported factor

inputs, loss of foreign exchange through migrant remittances, worsening terms of trade from crucial export crops, the devaluation of the Malawi Kwacha (MK) and limited regional export markets for Malawi's manufactured products. All these factors further justify why Malawi's growth took place without any significant development or improvement in equity.

Therefore, although, the World Bank was pleased with the export-driven growth policy and its orientation towards the international market, but it expressed concern about the failure of the smallholder sector growth (Kydd cited in (Sahley et al (2005:13). As a result, the Malawi Government was recommended to start implementing structural adjustment programmes of the World Bank and International Monetary Fund (IMF). The primary objective of these programmes included stabilising the economy, accelerating agricultural growth, diversifying the export base, increasing efficiency of import substituting enterprises and parastatals and improving the mobilisation and management of public resources.

A series of such programmes continued through the 1980s and 1990s supported by successive IMF standby arrangements and World Bank financed structural adjustment loans. The loans were as follows; three Structural Adjustment Loans (SALs) in 1981, four sectoral credit facilities and the Industry and Trade Policy Adjustment Credit (ITPAC) in 1988, the Agricultural Sector Adjustment Credit (ASAC) in 1990, the Entrepreneurship Development and Drought Recovery Programme (EDDRP) in 1992 and the Fiscal Restructuring and Deregulation Programme (FRDP) in 1996. Major elements of all the credit facilities included enhancing the country's competitiveness through successive currency devaluations, market and exchange rate liberalisation, removal of subsidies and trade barriers, rationalisation of the public enterprises and reduction of inflation rate through fiscal and monetary discipline. Successive loan facilities were also mechanisms for balance of payments support and drought mitigation as well as consolidating of on-going adjustment programmes.

Given that Malawi is an agro-based economy, many reforms were focussed on the agricultural sector. The first key reform was price decontrol; this was aimed at the allowing market forces to

drive resource allocation in production. Secondly, the market liberalisation was intended to encourage competition and ensure that smallholder farmers get good input and producer prices so that the country generates the foreign exchange required for imports and inputs.

By 1987, fertiliser subsidies were suspended and government introduced private trading of maize thereby ending ADMARC's monopoly in the marketing of the national staple. All seasonal markets were closed due to low volumes of trade and in the subsequent years, government liberalised produce and input pricing and opened up agricultural marketing to the private sector. The donors continued to make calls for the privatisation of ADMARC, worse still they made efforts to dispossess the parastatal of its social functions among which was the maintenance of a maize price band. The price band was aimed at stabilising maize prices and making maize affordable and accessible to the poorest Malawians by establishing floor prices to protect farmers' income and ceiling prices to protect consumers from price marking. The proponents of ADMARC privatisation argued that the structure was too costly and had very little impact on the poor.

However, the Malawi government still believed that maize price stabilisation would best be achieved by price bands set through the marketing parastatal board. Therefore, against the advice from the International Funding Institutions, the Malawi government resisted implementing the change but rather continued to guarantee a floor price for maize producers and a ceiling price for maize buyers. Subsequently, the two sides reached a compromise to de-compress the price band gradually (Ministry of Agriculture and Food Security, 2008b:3-4).

One adverse effect of restructuring was the unexpected closure of the least profitable markets which happened to be located in the remotest areas, thereby, making them the most costly to operate. Thus, when the marketing scheme had collapsed, the country was in another food crisis as the farmers turned away from maize production leading to soaring of food prices. The hardest hit areas were the remotest villages which were so distant and hardest to reach so much so that the private

entrepreneurs found them very unattractive and unprofitable. Eventually, all these led to increased levels of vulnerability in these areas.

Peters (cited in Deveureux, 2002:17), explains that de-compressing the price band forced the poor to sell their maize soon after harvest when the prices were lowest, and they ended up buying back the maize in the hungry season when the prices were the highest. Thus, liberalisation only benefited the wealthier rural households at the expense of the poorer households who were forced to sell their labour just to survive (Mvula et al cited in (Sahley et al (2005:51). Due to these outcomes, the government openly violated the Banks conditions and intervened in the market, especially maize market through ADMARC and fertiliser subsidies.

The liberalisation of the interest rates also began in 1987 when the lending rates were freed and a year later deposit interest rates were deregulated together with the abolition of preferential interest rates to agricultural sector. By 1990, all interest rates were fully liberalised. A very significant policy reform undertaken was the liberalisation of the exchange rates system in order to promote the country's competitiveness in international trade. By 1994, the markets were fully liberalised and the local currency (Malawi Kwacha, MK) was floated with the aim of enhancing flexibility in achieving this goal. Government also undertook the privatisation of public enterprises through the enactment of the Privatization act passed the same year. Locally produced goods were exempted from surtax in 1992 as a way of offering protection to local producers. The rationalisations of trade that only import duties were used as instruments of protection, while domestic taxes emphasized taxing consumption rather than production.

There were also other specific sectoral investments programmes to implement the changes during this period of the structural development programmes, these covered periods of three to five years. The agricultural strategy and action plans (1995) were thus aimed at accelerating broad-based agricultural and rural development programmes as a major element to reduce poverty and food insecurity among the poor and the vulnerable groups. In particular, the repeal of the Special Crops

Act in 1995 lifted the restriction on the smallholder production of burley tobacco, thereby allowing the smallholder farmers to generate more income (Government of Malawi, 2002:11). Other objectives included expanding and diversifying agricultural and livestock development exports, raising farm incomes as well as promoting growth and sustainable utilisation of natural resources.

One of the sector specific programmes initiated by the government to mitigate the social impacts of the liberalisation on the rural poor was the Agricultural Productivity Investment Programme (APIP). This programme was launched in 1997/98 season and it was providing subsidised credit to procure seeds (hybrid maize and legumes) and fertiliser. The goal was to improve household food security by channelling credit to farmers through Non-Governmental Organisations. This was the biggest input delivery programme under a credit programme and the lack of collateral requirements in this programme, improved accessibility to the resource poor farmers. However, the issue of sustainability was still outstanding because of the subsidy provided to the suppliers.

Another effort of the sector specific programmes was the initiative called the Starter Pack Program instituted in 1998/99 agricultural season and run up to 1999/2000. This programme was targeting at improving the household food security while maintaining soil fertility, ultimately the programme was supposed to improve the welfare of the rural population through adoption of agricultural productivity enhancing technology. Farmers were issued with small size packs of free improved maize seed and legume seed as well as fertiliser depending on their geographical location and farming system. This package was enough to plant 0.1 hectares. The starter pack programme had a universal coverage in the first two years where by almost all maize households (about 2.8 million) benefited. During these years, the country experienced maize surplus production.

However, in the year 2000, the main donors scaled down their support to the Starter Pack programme, citing operational weaknesses, lack of targeting to the poorest households and the negative impact on diversification efforts (Denning et al, 2009:6). Thus under the pressure of donors, the programme was remained to be targeted Input Programme (TIP) and it distributed inputs to 1.5

million households only. In 2001, the coverage was further reduced to one million households only. This modification was targeted at the most vulnerable households with less than 0.5 hectares of land. With this restricted distribution, the country experienced declining production and large deficits in the production of the main staple. Since this programme was not sustainable without foreign financial assistance, it was expended to be phased out gradually.

It is evident that the agricultural sector loans were specifically aimed at redressing the policy bias against smallholder agriculture, but unfortunately, the growth rates in GDP per capita and even the agricultural GDP per capita were generally negative during the 1980s and early 1990s, with some improvements in the late 1990s. The late 1990s actually registered higher growth rates in GDP per capita and agricultural GDP per capita than during the 1970s. However, the smallholder agricultural sector had the worst growth rates, with a decline of 1.8 percent per annum between 2000 and 2005 (Government of Malawi, 2008b:13). The rising cost of factor inputs following the market liberalisation and price deregulation limited the resource –poor farmers’ capacity to access inorganic fertiliser and improved seed. Therefore, efforts were made to encourage the farmers to use alternative soil-improving technologies such as compost manure, farmyard manure, agro-forestry and inter-cropping of cereals with various grain legumes. However, the current capacity to adequately utilise these low cost technologies is still limited.

In 2004/05 agricultural season the country experienced the worst maize grain harvest in the decade, thus, the food insecurity deepened. The total maize production for that year was low with a food deficit amounting to 57 percent of the estimated national maize food requirement (FAO, 2008). The Malawi Vulnerability Assessment Committee (2005) cited in the 2008 MGDS review report stated that over 2.4 million people required food aid and by the end of the year, over 38 percent of the population was in need of food aid (Famine Early Warning Systems Network, 2007). These dire circumstances underscored the urgent need to improve the smallholder maize productivity in Malawi through an African Green revolution. Therefore, in response to all these recurring food deficits, the

government decided to implement a national input subsidy program in 2005/06 agricultural season replacing the Agricultural Input Subsidy Programme.

The subsidy program essentially aimed at affording resource poor smallholder farmers with cheaper farm inputs for growing food crops. Through this program the government allocated coupons to buy sufficient fertiliser to cover 0.4 hectares; this was a four-fold increase in the amount provided under the Starter Pack Programme. Necessitated by funding constraints, the subsidy also included 3 kilogrammes of maize seed which an insufficient amount for 0.4 hectares (10 kilogrammes of maize seed is required on a 0.4 hectares). The subsidy program targeted distribution of fertiliser and high-yielding food crop seeds to over 1.5 million farming families (Government of Malawi, 2009). Using the coupons provided the farmers paid less than one third of the total market value of the input, which translated to an overall of 63 percent subsidy. All the subsidised seed and fertiliser was distributed through government agencies (Dorward, et.al, 2008).

Although the same donors supported the Starter programme but they objected to this policy citing potential costs and absence of a clear exit strategy, lack of explicit targeting of the subsidies as some of the reason for their slow support. However, in face of the adverse donor reactions, government used discretionary budget funds and support from the United Nations to import fertiliser and to procure maize seed for distribution to farmers in 2005. In order to reduce the potential for capture of subsidies by larger farmers, there was an official maximum allocation of two 50 kg bags of fertiliser per household. As a result of this programme, the 2005/06 season produced surplus of 510,000 tonnes above the national maize requirement and more than doubled the 2004/05 drought affected season. Even though the 2005/06 growing season was clearly more favourable for maize production than the drought affected 2004/05 season, but it was broadly comparable to the 2001/02 and 2002/03 seasons when relatively small subsidies were provided. Maize production with the subsidies was higher than in Starter Pack period which suggested a large incremental impact of the subsidy beyond the effect of better rains (Imperial College London et al, 2007).

3.1.3 Impact of the policies

Although the Malawi government implemented several economic reform initiatives since the early 1980s, the country never realised a sustained 6 percent economic growth of the 1960s and 1970s (GOM, 1999:12). The World Bank recommends that an economy has to grow at the rate of percent in order to prevent an increase in the number of people living in poverty. The decline in the economic performance in Malawi translated into deterioration in the people's welfare 85 percent of whom constitutes rural communities. The widening income gap between the individuals coupled with the rising inflation implied a worsening situation in food security.

These outcomes were further worsened by the weak institutional capacity in extension, research and technology development caused by a general malaise in the civil service which compromised implementation of development projects. The poor performance, rapid dwindling of qualified staff coupled with the freezing of hiring new staff in the civil service and the fact that since the late 1990's, the University of Malawi stopped offering diplomas in Agriculture where extension workers were being drawn; together all these factors contributed to the poor performance of the agricultural extension education system as evidenced by the lack of impact of the development programmes. It was not until 2004 when Natural Resources College took up the role. This time gap in training extension workers created a shortage which has not been fully met yet. Resultantly, the number of extension workers was not enough to match the number of smallholder farmers due to increased death toll and limited incentives for them to work in remote areas.

Therefore, the challenges of Malawian smallholder policy since the advent of liberalisation were much fundamental than simply managing with much lower levels of credit and input subsidy, less recurrent funding to government research and extension. Thus, institutional arrangements for the smallholder sector prior to liberalisation had their roots in the late colonial period but the liberalisation made the country to experience a major institution discontinuity.

This clearly shows that what evolved in the course of the 1970s was a structure in which to a substantial extent, ADMARC (while working with IRDPs and benefiting from aid-financed subsidies on credit and fertilizer) overcame market failures, notably in the credit market. At the same time, ADMARC managed to reduce risks for the minority of smallholder households who grew maize for the market as well as for subsistence. Thus, as far as agricultural markets are concerned, the liberalisation of markets and state withdrawal in various markets led to the erosion of complementary services necessary for the promotion of agricultural growth. These complementary services include extension services, provision of agricultural finance and interventions in product and input markets. Prior to reforms the various markets and services were coordinated through the active participation of the state in the agricultural sector. For example, through the state marketing corporation - the Agricultural Development and Marketing Corporation (ADMARC), smallholder farmers had access to agricultural finance (input credit) and easy access to product and input markets. These services were complemented by an extensive network of agricultural extension services.

However, Garforth cited in (Chirwa, 2006:22) notes during the 1990s, there was a progressive reduction in the budget towards extension services resulting in the erosion of technical expertise. Similarly, funding towards agricultural research substantially declined. According to GOM (2005b), only 13.1 percent of households in Malawi had received advice from extension staff in 2004/05, with variations in access according to gender. About 14.7 percent of male-headed households compared to 8.3 percent of female-headed households had access to extension services. In addition, there were district variations in extension services ranging from 1 percent in some district to 45 percent in other districts.

Although farmer organizations emerged in the 1990s, they were not able to coordinate these complementary services and many still face constraints in their outreach and operations (Kachule et al, 2005). The impact of the erosion of extension services is evident in cash crops. For instance, Chirwa et al (2006) states that the collapse of the state extension services contributed to the low

productivity among smallholder tea farmers and remarkable differences have emerged between farmers that deal with commercial estates that offer extension services and farmers that deal with a state processing factory that does not offer extension services.

Product markets and input markets for agricultural growth are not functioning. Many smallholder farmers are not integrated into the market system. Transaction costs remain high due to low economic activities, low traded volumes of agricultural produce, inputs and agricultural finance (Dorward and Kydd, 2004:22). There is variable access to input markets and output markets are less favourable to smallholder farmers. Access to agricultural finance is also limited among smallholder farmers, particularly since the collapse of the smallholder credit scheme within the coordinated structure of ADMARC.

Thus, even though the initial impact of the reforms implemented in the agricultural sector led to a substantial increase in the production of tobacco as well as private sector participation in the marketing of agricultural produce. However, overtime these benefits were offset by input prices increasing faster than producer prices. The lifting of the price controls and elimination of the fertiliser subsidies contributed to increased input costs. During years of bumper crop harvests, farmers lost out because the producer prices would collapse without any remedial government interventions. In addition, the failure to foster competition in both the input and output markets in response to the liberalisation compromised the sector's ability to consolidate and sustain the benefits accruing to the poor.

During this period, high fiscal deficits necessitated excessive government borrowing; this was the major cause of inflation in Malawi. Inflation is a regressive and an arbitrary tax, which places a heavy burden on the poor who have no other means of countering the associated adverse effects such as interest bearing accounts. In particular, high inflation is damaging to disposable incomes as it erodes the purchasing power. Thus, all these high fiscal deficits led to high interest rates such that lending interest rates moved from 17 percent in 1980 to 52 percent by 2001. Due to high inflation the

local currency continued to depreciate such that during the period of the reforms the exchange rate between the Malawi Kwacha and the United States Dollar moved from MK1.05 to a dollar in 1982 to MK80.5 to a dollar by 2001 (Government of Malawi, 2002:15).

All these led to the crowding out of the private sector because the high interest rates acted as disincentives to investment as they increased the cost of borrowing and thereby retarding economic growth. The high interest rates worsened poverty as the poor failed to raise credit resources to maximise agricultural production and other income generating activities. Consequently, commercial banks and microfinance institutions considered lending to the agricultural sector as a risky investment due to the seasonality of the income stream and the unpredictability of the natural environment particularly for rain-fed agriculture that is practiced in Malawi. Thus, most financial institutions are willing to lend to non-farm activities. The recent government actions on produce and input markets indicate the desire to revive the role of ADMARC in the purchase and marketing of smallholder agricultural produce.

The major challenges, therefore, are on how to coordinate the complementary services for the promotion of agricultural growth in a liberalised market in which most markets are still thin and working imperfectly; how to develop the private sector and to ensure that it operates efficiently; how to achieve scale in the product markets for export crops and the role of the state in the market. The other challenge is how to restore agricultural credit given the past repayment problems. In addition, there is a challenge in making choices for public policy in aid-dependent countries such as Malawi; the challenge is to allow the policy swings to be Malawian driven and there after to enhance local ownership of the process.

3.2 Agriculture development and the food security situation in Malawi

Malawi faces the challenge of achieving self-sufficiency in food production and in ensuring that there is an adequate national food balance. In the 1960s and 1970s, with active state support Malawi was mostly food secure. During this time, the state was actively supporting the smallholder production because smallholder farmers were relied upon to achieve national food self-sufficiency. It was the state's agricultural policy to maintain self-sufficiency in food production by making sure that domestic production was stable and predictable. Hence, smallholder farmers had monopoly over food production while the estate/commercial sector had monopoly over cash crop production.

Thus, Malawi had been a self-sustaining country in terms of food availability since the attainment of independence up until the 1980s when things started to deteriorate and the country became unable to meet its food requirements (Chilowa, 1999:559-569). Due to these food deficit challenges, the country started implementing the Structural adjustment. However, just like many other countries in Southern Africa in which the structural reforms had been implemented; liberalisation programmes were not properly implemented. Since these countries did not liberalise enough, it opened a floodgate for neo-patrimonialism which greatly affected the agricultural sector during the liberalisation period (Bird, 2003:11). Patrimonialism is defined as a type of traditional political authority in which the chief uses his position for his own personal gain (Webster, 1974:347). In line with this definition, Bird (2003) refers to neo-patrimonialism as the mediocrity/in-betweenness of a national state between a patronage and democracy or presidentialism and democracy.

Neo-patrimonialism is characterised a partial reform syndrome. Van de Walle and Jayne et al (cited in Bird, 2003:10) identified a certain pattern of structural adjustment reforms during this time, which is referred to as 'tamed structural adjustment'. Under this pattern of structural adjustment reforms, national governments implemented stabilisation policies such as reforming exchange rate distortions; however, deeper structural reforms such as the reducing state interventions in agricultural markets

were resisted despite formal commitments. Hence, agricultural and food security policies continued to involve state interventions in the market even after several decades of economic liberalisations.

In general, the donor support to structural adjustment re-enforced the neo-patrimonialism in the African states including Malawi, thereby affecting the pattern of policy reform, compromising its coherence as well as its effectiveness (Bird, 2003:12). In addition, the adjustment funds tended to take over the developmental functions previously performed by the state. Therefore, neo-patrimonialistic tendencies, as encouraged by the structural reforms contributed to food insecurity, by among other things, diverting the state resources that could be targeted for food security to other areas in which there exists stronger political or personal interests by the ruling elite.

This narration shows that food insecurity problems were exacerbated by the widely changeable food prices due to the liberalisation of agricultural produce marketing and the removal of price controls on maize. Thus, ever since Malawi adopted the structural adjustments in the 1980s, the country has been characterized by severe food insecurity, particularly in drought years.

One other major cause of these food shortages in Malawi was the decreasing farm sizes due to absolute increases in population, which resulted in steady increase in the food demand in the country (Kundell, 2008:5). In addition, droughts such as the one which occurred in 1991/1992, partially of 1996/1997 and 2001/2002 caused low yields and countrywide crop failures. Kundell (2008) further explains that past food production increases in Malawi were achieved through expansion of the cultivated area. However, because of the increasing shortage of land and the small size of the family holding, this was no longer a viable option. In addition, given the relatively low rainfall in some parts of the country, the potential for increased production through higher cropping intensities became severely limited without any form of irrigation.

All these pressures were worsened by the policy environment brought about by the structural reforms which were introduced in the country with the aim of establishing stability in the economy through

stabilizing the balance of payment and regenerating economic growth (Mtawali, 1993:300-307). Thus, the structural adjustment policies mainly revolved around reforming marketing and pricing of outputs and inputs in smallholder agriculture. As a result, these price oriented policies led to disappointing results as they constrained smallholder agriculture and contributed to wide spread food insecurity and malnutrition (Sahn and Arulpragasam cited in (Chirwa (2007:1).

Harrigan cited in (Chirwa et al (2006:20) notes that there two options for addressing the food insecurity problem in Malawi, self-sufficiency in food production or reliance on food imports. The challenge in achieving self-sufficiency in food production hinges on raising the productivity among smallholder farmers. Barahona and Cromwell cited in (Chirwa et al,(2006:20) assert that the intensity of maize cultivation in Malawi is low, and this has negative consequences on food security and livelihoods. Others argue that in order to increase productivity to achieve national food security complementary and other policies are required. These complementary policies include appropriate technology transfers, free inputs, extension services, infrastructure development, credit schemes, market development, subsidized inputs and attractive prices for agricultural output. The second option is to increasingly rely on imports of food commercially or through food aid. However, as Harrigan (2005) notes, commercial food imports require massive foreign exchange earnings which can be achieved by promoting export-oriented cash crops or through export-oriented industrialization. This option need to be supported with efficient product markets and cash incomes to purchase imported food.

The other issue is the question about the change in the food basket in Malawi. Maize is the main staple food and national food security has traditionally been defined in terms of adequacy of maize production. For most Malawians maize is life (Smale, 1995:815) and maize meal forms the typical diet among rural households (Chirwa and Zakeyo, 2003). The policy dilemma is therefore the

balance between promotion of food crops and cash crops and the challenge of diversifying away from maize as the main food.

Since the majority of smallholders in Malawi struggle to meet their subsistence needs on less than one hectare of land, agricultural intensification is essential. However, the increased levels of production through higher cropping intensities can become severely limited without any form of irrigation. High crop intensification requires that farmers get involved in irrigation where by they can produce from those small plots of land at least more than twice a year and this requires adopting sustainable land and water management practices. However, high labour requirements, and uncertainty about investment returns, have created a barrier to the adoption of sustainable land management practices.; yet experience in Malawi has shown that agricultural intensification without appropriate land and water conservation results in is unlikely to be economically or environmentally viable in the longer term. Intensification strategies need to be linked with conservation efforts.

However, previously irrigation was mostly by large-scale farmers and a few smallholder farmers on government or non-governmental organisations schemes. Thus, for a long time only large-scale estate commercial production, namely sugarcane production and supplementary irrigation of tea and coffee grown on estates was well established in the country. Between 1960 and 1990, less than 2 percent of total potential irrigable area was under irrigation (Government of Malawi, 2001). Therefore, promotion of irrigation development among the smallholder farmers is still highly required in Malawi. Agriculture in Malawi is largely based on rain-fed cultivation such that very little irrigation farming takes place. Although, the potential for irrigation farming along the lakeshore and the Shire River basin is high, the country did not fully utilise its water resources for irrigation agriculture. More recently, there has been a drive to promote irrigation by treadle pumps, motorized pumps and river diversion irrigation. These efforts have led to a slightly significant increase in area

under irrigation such that about 30 percent of total potential irrigable area was being irrigated in 2008 (Department of Irrigation, 2009).

However, there are questions about the efficiency of large and small scale irrigation: large scale schemes absorb subsidy for the benefits of small numbers of farmers, on the other hand, treadle pumps are questioned as an appropriate technology for smallholders as the man-power demands to operate such pumps are enormous rendering them unfriendly to female farmers and other disadvantaged groups. Despite all the technicalities surrounding the appropriate form of irrigation for farmers; it clear that irrigation farming could go a long way in promoting sustainable agricultural development and improving food security status of most smallholder households in Malawi.

3.3 Agricultural input subsidies; The green revolution of Malawi

In the past decade, the government has experimented with several productivity enhancing interventions in the agricultural sector targeted at smallholder farmers. As previously noted, the early post-independence policy stance involved significant government intervention in the smallholder sector through heavy subsidization of production, extension, technology development and marketing of agricultural produce. Still, the growth of the agricultural sector was highly uneven with smallholder farmers playing a minor role resulting in widespread poverty (Ministry of Agriculture and Food Security, 2008b:9-10).

With deteriorating macroeconomic conditions, the structural adjustment programs were adopted. Among others, the major conditions of the SAPs were the removal of fertilizer subsidies and price liberalisation in the 1980s and 1990s, these were aimed at encouraging a market-led private sector growth with the government was withdrawing its interventions. During this time, the cost of inputs particularly fertilizers increased sharply in Malawi. By the mid 1980s, there was compelling evidence that despite the fact that the ADMARC retail markets were well stocked with inputs but many Malawian households were too poor to buy the inputs. DFID Malawi (2005) observes that

fertilizer prices in Malawi have been 20 to 50 percent higher than her other landlocked neighbours. Thus, due to the low levels of purchasing power of most Malawians, the performance of the sector did not improve significantly. The market reform did not realise its potential, agriculture still produced inadequate food and the growth in agricultural outputs was low and erratic thereby subjecting many farming families to high risks and vulnerability.

The government of Malawi hence implemented the 'Starter Pack' program that provided free seeds and fertilizers targeting the poorest smallholder farm since 1998/99 season. This programme was experimented at different scales and it generated varying impacts on food security (Levy, 2005). However, the programme was criticised for its small package and high implementation costs. The 'Starter Pack' program also raised issues relating to targeting of beneficiaries (Chinsinga, 2005) and their ability to transfer technology and contribute to sustainable agricultural development (Barahona and Cromwell cited in Chirwa et al, 2006:21).

The low rainfall levels in the 2004/2005 growing season resulted in 60 percent of farm families relying on food aid and subsidized food distribution. According to the Famine Early Warning System Network as reported in EDRP (2007), Malawi's food deficit was estimated at about 390,000 tons of maize in the consumption/marketing season from April 1, 2005 to March 31, 2006. This declining production of the country's main staple food maize, due to bad weather, low input uptake among others, led the country to do massive importation of the maize. The total net informal cross-border imports during this period contributed significantly to Malawi's food security. However, due to uneven food distribution in the country, household food insecurity persisted in many parts of the country.

In response to the acute food shortages following poor harvest in the 2004/05 season, in 2005/06 the Government re-introduced agricultural input subsidies with a view of increasing agricultural productivity and to improve food security both at household and national levels. The government

therefore subsidises seeds and fertilizers to boost maize production and other cash crops such as tobacco.

The experience of government's increased support to the smallholder farmers, through the agricultural input subsidy programme in the 2005/06, 2006/07 and 2007/08 seasons, combined with good weather conditions has demonstrated that the country can avoid chronic national food shortages. Smallholder farmers currently allocate approximately 85 percent of their land to maize production. Since, most of them continue to experience difficulty producing enough grain to meet their consumption requirement, therefore maize productivity growth remains essential for achieving food security (Government of Malawi, 2007:13). On different note, the 2008 the Subsidy programme included support to the cash crops of cotton, tobacco, coffee, and tea in support of the smallholder farmers who could not afford the rapidly increasing high fertiliser prices. Such targeted farmers do use proceeds from such crops to buy basic necessities including food.

The price of maize has remained low and stable with limited seasonal and territorial variations, and has potentially improved the real incomes of the poor who would have struggled to purchase maize at high and variable prices. The availability of maize has also resulted in improvements in the wages that the poor receive from piecework (Imperial College London et al, 2007). The analysis by Benin et al (2007) demonstrates that the strategy of focusing on improving the productivity of maize and pulses is not only for pro-growth but can also lead to significant poverty reduction. However, improvements in maize productivity will require continued support that ensures access to fertilizer and improved seed by low-income smallholder farmers.

3.5 Conclusion

This chapter discussed the dualistic nature of agriculture in Malawi, which was biased in favour of the estate/commercial sector to the disadvantage of the smallholder farmers. The chapter addressed

the issue of how land fragmentation was brought about resulting in the average land holding size among the smallholder farmers to fall to as low as 0.23 hectares per farm household (Kishindo cited in Sahley et al (2005:50).

The major agricultural policies employed in the country reveal that the country has always favoured export-oriented growth by restricting smallholder farmer to produce food crops, low value cash crops and those producing cash crops were paid less than the export parity price by the state marketing board. Through, these policies pursued for the last few decades, the small holder farmers in Malawi were merely producing for their subsistence at times even below subsistence, thereby worsening poverty as well as food insecurity at household level.

However, all this time there was significant government intervention in the smallholder sector through heavy subsidization of production, extension, technology development and marketing of agricultural produce. The poverty and food insecurity situation worsened when these government subsidies were removed when government adopted the structural adjustment reforms programmes of the IMF and World Bank from the 1980s through the 1990s.

The chapter further looked at various measures put in place to address these agricultural sector challenges, these included small packages of inputs from the mid 1990s and lately the Agricultural Input Subsidy Programme. All these were aimed at improving and stabilising agricultural productivity so as to reduce household food insecurity in the country. Outcomes from these policy interventions were also discussed.

The next chapter discusses the methodologies used to conduct this research; instruments and methods used to collect data from the field as well method for data analysis are the theme of discussion. The next chapter also discusses the characteristics of the area of study, sampling the study respondents as well as procedures followed to ensure reliability of the data.

CHAPTER IV

RESEARCH METHODOLOGY

This was an empirical study based on a survey method, which basically involves collection, investigation and reporting of information on agricultural development activities and how their sustainability can be achieved. Crucial in the study were the policies which have direct bearing on sustainable agricultural development. An assessment of the impact of the agricultural development policies and their contribution to sustainability of agricultural development among the smallholder farmers was done by evaluating the production trends. Long-term production trends were obtained by employing a desk research whereby secondary data sources were used to analyse public policies and strategies used in the agricultural sector in Malawi.

However, the study identified a gap in the desk research which was filled through interviewing the farmers themselves. Thus, given the data constraints in secondary sources, a primary data source was used to capture the production trends and impacts of the most current agricultural policies. The Agricultural Input Subsidy Programme became the centre of the analysis considering the fact that it is the most recent tool being used by Government of Malawi in achieving food security. This chapter, therefore, describes the methodologies as well as the instruments and methods used to collect and analyse data for the study.

4.1 Research design: materials and methods

The study employed the use of quantitative research methodologies, which involve collection of numerical and statistical data obtained through a survey research, and usually the presentation of the results of these methods is done using statistics, tables and graphs. Thus, a survey research was employed in this study in order to capture the primary data right at the point where it was generated, that is, at household level.

Survey research also helps to improve accuracy in a research by controlling the amount of error through designing a questionnaire that is directly relevant to the research problem. Quantitative methods are replicable thereby ensuring objectivity, generalizability, reliability and verifiability. In addition, these methods also allows a researcher to summarise vast information, therefore it is very effective when looking at a great number of subjects just like is the case in this study. The study opted for the survey research method because it accords the advantage of capturing numerical data. Numerical data are the hard facts which cannot be disputed as compared with qualitative data, which are subjective. In addition, numerical data also has the advantage of giving the precision of ideas that would otherwise remain vague.

Contributions from the farmers in the research were pursued through conducting a survey research, which was done in the months of September and October 2009. During the survey, individual interviews were conducted by employing the use of a semi-structured questionnaire, which was administered to the sampled households, who were the primary units of analysis for the study (see annex 11). The questionnaire had both structured and unstructured questions. Structured questions had close-ended questions with a definite set of answers from which the farmers had to choose from, these were prepared in advance and the interview could not deviate from the questions. The close-ended questions help in controlling the amount of error thereby ensuring accuracy of the research. On the other hand, some unstructured questions were left open for the respondent to discuss his or her answer without restrictions. The open-ended questions provide the ability to elicit information directly from the perceptions of the respondents as it provokes deep thinking.

As a way of validating the household data, secondary data and other pre-collected data were obtained from Ministry of Agriculture and Food Security as well as other stakeholders in the agriculture sector of Malawi. Secondary data refers to data that are processed by others for other purposes other than the problem at hand, however it can still be used to fine-tune the primary research as it provides detailed knowledge of the research topic and problem. In this study, secondary data was used as a

means of triangulating the primary information from the survey research. The secondary data obtained mainly captured agricultural policies in Malawi both past and present, agricultural development strategies used in the country and trends in the country's food security situation among other things. In addition, the secondary data also captured data from various surveys done in the country, which included integrated household surveys, agricultural market surveys, livestock census and agricultural estimates among others.

The foregoing shows that this research follows a deductive logic rather than an exploratory logic of reasoning. Using a deductive reasoning phenomenon one comes up with a theory about a topic of interest. This theory is narrowed down into more specific hypotheses that can be tested. Furthermore, one collects observations or information to address the hypotheses which ultimately leads to testing of the hypotheses. Using this specific data a confirmation or refusal of the original theory is made.

As mentioned earlier on, the focus of the research was on a farm household. The study adopted the working definition of a household as a social group which resides in the same place, shares the same meal, makes joint or coordinated decisions over resource allocation and income pooling, (Ellis, 1998). This definition seems to accommodate most of the households in Malawi. Household heads were the main respondents for the selected households; however, in the absence of the household head the spouses were interviewed. The study defined a household head as the person who makes economic decisions in the household or a breadwinner. At household level, the survey captured information on demographic data, land-holding system, crop production on both rain fed and irrigated agriculture, livestock production, food security, agricultural extension support, farmer capacity building and knowledge of local institutions roles in community development.

The household data obtained from survey research was subjected to the Statistical Package for Social Sciences (SPSS), which produced descriptive statistics to explain the results. Descriptive statistics refers to information that can be organised, summarised and presented in rather simple and direct ways such as percentages, ratios, proportions, frequencies, charts, tables and graphs. However, since

descriptive statistics are limited to the data at hand such that they do not involve any inferences or generalisations beyond them, the study also employed the use of inferential statistics. These are statistical techniques, which takes into account certain assumptions thereby enabling a research to make inferences or generalisations about a large group based on the data taken from a subset of the group called a sample. Sample statistics are thus used to estimate population parameters.

Further explanations to certain occurrences and outcomes were provided through use of reports on food security programmes in Malawi. The study also used information based on theoretical works and other sources like the country strategic papers, policy documents, donor agencies' country reports on development in Malawi. References were also made to other secondary sources, such as journal articles on development projects in Malawi and books on theories of sustainable development. These assisted in understanding the prevailing local situation in Malawi and how issues on sustainable development have been handled from the past to the present. Therefore, using the primary information obtained from the farming households in comparison with the secondary data obtained from the Ministry of Agriculture and other stakeholders, inferences were made regarding the smallholder farmers in Malawi. Challenges faced by both the farmers and the executing institutions during implementation were also analyzed. These included institutional, economic, social, political, etc.

Using all these research instruments, the study was enabled to determine whether agricultural development programmes implemented by smallholder farmers in the Malawi were sustainable or not. Agricultural sustainability was determined by assessing the ability of the communities to sustain high levels of agricultural productivity over time given the prevailing policy environment in the country. The study also endeavoured to establish the main limiting factors to sustainable agricultural development in Malawi. Thereafter, suggestions and recommendations were made as to what policies and strategies are necessary to ensure sustainable agricultural development in the smallholder farming communities in Malawi.

4.2 Description of the study area

Malawi has the benefit of a variety of ecological zones broadly grouped into: Lower Shire valley; Lakeshore and low-lying rain shadow areas; medium attitude areas; and high attitude Plateaux and hilly areas. Unique features in terms of rainfall, temperature, attitude and agricultural operations characterize each of these zones. Lilongwe district falls within the medium attitude zone, which is also referred to as Kasungu-Lilongwe Plain. The zone also covers most districts in the country. The zone enjoys high average rainfall ranging from 800-1,200 millimetres annually with an attitude of 1,000 to 1,500 metres above sea level (Tchale et al, 2009:14). The Kasungu-Lilongwe Plain is especially noteworthy for its dependence upon maize, in addition part of this agro-ecological zone is considered as Malawi's breadbasket. Since the bio-physical characteristic of this zone are very comparable to most parts of the country, therefore the study used Lilongwe district as an area of study thereby making a fair representation of the conditions faced by most smallholder farmers in the country.

Lilongwe district is located in the central region of Malawi. It is one district in which there is high level of agricultural activities as compared to other districts. The district is historically recognized as the breadbasket of the region. During the 1960s and 1970s, it was also the centre for the great tobacco expansion among smallholder farmers. This was the district where the postcolonial government, in 1969, implemented its most comprehensive Integrated Rural Development Program. It was in this district that they identified and gave special support to most of the so-called progressive farmers during the 1950s and 1970s with the main aim of creating a new class of 'yeoman' farmers (Kalinga cited in (Green, 2009:6).

Soils in the district are generally of good quality while population pressure in the district is a problem that was identified as early as the late 1980s (Spring cited in (Green, 2009:7). The district possesses a relatively good to average terms of ecology such that production levels of maize and

tobacco are relatively high. The district also accommodates a major urban centre in Lilongwe city. However, in as much as it does, it also exhibits factors that augur poorly for future food security and economic advance. Firstly, the area has been prone to drought and other rainfall irregularities. Secondly, increasing population pressure on the land combined with low pay rates or crop earnings and rising prices of inputs for maize and tobacco production mean that one in four households normally produce only half of their grain requirement annually. They also spend much of their tobacco profits on basic food after repaying debts on inputs. Just like in all areas in the country, one third of the population in the district is perpetually in food production deficit and has to rely on local agricultural labour between 2 and 6 months each year.

The country's agricultural extension administration is channeled through a hierarchy of levels of agro-ecological zones whose execution started in the late 1960s when the government implemented one of the first Integrated Development Projects (RDP) in Africa. This move was financed by the World Bank and so the country was administratively re-organised into Ecologic Planning Areas and Agricultural Development Divisions (Cohen, Spring, World Bank cited in (Green, 2009:6). The hierarchy starts with an Agricultural Development Division (ADD) at a regional level, District Agricultural Office (DAO) at a district level and an Extension Planning Area (EPA) at a local level (Tchale et al, 2009:9). The EPAs are further sub-divided into sections that are manned by frontline extension staff that are in direct contact with farmers. All in all the country has eight ADDs, 28 districts and over 150 EPAs.

The choice of the Lilongwe ADD was purposefully done for two main reasons: firstly, the ADD has a good representative of Malawi's diverse farming systems, in terms of production potential and heterogeneity in resource endowments more especially land, with some areas being the more land constrained than others. Secondly, this agro-ecological zone has adequate numbers of smallholder farmers who have been involved in various agricultural improvement programmes, involving both public institutions and non-governmental organizations for the past four decades.

In almost all the Extension Planning Areas in the country, there are various institutions supporting the smallholder farmers. However, for the sake of the study Mpenu EPA was selected because it met the criteria required for the study. It is located on the South Eastern side of Lilongwe district. Within the EPA, there were about 15 irrigation schemes in the mini-scale irrigation category as at the time of the study. Among these groups, 3 were being sponsored by NGO; another 3 were being sponsored by a donor-funded project while the rest (9) were being assisted through normal Government recurrent budget. Out of these 15 smallholder-irrigation groups, 8 were sampled for the study.

4.3 Sampling procedures

Within the quantitative survey design, determining sample size and dealing with non-responsive bias is essential. Holton and Burnett (cited in Bartlett et al, 2001:43) acknowledges that “one of the advantages of quantitative methods is their ability to use smaller groups of people to make inferences about a larger group which would be prohibitively too expensive to study”. Therefore, the study drew a sample of households participating in mini-scale irrigation farming from the population of irrigation farming households in Mpenu Extension Planning Area in Lilongwe district. According to the Monitoring and Evaluation guidelines for the Department of Irrigation (2008), classification of schemes by scale stipulates that a scheme whose net irrigated area is less than 10 hectares fall within the mini-scale irrigation scheme. This study used smallholder farmers who were in the mini-scale irrigation schemes because most of the schemes in Malawi fall within this category; therefore using this category of smallholder irrigation farmers was a good representation of the majority of the smallholder farmers involved in irrigation farming.

In addition, sampling of the irrigation sites deliberately comprised of irrigation sites that were being sponsored by either a donor or normal government funding. It has been observed that there are differences in the level of agricultural activities between areas with donor sponsorship and areas where there is no donor sponsorship. Therefore, incorporating both areas with and without donor

funding in this research, enabled the study to capture a wide range of strategies and approaches used by various institutions in community project implementation but within the same policy environment. The choice of these sites also allowed for comparisons to be made on how the nature of the implementing agency affects sustainability of agricultural programmes. The areas without any donor sponsorship served as a control for the study. Lilongwe district was chosen as an area of study because it is one district which is heavily reliant on agriculture. In addition to this, most of the rural development approaches implemented in the country were piloted in this district. These include the Integrated Rural Development projects. D'haese and Kirstein, (2003:20) reports that the Lilongwe Integrated Rural Development Projects was deemed to be one of the successful IRDPs in the region in which other countries came to learn from.

The study employed a nomothetic model of explanation as opposed to idiographic model of explanation. Idiographic model of explanation aims at explaining observations through the enumeration of many and unique considerations that lie behind a given action. On the other hand, the nomothetic model does not involve an exhaustive enumeration of all considerations that results in a particular action or event. Rather, this model is consciously designed to discover those considerations that are most important in explaining general classes of action or events. In other words, the nomothetic model of explanation involves isolation of those relatively few considerations that will provide a partial explanation of a particular behaviour of many people. The goal of this model of explanation is to provide the greatest amount of explanation with the fewest number of causal variables to uncover general patterns of cause and effect. This model is certainly probabilistic in its approach to causation as it indicates the likelihood that a given action will occur whenever a limited number of specified considerations are present (Babbie, 2007:71).

Therefore, in keeping with the nomothetic model of explanation, the study specifically selected Mpenu Extension Planning Area in Lilongwe district to constitute a sample population. This was the

only area within the district that met all the criteria required in the study. It had all the three categories of institutions involved in providing support to irrigation schemes. These institutions included donor agencies, Non Governmental Organisations as well as Government departments. This set up allowed the study to make comparisons on performance of smallholder farmers in different groups but within the same policy environment.

Due to land pressure in Malawi, almost all farmers who are advantaged to be in an irrigation scheme complement their irrigated farming with rain fed agriculture. Therefore, farmers were purposefully sampled from small-scale irrigation schemes in order capture information on both rain fed agriculture and irrigated agriculture from one household.

The study employed a stratified random sampling method whereby the target population is divided into a number of strata and a sample is drawn from each stratum. This method has the advantage that it allows all population groups to be represented in the final sample thereby reducing the mount of error. The criteria used in determining a stratum in this study was the type of institution supporting the implementation of programmes in a particular irrigation site. In this study three types of supporting institutions were identified, these were the Non Governmental Organisation, the donor funded projects and Government departments.

The following procedure was used to sample the respondents; a list of all Smallholder irrigation groups in Lilongwe district was obtained from Lilongwe District Irrigation Office. Mpenu was selected because it was the only Extension Planning Area in the district which contained all the three categories required for this study; hence, it constituted a sampling framework for the study. In order to increase precision of the data to be obtained, the study isolated from this list only those schemes with net irrigated area of not more than 10 hectares (mini-scale irrigation schemes). Using these criteria, only 15 schemes qualified. This list was further classified into three subsets/strata according to the executing institution namely; NGO sponsored schemes, Donor sponsored and Government

sponsored schemes. Through this classification, 3 schemes qualified from the NGOs stratum, another 3 qualified from the donor-sponsored schemes while 2 out of 9 schemes qualified from the government stratum, making a total of eight schemes (only 2 schemes from the government-sponsored stratum were sampled because the rest were not operational as at the time of the research). A total population of 95 farm households was determined from these sites and these constituted the sampling framework for the study, which enabled computation of the sample size.

A sample size refers to the number of farming households required for the study. In this study, the sample size was determined by using a statistical table devised by Krejcie and Morgan (1970)⁴ which uses a formula. The formula used in this table provides identical sample sizes in all cases where the researcher adjusts the z-value based on population size, which is required when the population size is 120 or less. The population for the farm households in this study is 95; therefore, using this table the recommended sample size is 76 households (see Annex 10). The study acknowledges the fact that no research can claim to be 100% confident free of error; rather any research is bound to have some errors whose sources could be sampling procedures or other personal errors. In any case, these errors need to be indicated, therefore, the formula used in statistical table adopted in this research assumes an alpha of 0.05 and a degree of accuracy of 0.05 (Krejcie and Morgan, 1970:607-610).

⁴ The statistical table by Krejcie and Morgan (1970) determines the recommended sample size of a given population through use of this formula;

$$n = \frac{z^2(1-p)p}{e^2}$$

Where n =estimated sample size; p =expected proportion of a given indicator; e =percentage error in a given confidence interval; z =z value at a given confidence interval. However, quite often this information is not readily available. In the absence of this information, p is assumed to be 0.5. This value gives the maximum sample size for any given e and z . Thus, substituting p for 0.5, e for 0.05 (hence $z=1.96$) into the equation above, estimates the sample size, n .

4.4 Data collection, entry and analysis

The information for the study was collected through both primary and secondary sources. The key participants were smallholder farmers targeting household heads as the main respondents. The primary data was collected from farming households in the sampled area of Lilongwe district. Lilongwe district represents an area with relatively high levels of agricultural activities among farming households and these include some of the poorest households in Malawi (NSO, 2008). The results thus provide a fair snapshot of the general performance of smallholder farmers under different categories of supporting institutions with regard to sustainable agricultural development. The household interviews captured agricultural trends in the past three years depicting cultivated areas, crop and livestock production, food security situations, cropping patterns, extension support, capacity building programmes among others. The long-term agricultural trends for as far back as the 1980s were obtained from secondary data sources especially from the Ministry of Agriculture and Food Security through the agro-economic surveys Department. Apart from production trends, other areas of interest were input subsidies, research, agricultural market and credit as well as agricultural extension service. All these were aimed at finding out whether farmers are able to sustain high levels of production as well as maintaining food security levels.

Seventy-six semi-structured interviews with a cross-section of the smallholder farmers in Mpenu EPA of Lilongwe district in the months of September and October 2009. Semi-structured interviews are interviews in which a researcher uses a set of predetermined questions to guide the interviewing process. This is opposed to an open interview process in which no schedule is used (Kvale, 1996). The interviews took place to collect information from the households based on the semi-structured questionnaire contained in annex 11.

Development of the questionnaire was based on the premise that for the past four or so decades agricultural production in the smallholder sub sector has faced major discontinuities, which in turn

have affected its sustainability. Considering that the determinants of agricultural productivity are multi-focal, the questionnaire purported to identify critical constraints faced by smallholder sub sector. Overall, the effectiveness of government policies and strategies were examined by consulting by consulting government documents and reports covering the period under review.

Respondents included men and women of varying ages ranging from 18 to 65 years. The interview schedule comprised close-ended questions and open-ended questions. It was geared at documenting agricultural production trends in smallholder sub-sector, food security issues and natural resources management, their views regarding management and development issues. The researcher and one other enumerator conducted the interviews. The interviews were conducted in the vernacular language, Chichewa, which was later translated into English. The survey was designed to capture data at the household level; hence, the household became the logical primary unit of measurement and analysis. Responses collected from the households were coded and entered into computer software package of statistical package for social sciences (SPSS). Descriptive analyses for frequencies and cross tabulations were run to produce percentages and averages, which were used to interpret the results. All these findings were used to illustrate research findings and recommendations.

4.5 Ethical procedures

The study ensured that appropriate measures were taken into consideration to protect the human rights and welfare of individuals acting as subjects in the research by observing ethical procedures as recommended by the University of Fort Hare. The respondents at the farm household level were the main source of raw data for the research. Therefore, their individual rights which include the right to full information on nature and purposes of the research and of the risks and benefits, their right to withdraw, the right to assurance of privacy and confidentiality, and the right of cultural groups to accurate and respectful description, and to discreet use of information on them was maintained throughout the study.

The right procedures were followed to access the sampled households. This involved asking permission from the village headmen to conduct interviews in the village and going through the Ministry of Agriculture procedures to get the extension workers responsible for the areas.

4.6 Conclusion

To summarise this chapter, the study employed a quantitative research methodology, whereby a survey research was used to collect primary data from the sampled households in Lilongwe district. A questionnaire was used as a tool for primary data collection while household heads were the main respondents. Other data sources used to collect information for the study were also used and these included Government Departments as well as other stakeholders in the agricultural sector. Secondary information was necessary for ensuring reliability of the information.

Sampling of the farm households was done using the stratified random sampling in which the farmers were categorised depending on what type of institution was sponsoring their farm activities at the irrigation schemes. This method was employed in order to capture a wide range of strategies used by various implementers in agricultural production activities. Lilongwe district was selected as a survey population because it is the breadbasket of the Malawi nation with the highest level of agricultural activities. In addition, its ecological characteristics are representative of most of the districts in the country.

Analysis of primary data for this research was done using statistical Packages for Social Scientists, which produces descriptive statistics with which inferences were made to the entire population. The next chapter will go on to present the results obtained from the analysis of the primary data. Interpretation of the data as well as thorough discussions on the results with reference to secondary data sources has also been provided.

CHAPTER V

PRESENTATION AND DISCUSSION OF THE RESULTS

The focus of this chapter is on the presentation and interpretation of the information as revealed by the analysis process done using SPSS software. The results were described using descriptive statistics, these include percentages and averages. Cross tabulations for certain variables were carried out for purposes of establishing the extent to which they affect each other. Further explanations were also given with reference to secondary data sources.

Central to the discussion of the results in this study is the issue of sustainable agricultural development in Malawi with particular interest to food security issues among smallholder farmers. The commonly accepted description of sustainable development worldwide is that it is the development that meets the needs of the present without compromising the ability of the future generations to meet their own needs (The World Commission on Environment and Development, 1987). In agriculture development, the major concern is future food availability bearing in mind the rate at which the World human population is increasing even with the most optimistic projections of family planning. Thus, sustainable agriculture is mainly concerned with the ability of the agricultural systems to remain productive in the long run.

According to Lynam and Herdt (cited in Barnett et al, 1995:5), agriculture sustainability is a result of the relationship between technologies, inputs, and management used on a particular resource base within a given socio-economic context. To put in other words, sustainability is concerned with production of agriculture over time. They further argue that sustainability has to be defined with respect to systems rather than inputs or crops because crop varieties and inputs produce nothing in isolation. Only when they are combined as components of a system do they produce output. The

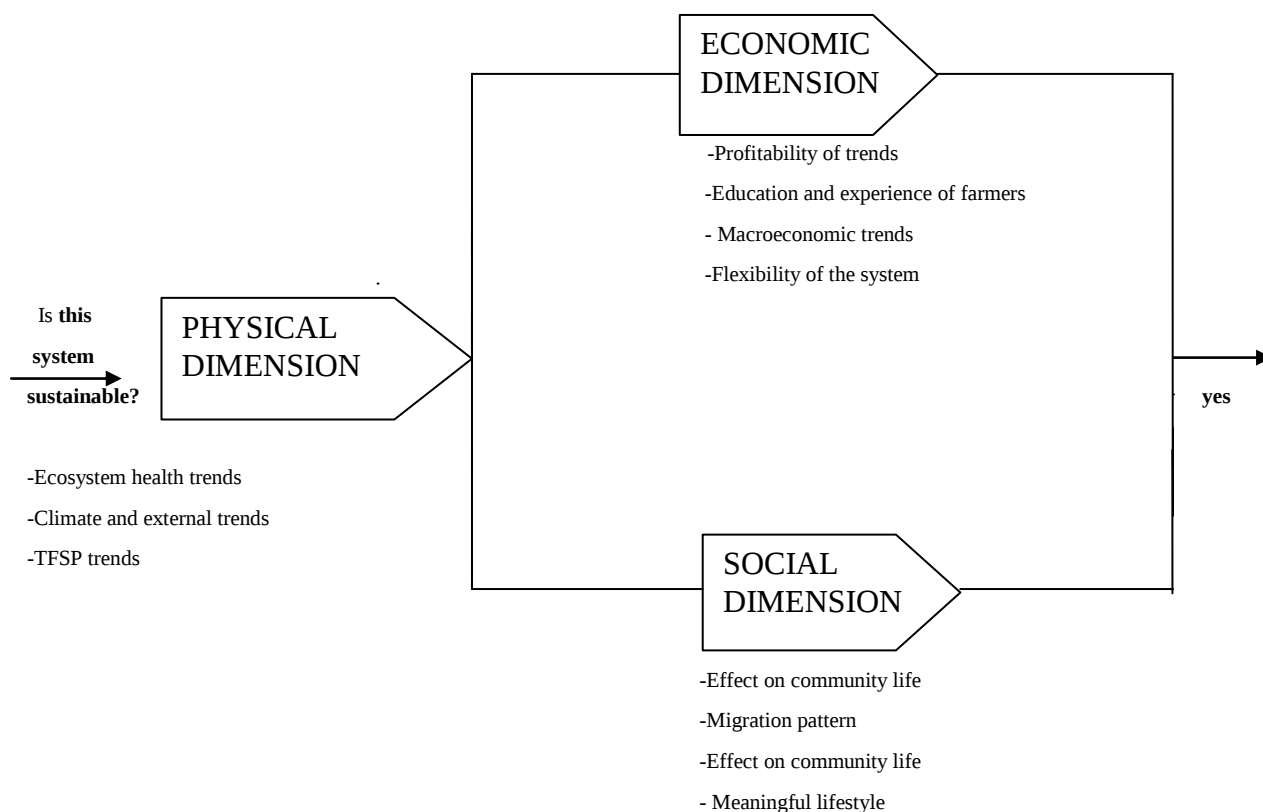
question, therefore, is whether or not the system of production in Malawi's smallholder sector is sustainable.

Having this background in mind, the study attempted to analyse sustainability of agriculture in Malawi by looking at it as a system. System may be considered across an infinite range of space such as global, regional, farm field, individual plants and microscopic (Barnett et al, 1995:5). In this study, smallholder agriculture development at household level has been looked at as a particular system of interest. The study recognises that crop and animal production is not only affected by weather with its variation in rainfall, solar radiation and temperature; but it is also affected by the biotic environment in which insects, diseases, microbes and fungi affect the system. In addition, the system is also affected by the soil with its physical, chemical and biological characteristics.

It is expedient that the sustainability notion be thought of in the context of a defined time period. However, the consideration of time dimension is further complicated by the dynamic nature of reality. Empirical evidence illustrates that in the real world agricultural production systems are constantly changing such that systems in use by farmers today are different from those used 25 years ago. Never the less, in most cases the important trends affecting the sustainability of a system usually become apparent in the first 20 to 40 years. This is why the present is concerned with the sustainability of the agricultural systems that have been in used in the Malawian smallholder sector for the past three decades.

Over and above the difficulty of defining systems boundaries and specifying the time period, measuring sustainability is further complicated by the dimensions in which people think about human condition. Agriculture is an economic activity serving a social purpose unlike plant growth, which is just a physical process. Therefore, in agricultural development the three dimension forces of biological, economic and social need to be analysed in very different and yet interrelated ways, refer to figure 1. This study attempted to embrace these aspects.

Figure 1: The dimensions of sustainable development



Source: Barnett, et al (eds). 1995. Agricultural sustainability: economic, environmental and statistical considerations. Chichester: John Wiley and Sons Ltd.

The biological or the physical dimensions are reflected in the quantity of output, which depends on the physical quantity of inputs and the biological growth processes. As an illustration, the degradation of the resource base can result in falling quantity of output overtime through erosion, water logging, destruction of soil structure and many similar physical or biological phenomena. Similarly, climate change or introduction of new plant diseases and pests can also affect quantity of output. On the other hand, the level of the output which is quantity multiplied by time, can reflect the economic dimension of a system. Even in a situation whereby the quantity of a system's output is

constant overtime, the economic system can result in the system's failure due to falling commodity prices, increased input costs or other economic changes.

The capacity of the system to adequately support farming communities exhibits the social dimension of agricultural sustainability because agricultural systems depend on human communities and institutions. In the event that these communities are deteriorating then agricultural production may also fall. Poor agricultural policy, insecure land tenure, war, social disruptions and changing labour conditions are some of the many social factors that can lead to non-sustainable agricultural systems. The biological /physical sustainability of an agricultural system affects the capacity to sustainably support a social system. Since, all the three factors are interrelated, therefore, while economic performance has important effects on the farmer's decisions, biological performance is the base which is modified by costs and prices to give economic performance, on the other hand, social performance is dependent on both physical and economic performance. On biological dimension, one may confine observations by focussing on performance of individual fields, villages, regions or national agricultural systems. Since regional and national performance is because of the many farmers' activities, therefore if one understands what is happening at individual farm fields, then one has a basis for understanding what is happening at aggregate level.

Based on this understanding, the study looked at the sustainability of agricultural systems in Malawi on farm fields for the past 3 years to 20 years with agronomic or biological sustainability as well as economic sustainability. All the three aspects of sustainability have been thoroughly discussed in the subsequent sections of this chapter.

5.1 Presentation of findings

5.1.1 Socio-economic characteristics of the study community

This section captures the social dimension of agriculture sustainability among the study population. In order to make certain inferences as to why some issues observed were the way they were, it was expedient for the study to capture social-economic status of the respondents. The socio-economic characteristics captured include age of the household heads, literacy or education status of the household head, household composition of the farm families, type of dwelling units as well as land tenure information. These factors contribute to the performance of the farmer in one way or the other, for instance, in understanding agricultural extension messages, adoption of technologies, accessing agricultural credit, and in many other ways.

5.1.1.1 Age and sex distribution

The respondents of this study consisted of 76 households all of which were smallholder farmers from Mpeni in Lilongwe district where the study was carried out. Out of the 76 respondents, 56.6 percent were male while 43.4 percent were women, refer to Annex 1. As outlined earlier in chapter 4.1, wherever the household head was not available, spouses were interviewed. In this case, 35.5 percent of the respondents interviewed were spouses of the household head while 64.5 percent of the respondents were house heads. This reveals that although the study had 43.4 percent as women respondents, most of these women were just spouses in the male-headed households. Only 2.6 percent of the households were female headed due to widowhood, divorce or singlehood. On the other hand, 97.4 percent were male-headed households. This signifies male dominance in decision making in most households in the area.

In terms of age of the household heads, the highest number of male household heads (42.11 percent), was falling in the age category of between 18 to 35 years (refer to annex 2). Household heads in the

category of 51 to 65 years, only made up 14.5 percent of the household heads while only 3 percent of the male heads were found to be in the age group of more than 65 years. These results depict the fact that there is a relatively larger population in the younger age groups. These results indicate that most young people are engaged in the agricultural sector as smallholder farmers.

5.1.1.2 Household composition

In terms of household composition, the analysis revealed that 60.5 percent of the households were composed of an average of 3 to 5 members. In addition, the highest percentage of 31.6 percent of the households of these households were in the category of households whose heads were aged between 18 to 35 years (refer to annex 3). Only 6 percent and 5 percent of the households were made up of less than three members and over eight members respectively. These results are consistent with the findings of the Second Integrated Household Survey (IHS2), which reported that rural populations had a mean household size of 4.5 persons per household.

These results show that the population structure in the study area was congruent with the wider population structure of the country which is wider at the younger age groups than at the older age groups (Government of Malawi, 2005b:12). In terms of agricultural development, it shows that these people are energetic enough hence they form a very productive labour force in the agricultural sector which if utilized efficiently could contribute positively to development.

5.1.1.3 Education and literacy levels

Education is internationally accepted as one of the major determinant of living standards and it is an essential factor in planning and evaluating policies. Low education levels, accompanied by illiteracy are some of the major characteristics of developing countries such as Malawi. In this study literacy is defined as the ability to read and write whether in the vernacular language only or even in English. The survey collected information on education and literacy levels of the household members. This

section therefore presents information on literacy and education attainment of the study population with particular interest on the literacy level of the household head as the decision maker.

Even though, the population of Malawi is young as noted earlier on, illiteracy is still an issue of major concern in the country. The study revealed that 27.6 percent of the household heads in the study area could neither read nor write (refer to annex 4). For Malawi as a whole, the Second Integrated Household Survey (Government of Malawi, 2005b:19) reports that 60 percent of the population could not read or write; however, for Lilongwe rural which is the study area in this research, it states that 26.3 percent never attended school. This figure is in line with the findings of this research which also shows that 26 percent never attended any formal education. Never the less, out of this figure 1.32 percent were able to either read or write respectively. This could be attributed to the presence of adult literacy classes prevalent in the rural areas. Malawi Government (2000b:19), reports that the country is among the countries with low literacy levels in Africa. In fact, the review of the Malawi Growth and Development Strategy (Ministry of Economic Planning and Development, 2008) states that Malawi is still below the Millennium Development Goals (MDG) target and may not reach the MDG target of education for all by 2015.

These low literacy levels have a bearing on the national development and sustainable agricultural development in particular as they affect the understanding capacity of the farmers, eventually limiting the adoption of new agricultural technologies. This is a big challenge even to the extension service as it affects effectiveness of the agricultural extension service. Effective agricultural productivity goes beyond increased farm produce, farmers must operate like entrepreneurs, and this requires education of some kind to make reasonable decisions.

5.1.1.4 Housing infrastructure

One other useful information reflecting on the household's socio-economic characteristics pertains to the housing characteristics of the study community. Housing is one of the basic needs and hence it reveals the poverty levels of the community. The housing characteristics on which information was gathered include the type of dwelling occupied by the household with particular regard to type of building materials for roof, wall and floor. According to the National Statistics Office (Government of Malawi, 2005b:80), a housing /dwelling unit is defined as all living space occupied by one household regardless of physical arrangement of facilities available. This could be one room or more occupied by the household members or it may be one, two or more dwelling units occupied by the extended family. However, for the purpose of this study only the main structure of the dwelling unit was taken into consideration.

Housing units can be classified in several ways. A housing unit is classified as "traditional" if it is generally made from traditional materials such as grass, mud or poles. On the other hand, a house is classified as "permanent" if it is built using modern or durable facilities. A semi-permanent house is the one that has been built using modern and partial lasting materials (Government of Malawi, 2005b:80).

The analysis of the results in Annex 5 shows that traditional houses were the main type of dwelling units for the rural people in Malawi. In terms of roofing, 86.8 percent of the households had grass-thatched roofs while only 13.2 percent had iron sheets roofed houses. As regards the type of floor, only 5 percent of the households had their main dwelling cemented floor while 95 percent had their main dwelling with mud floor. Lastly, as concerns the type of the walls for the houses, 55.3 percent of the walls for the main dwellings of the households were made of mud while 23 percent had baked bricks for the wall of their main dwelling. This shows that traditional houses still dominate. The National Statistics Office in (Government of Malawi 2005b:82) reports that rural areas of Malawi have 72 percent of traditional houses with only 28 percent of them being either permanent or semi-

permanent houses. The significance of this information as well as that on land holding systems to agricultural development is that the smallholder farmers in Malawi do not have reliable assets which they can use as collateral for loans such as agricultural credit.

5.1.1.5 Land Tenure

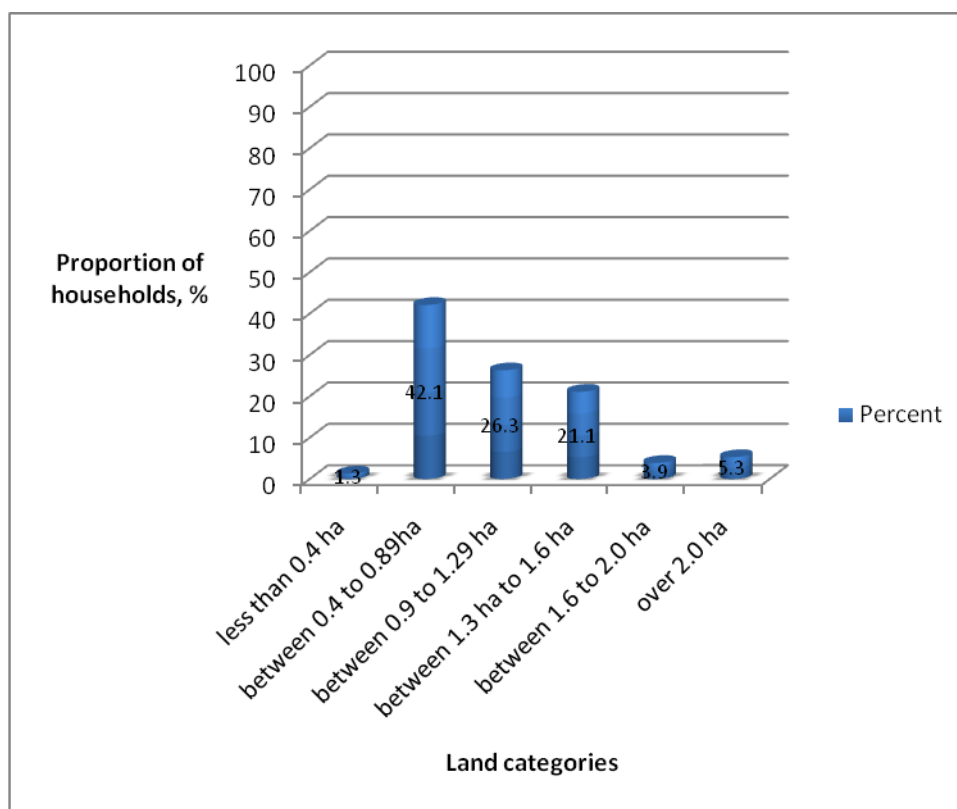
As mentioned above, land ownership is one of the factors, which impacts on sustainable agricultural development. In that regard, even the Malawi Growth and development Strategy recognizes the importance of land as a basic factor of production as well as the sole source of livelihood for the majority of Malawians. However, smallholder farmland has been shrinking due to increased population and fragmentation of land among family members. Hence, inadequate access to land by majority of Malawians has been identified as one of the critical factors contributing to poverty in the country. Therefore, the country's goal in the long term is to ensure tenure security and equitable access to land for the attainment of broad-based social and economic development.

In view of these facts, the study gathered some information in order to ascertain whether land issues affect agricultural development's sustainability. In terms of land holding characteristics, the results indicate that all the respondents owned some land of different magnitudes in the upland. About 97% of these upland farms are owned by the households who acquired the land through inheritance and for the 2.6% who were renting did so in order to increase cultivated area in addition to whatever land they already have. This confirms what was already reviewed in chapter 3.2.1 about the land tenure system of Malawi; it was narrated then that most Malawians cultivate or produce for their subsistence food requirements on their own holdings.

In terms of land utilisation, the study revealed that the largest proportion of 42.1 percent households in the area cultivates on land of between 0.4 hectares to 0.89 hectares during the rainy season. These findings concur with figures reported by Government of Malawi (1999:9, 16) which indicated that

the rapid increase of population in Malawi has resulted in customary land to become more fragmented and hence landholding sizes per family have also declined. Consequently, approximately 72 percent of the smallholder farmers cultivate less than 1.0 hectare of land, with 41 percent of these cultivating less than 0.5 hectares. Only 6% of the smallholder farmers cultivate more than 2 hectares (Government of Malawi, 1999:4). Consequently, even though most farmers knew the benefits of leaving some land fallow, only 11.8 percent indicated that they leave some land fallow while 88.2 percent said that they could not afford to leave any land fallow. Figure 2 below shows how land is utilised among the study population.

Figure 2: Land ownership and Utilisation



Source: Field survey, 2009

The study also endeavoured to find out on issues concerning wetland ownership for irrigation, wetlands are locally referred to as ‘*dambo*’ land. Only 2.6 percent of the respondents indicated that they own land in the *dambo* for irrigation while 97.4 percent indicated that they do not have land in the irrigable areas. Thus, for land cultivated during winter season, 97.4 percent of it was rented from landowners; only 2.6 percent of the land was reported to have been inherited from parents.

This scenario comes about because most of the interventions on irrigation are supported by external institutions. Usually this support is not given to an individual farmer but rather the farmers are required to form groups so that they operate like an irrigation scheme. As such, usually the farmers acquire a single piece of land by rent for a season. This land is then developed with the support of the sponsors such as NGO, Donor agencies or Government departments. The farmers in these groups then divide the developed land amongst themselves into small equal plots; the recommendation is that each farmer should have not less than 0.1 hectares to achieve the minimum economic benefits from irrigated agriculture. Therefore, since most of the irrigable land is not developed, most of the farmers in the Malawian irrigation schemes usually utilise land of between 0.1 and 0.2 hectares. This explains the reason why none of the respondents had an irrigated farm of more than 0.4 hectares.

5.1.2 Agricultural Productivity and the policy environment

This section analyses the biological/physical dimensions of agricultural sustainability by mainly looking at crop productivity as well as livestock production. The study collected information on agricultural production on various practices and their trends for the last three years. This was done in order to assess any significant changes in the communities with regard to the current agricultural policies as well as the approaches being employed to reach the farmers with the development initiatives. The main practices considered under agricultural production were crop production, livestock production as well as natural resources conservation practices.

As defined earlier, productivity refers to the output of valued product per unit resource input. The basic resource inputs include land, labour and capital. Productivity can be measured as yield, which is total production per unit area or income per unit area, or total production of goods and services per household or nation. In the past, increased production in Malawi was attained through expanding area cultivated (extensification) but due to decreases in hectarage intensification through irrigation is necessary. Therefore, the study captured information for both rain fed as well as irrigation to. The major crops grown under rain fed agriculture in the area include maize, tobacco, groundnuts.

5.1.2.1 Crop husbandry practices and other factors affecting crop productivity

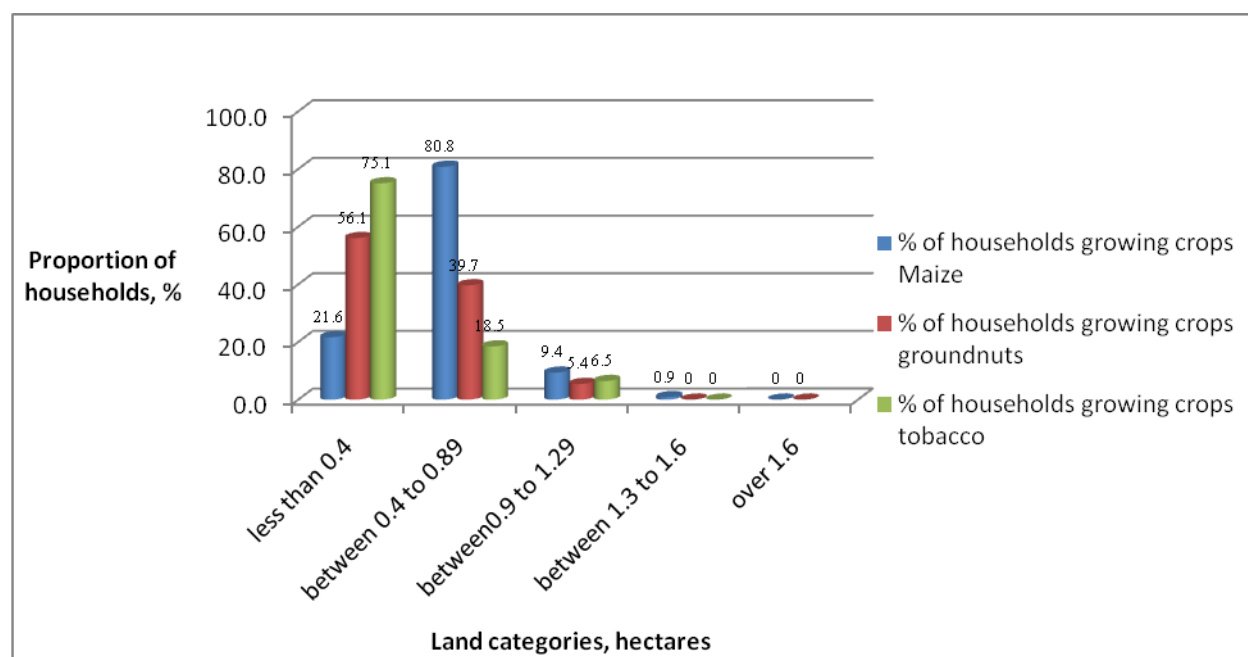
In terms of area coverage, maize occupied most of the land in all the three years under review. As already reviewed, the sizes of most farms were in the range of 0.4 to 0.89 hectares. Coincidentally, on average 80 percent of the household allocated the same amount of land to maize production in all the three years under review. However, maize being a staple food for most Malawians, it was quite understandable that farmers decided to allocate more land to the crop. Therefore, the study looked mainly looked at maize productivity due to its prominent contribution to food security. Moreover, the respondents could easily quantify maize production than any other crop (refer to figure 3).

In groundnut production, an average proportion of 56 percent of the households allocated less than 0.4 hectares of their land to growing this crop. In addition, about 40 percent of the households allocated land between 0.4 to 0.89 hectares to groundnuts production. This shows the significance of the crop in this area as it is grown as one of the cash crops though it is of low foreign exchange cash value and Lilongwe district is one of the highest producers of this crop. It was difficult to standardise the production figures for groundnuts at household level, therefore the study relied on national level production figures.

Tobacco, the main cash crop for the country, was being grown by most households in the area. However, the study revealed that most households (75 percent) allocated less than 0.4 hectares of

land to the crop while an average of 18 percent of the households allocated land ranging between 0.4 to 0.89 hectares to tobacco production. Just like the case for maize and groundnuts, Lilongwe is the country breadbasket as well as the highest producers of tobacco in the country (Malawi Vulnerability Assessment Committee, 2005). Though it is easy capture productivity of the crop but due to the small amounts produced, most farmers were selling it to vendors/middlemen instead of selling directly to the export market. Therefore, just like in the case of groundnuts, production figures for the crop were not reliable as a result the study used national level production figures.

Figure 3: Land allocation to various crops



Source: Field survey, 2009

5.1.2.2 Crop intensification through irrigation farming

The Malawi Irrigation Act (Government of Malawi, 2000c:2), refers to irrigation as the application of water, which is confined in time and space thereby enabling satisfaction of water requirements of a crop at a given time of its vegetative cycle or to bring soil to a desired moisture level outside the

vegetative cycle. The aim of irrigation is to intensify crop production by increasing crop production and ensuring production during droughts or even the dry season thereby supplementing rain fed production. Thus, the major aim is to reduce over dependence on rain fed agriculture.

The Malawi Government policy in irrigation is aimed at ensuring increased value addition to agricultural products by rural farmers and increasing smallholder productivity while orienting the smallholders to greater commercialisation and international competitiveness (Government of Malawi, 2006:14). In addition, the National Irrigation Policy and Development Strategy (Government of Malawi, 2000a:4) states that this increased and stabilization of agricultural production would be attained with full participation of the beneficiaries, the private sector, NGOs and the public sector and ample observance of environmental aspects to ensure sustained productivity for food security, effective poverty alleviation, and national economic development.

The sampled households in this study were taken from organized irrigation groups who were getting support from different development agencies. However, 9.2 percent of the households interviewed said that although they were in irrigation group but they were not participating in any irrigation activities. Upon further probing as to why this was the case, it was discovered that these farmers were doing some form of irrigation activities, but these activities were for the benefit of the disadvantaged groups in the community. Therefore, because the participating household felt that their households were not benefiting directly from these activities, hence they gave such response.

Much of the irrigation activities in the area were being done using either treadle pump or gravity based systems. Thus, 48.7 percent of the sampled households were irrigating using treadle pumps while 40.8 percent were using gravity-based system. The farmers find these two technologies relatively less costly to operate than motorised pumps, which have very high operating costs. About 39.1 percent of the irrigation water was been extracted from rivers/streams in the area while 59.4 percent of the water was extracted from reservoirs which were usually earth dams. About 69.6

percent of the groups were supported by either an NGO or donor funded projects operated through the Department of Irrigation, however, 27.5 percent of the groups were being supported using government's recurrent budget.

Almost all the participating households were trained on irrigation farming apart from 7.2 percent. It was learnt that all the farmers who indicated that they were not trained were new members in those groups. Even though the Government only supported 27.5 percent of these groups, however technical assistance especially in terms of training of the farmers was being administered through the Government machinery. It was noted that most of the NGOs lack technical expertise in terms of construction, operation and maintenance of the irrigation schemes, as a result they use government technical staff to provide technical services to the farmers. This demand on the staff from the Irrigation Department poses a challenge on the staff/farmer ratio because the Department is reported to be understaffed. The Malawi Government (1999:58) through stipulates that this situation arose from the fact that the Government had been depending on foreign technical assistance to manage irrigation schemes during the first three decades of independence. Currently, measures have been taken to reduce the staff/farmer ratio challenge.

The study revealed that the major infrastructural constraint faced by irrigation farmers was water shortage followed by inadequate irrigation equipment/infrastructure. In fact, water shortage problem in the irrigation schemes was mainly because of the inability of the equipment / infrastructure to serve a wider area. In the case of treadle pump based irrigation schemes, once the pumps were on breakdown, farmers never maintained them mostly due to lack of local artisans who could do the job. About 25 percent of the farmers indicated that they wait for external assistance from either the donor or other well-wishers to maintain the equipment. A small proportion of the respondents, most of which were women indicated that they have water shortage problems on their plots because they do not have enough the man-power to peddle the pumps. Others have argued that some treadle pumps are not well suited for the all classes of people due to the heavy requirement on man-power to

peddle; however, recently there have been some innovation on treadle pumps which addresses this challenge.

In case of gravity based irrigation schemes, the farmers were having problems to maintain the systems; these include de-silting of the canals, maintaining the canals where broken and lining of the canals to reduce water sippages. However, even though the gravity based irrigation system requires high initial cost but generally, it has less operation costs because it does not require any energy to pump the water. As a result, almost all the farmers who were to able to repair their irrigation infrastructure on their own were from the gravity-based schemes.

The dominant crops grown under irrigation were maize, tomatoes and a variety of vegetables. However, maize was the most dominant crop which was grown on pure stand (mono-cropping). It was grown by almost 80 percent of the respondents while the other crops occupied only 20 percent and they were grown on a mixed stand. The reason for the dominance of maize in irrigation was that the crop is harvested green and thus it has very high returns per unit area than any other crop. In addition, during the dry season, the demand for green maize is very high, so much so that the vendors actually go to the irrigation schemes to buy right at the farm gate. This presents a readily available market, which is free of any transport costs, hence very profitable.

The major agronomic constraint in irrigation farming was the shortage of fertilizer. This was reported to be a major constraint by an average of 54 percent of the farmers. The Agricultural input subsidy does not cover all areas hence these farmers could not access cheap fertiliser for irrigation. In addition, some farmers who own livestock were applying livestock manure in their fields and others were using compost manure. However, in most cases these manure were not enough to cover the entire fields. It is common knowledge that soil fertility through manure is a slow gradual process, which builds up with time. Other major challenges faced in irrigation farming include operation and

maintenance problems, limited crop diversification, marketing problems, and catchment protection as well as stream bank cultivation, which have direct effect on natural resource sustainability.

Despite these challenges, the study discovered that most farmers realized benefits from irrigation (refer to annex 6). The results revealed that household food production increased, households' food insecurity was reduced and income base was increased refer to annex 8. Provision of extension services to the irrigation farmers was reported to be adequate by about 91 percent of the farmers. Mostly, these extension services were provided by field level government staff.

5.1.2.3 Crop yields

As explained earlier agriculture is the most important sector of the economy as it contributes to both household and national food security; nevertheless, its productivity has been low and unstable for a number of decades. The Government's food security policies during most of the 1990s aimed at ensuring a minimum of 1.8 to 2.0 million metric tons of domestic maize production and avoiding sharp increases in the maize price to consumers, especially during the lean season of November to March. One of the instruments used to achieve this was widespread promotion of hybrid maize and inorganic fertilizer packages through preferential or free distribution of seeds and fertiliser. On the other hand, the Government relied on ADMARC to domestically buy maize at the time of harvest or import it and sell it during the rest of the year at (affordable) pan-territorial prices. Beginning in 1999/2000 pan-territorial prices were abolished, and the National Food Reserve Agency (NFRA) was created to manage the country's Strategic Grain Reserve (SGR). However, these past food security policies have been ineffective, resulting in stagnating aggregate food production and productivity, and poor functioning markets.

Despite these challenges, the government still puts in measures to bring a lasting solution. Currently, the government aims at increasing agriculture's contribution to economic growth, by not only

increasing production for food security, but also for agro-processing and manufacturing for both domestic and export markets (Government of Malawi, 2006:14). The emphasis is on enhancing agricultural productivity, promoting food security and agro-processing of key crops. Among others, the key strategies to achieve increased productivity includes strengthening linkages of farmers to markets by connecting rural communities, targeting rural roads and developing farmer organizations and market information.

The other strategies include encouraging the expansion and intensification of staple food production by smallholders; providing effective extension services with more decentralized service delivery for agribusiness skills; increasing the use of pest resistant varieties and promotion of pest management, promoting soil and water conservation and farming techniques; promoting irrigation farming; ensuring that existing land rights are recognized, clarified and secured by appropriate legislation, and lastly encouraging and expansion of horticultural crop production for agro-processing. This section, therefore analyse the smallholder farmer performance as far as crop production is concerned in light of these strategies.

Crop productivity is usually expressed in terms of crop yields. Crop yield refers to total production per unit area. It can also refer to total income per hectare or total production of goods and services per household or nation. Thus, yield may be expresses in terms of kilogrammes or it can be converted to its monetary value at the market. Even though some authors considered yield as an inadequate measure of agricultural sustainability, this study still used due to its applicability in the smallholder scenario.

With regard to production, the study results shows that overall the households experienced an increase in production levels of maize in general from 2006 to 2008 although there was a slight decline in 2007 (refer to Annex 7). The Ministry Agriculture and Food Security (2008b:12) portrays a similar picture in the overall national production trends over the last three years (refer to figure 4).

This scenario is attributed to the implementation of the input subsidy programme combined with good weather for these three years.

In this study, crop production was categorised into five groups as shown in annex 7. Across all the three years under review, the highest percentage of smallholders producing maize realized a harvest ranging between 360 to 720 kilogrammes (1 to 2 ox-cart loads of unshelled maize). Households realizing a harvest in this range increased from 45.6 percent in 2006 to 50 percent in 2008. Another category was made up of households who produced in the range of 721 kg to 1080 kilogrammes (3 to 4 ox-carts of unshelled maize) also increased from 13.2 percent in 2006 to 17.1 percent in 2008.

To concur with these findings, Famine Early Warning Systems Network (2007:3) reports that the increase in maize production over these three seasons is due to a number of factors which includes increased area planted, higher levels of input use (fertilizer and seeds), and favourable weather conditions. In the 2007/08 season alone, the area planted to maize increased by 4 percent from 1,620,493 to 1,686,422 hectares, in comparison to 2006/07. Maize yields increased by a substantial 28 percent, from 1,590 kilogramme/hectare to 2,043 kilogrammes/hectare. This shows that the re-introduction of input subsidies has resulted in increased agricultural productivity in the country. Refer to Figure 4 below, which shows maize production trends in Malawi for the current decade.

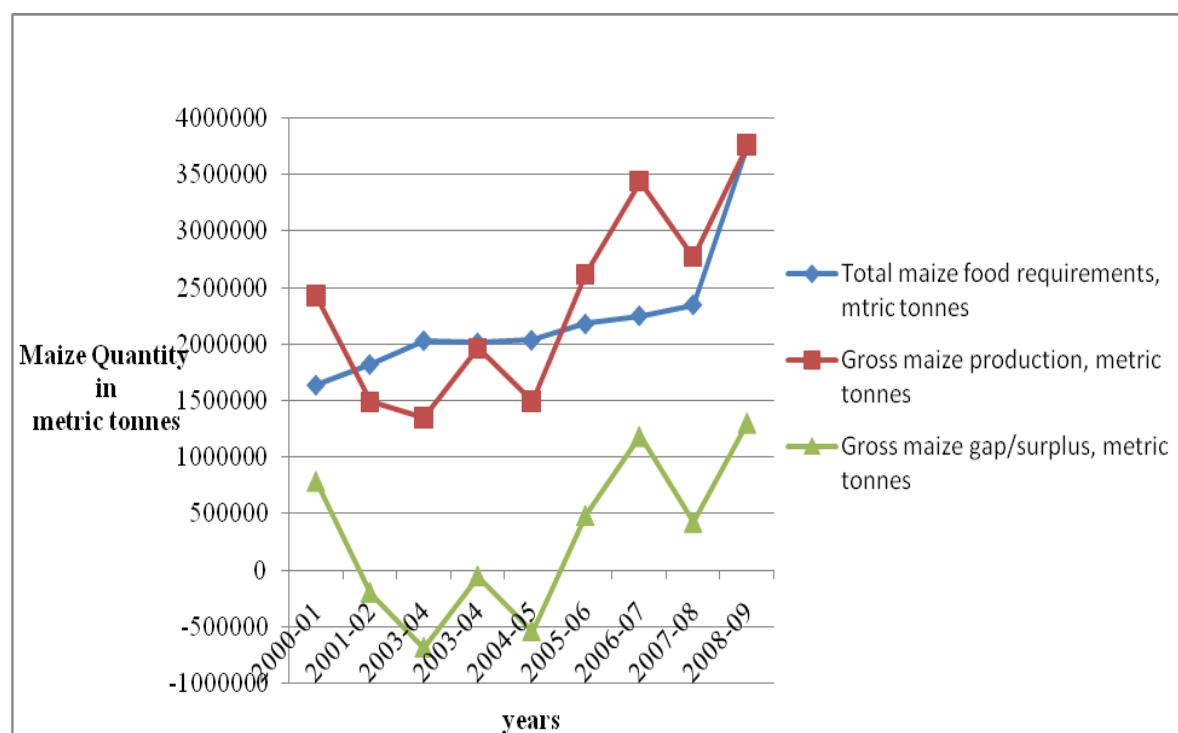
However, for tobacco production (refer to annex 7), the figures show a decline in production. In 2006, approximately 72 percent of the households realized a harvest of less than 360 kilogrammes but this figure declined to 70 percent in 2008. The same declining trend was also true for all other smallholder categories under tobacco as defined by this study. However, this decline was specific to this area (the reasons are beyond the scope of this study), but at national level the Ministry of Agriculture and Food Security (2008a:14) indicates that there has been an increase in cash crop production including for tobacco (refer to annex 8). There was also an increasing production trend in

groundnut production at national level from 203,071 Metric tonnes in 2005/06 to 293,947 Metric tonnes in 2008/09.

Since land available to smallholder farmers is limited, the potential for increased maize and other crop production lies in increasing the yields. Yet, maize yield levels remain very low compared to their potential. The 2006/07 agricultural season figures show that the average hybrid maize yield ranged from 2,147 kilogrammes/hectare to 3,338 kilogramme/hectare compared to potential yields of up to 10,000 kilogramme/hectare. Composite maize yields ranged from 1,315 kilogrammes/hectare to 2,333 kilogrammes /hectare compared to potential yields of up 5,000 kilogrammes per hectare. Local maize yields ranged from 844 kilogrammes per hectare to 1,223 kilogrammes per hectare against potential yield of up to 3,000 kilogrammes per hectare. Hybrid maize yields significantly more than composite and local maize. Therefore, greater adoption of hybrid maize would certainly increase production. Although the proportion of land put to hybrid maize has been increasing, the annual growth rate is very small, estimated at about 1 percent. At the same time composite maize, which is much higher yielding than local maize, is growing at 2 percent a year.

Despite this slow change, there has been a significant shift in the overall area planted with each type of maize seed since 1990 (Famine Early Warning Systems Network, 2007:3). In the early 1990s, local maize accounted for almost 90 percent of the area planted, whereas in the last 2 to 3 years, about a third of the area planted to maize has been planted with each type of seed. Malawi has experienced serious fluctuations in maize production since the beginning of the 1990s. Serious food deficits were faced in 1991/92, 1993/94 and 2004/05, while surpluses were produced in 1998/99, 1999/2000, 2005/06 and 2006/07 (Ministry of Agriculture and Food Security, 2008b:14). While the immediate impact of these three seasons' good harvest improved food security, the fluctuations in maize production seen in the past are likely to continue to make Malawi highly vulnerable to food insecurity in the future, unless yields are increased more sustainability.

Figure 4: A comparison of maize production, maize requirements and domestic food gap/surplus



Source: Ministry of Agriculture and Food Security. 2009. *Report presented at the at the Food and Nutrition Security Policy Joint Task Force workshop*. Sun and Sand Holiday Resort. Mangochi. September 2009.

The study further endeavoured to find out on the extent to which agricultural extension services were available in the area. The analysis revealed that 93.6 percent of the households were being reached by Government Extension workers, 5 percent reported that they did not have any extension provider in their area while only 1.4 percent of the households received agricultural extension support from Non Governmental Organisations. For those farmers who were accessing Extension support, 64.5 percent were of the view that they had adequate support from these extension agents while 28.9 percent perceived their support to be inadequate. The Department of Agricultural Extension services in Malawi mentions the fact that there are shrinking financial and human resources to the Department since the 1990s. The decreasing numbers of staff in the public extension leaves the service with lowly and untrained staff in the public service extension programmes. The erosion of technical expertise together with the financial situation makes the public service largely ineffective

and unsustainable. As a result, farmers are not getting the services they need and deserve on the understanding that poorly resource endowed extension service cannot effectively deliver (Malawi Government, 2000b:12-13).

5.1.2.4 Livestock production

Livestock production is also one of the important aspects in smallholder agricultural production and it contributes about 8 percent to the GDP (Department of Animal Health and Livestock Development, 2009). Most smallholder farmers keep livestock for various reasons. The most commonly found livestock species in Malawi include cattle, goats, rabbits, local chicken, guinea fowls and pigs among others. The study showed that almost 80 percent of the farm households kept some type of livestock and only close to 20 percent did not own any livestock. Usually those who did not have any livestock were ultra poor households.

Smallholder farmers in Malawi keep livestock for various reasons, which include provision of food, income, manure, animal traction, and social security. The majority, 62 percent, indicated that they keep livestock as a source of income for the household while the remaining 38 percent reported that they keep for other reasons. These other reasons included using the stock for consumption (22.4 percent) and as a form of investment as well as security in case of unforeseen circumstances such as funerals, weddings and other traditional rituals (16 percent). Even though the major reason cited for raising livestock was for income purposes, the study showed that organised/formal livestock markets are no longer available such that 81 percent sale their livestock informally. This is a set back because the farmers do not realise benefits from their animals. This is worsened by the fact that most of the livestock are sold in times of food crisis where the main drive for selling is survival. During this time, livestock prices tend to be very low.

On the production systems used in raising these livestock, 96.7 percent reported that their animals were on free range while only 3.2 percent provided supplementary feeds to their livestock. This

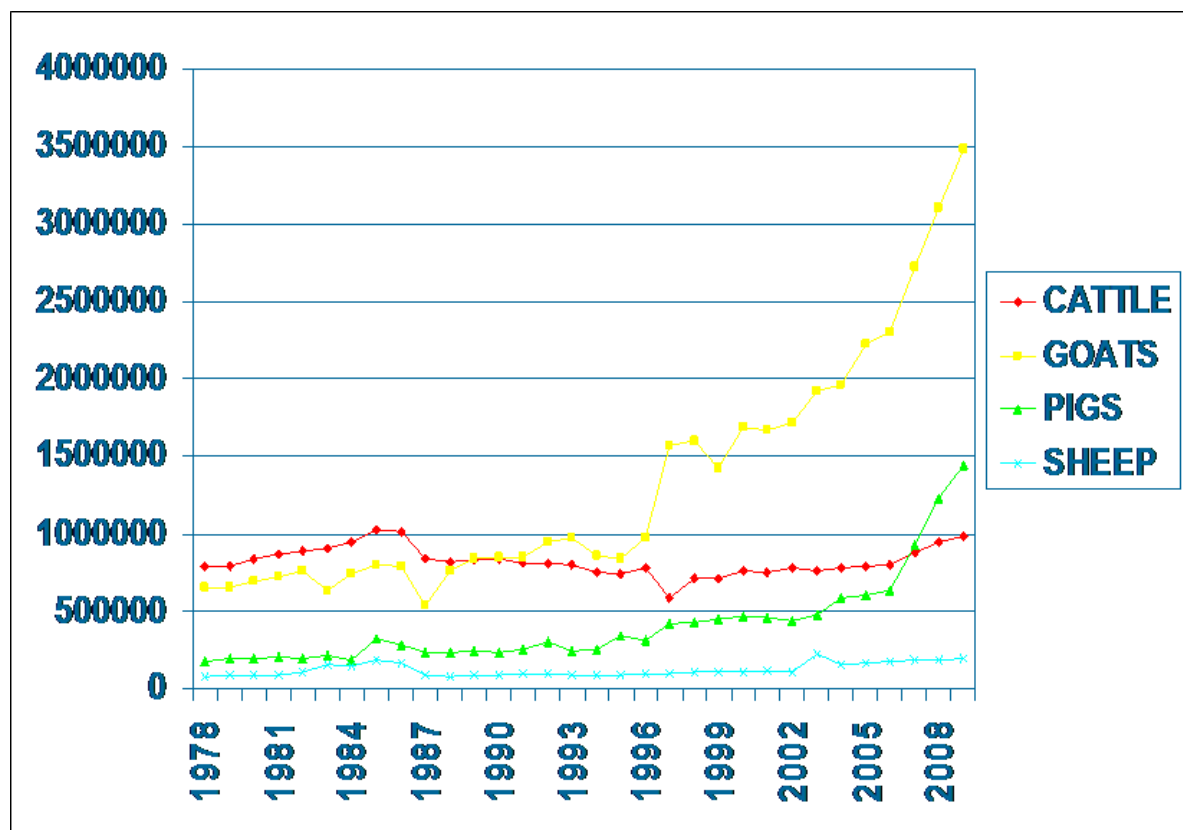
means that they used the communal grazing land for feeding the livestock. This generally implies that livestock production has a certain degree of impact on agricultural production because of the damage that grazing has on land conservation. In addition, this study already mentioned the land shortage problems amongst smallholder farmers; therefore grazing poses a challenge to crop production.

The study reviewed the trends in livestock production for the past three years and the results showed that in almost 54 percent of the households they were experiencing increasing livestock trends while 44 percent reported decreasing livestock trends (figure 5). The increasing trends were especially noted in such species as goats and chicken. However, the figures for cattle were declining in the area. These figures concur with livestock trends at national level obtained through annual livestock census during Agricultural estimates exercise. The national picture shows increase in all livestock species except cattle (Department of Animal Health and Livestock Development, 2009).

It was observed that almost all the farmers interviewed in the area were not keeping improved livestock breeds. The reasons given were that improved livestock breeds were not difficult to access. In addition, even if they could access them, management of the improved breeds tend to be difficult. Another challenge faced by the smallholder farmers on livestock production was lack of technical capacity in livestock production. It was revealed that out of the 80 percent households which owned livestock, almost 75 percent had not received any training in livestock production. Only 24.6 percent reported to have received training in such areas like disease control, feeding and housing. On housing of the animals, even though some had received training on construction of livestock houses, almost 77 percent housed their animals in their own dwelling houses. The main reason for not housing the animals properly was theft; this is a disincentive to extensive livestock production and impacts negatively on this enterprise.

On access to veterinary services, about 13.6 percent reported that they do not treat their animals when they fall sick while 81.4 percent stated that they go to the veterinary officers for drugs. However, all of those farmers who received advice from the veterinary services rated the service as inadequate. Just like in crop production, livestock production faces the similar challenges as far as provision of extension services are concerned. Section 5.3.2.1 of this chapter thoroughly discusses these challenges.

Figure 5: Livestock production trends (livestock counts)



Source: Department of Animal Health and Livestock Development. 2009. *Report presented at the Food and Nutrition Security Policy Joint Task Force*. Sun and Sand Holiday Resort. September, 2009.

5.1.3 Economic factors and the policy environment

5.1.3.1 Agricultural inputs supply: seed and fertilizer

The major production constraint faced by the smallholder farming households was inadequate fertilizer. On average, about 85.6 percent indicated that they had inadequate fertilizer as a constraint to production. The second constraint faced during the rain fed agriculture was inadequate labour supplies as reported by 10.2 percent of the households. Therefore, the study endeavoured to examine two of the major input factors of production that affects the level of agricultural productivity among the smallholder farmers in Malawi. These factors are input supply and input markets; hence the discussion below centres on these factors.

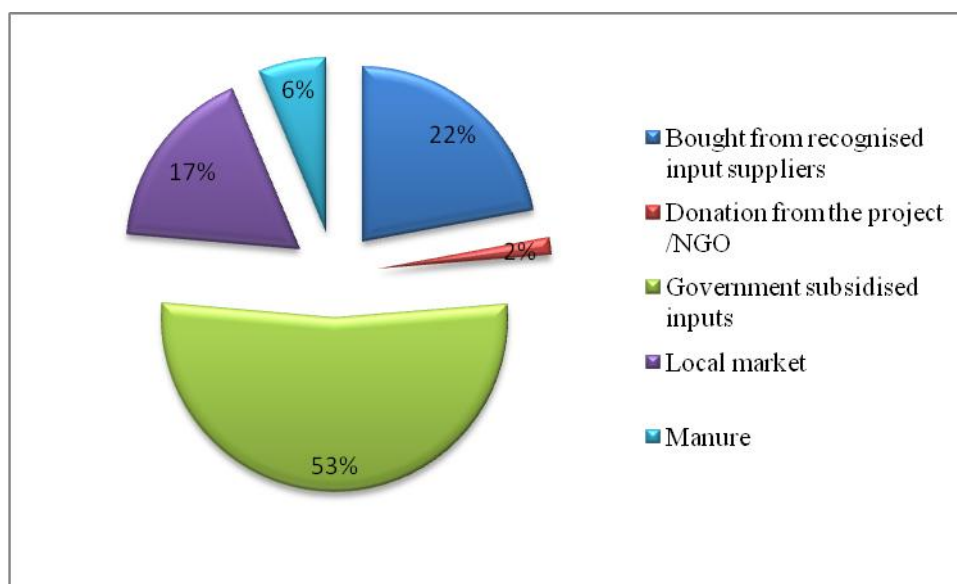
The major agricultural farm inputs for the smallholder farmers in Malawi include seed, fertilizer, chemicals and farm equipment. There are many challenges that farmers face in accessing these inputs. The key issues which relate to input supply include availability due scarcity of reliable suppliers, distance to supply points and road access problems, timeliness of supply and lastly affordability due to high input prices. While acknowledging the importance of all other agricultural inputs required in smallholder agriculture, the discussion on inputs in this study mainly focussed on seed and fertiliser. Hence, the term ‘inputs’ in this study, mainly refers to these two.

One of the policies that affected the smallholder input supply is the trade liberalisation. Although it was implemented with the aim of providing greater opportunities to the private sector in the input trade, the trade liberalisation policy, which necessitated the removal of subsidies in 1994 actually led to sharp increases in input prices (Government of Malawi, 1999:11). There was a drop in fertiliser use as well as use of improved seeds. In fact, up to date input supply to rural areas is poor due to withdrawal /scaling down of ADMARC. Local traders find it costly to move in because of poor road network; because of this those traders who supply rural areas charge exorbitant prices. Thus, currently major inputs sources for the rural areas in Malawi are private traders, local markets,

project/NGOs and the government through the agricultural marketing parastatal-ADMARC and the input subsidy programme.

The results of this research concurs with the above explanation as they revealed that an average of 28.9 percent of the respondents depended on their own seed (recycled seed) as a source of seed while an average of 27.5 percent bought the seed from recognised input suppliers. 23.1 percent used the government-subsidised inputs while 10.8 percent bought from the local market. With regard to fertiliser sources, the study revealed that as many as 53 percent of the population relied acquired the commodity through the government agricultural inputs subsidy programme (refer to figure 6). On the other hand, about 21 percent bought the commodity from government recognised private traders, 17.1 percent bought from the local market and only 6.3 percent used organic manure in their field.

Figure 6: Sources of inputs (fertiliser) for smallholder farmers



Source: Field survey, 2009.

On inputs subsidy programme, it should be noted that in the first two years (2006 and 2007), the subsidy programme did not cover irrigation farming. However, due to late delivery of the inputs in

those two years, some farmers used their fertiliser for irrigation during winter season. This scenario caused an average of 27.6 percent of the farmers to use inputs from the subsidy on irrigation.

Never the less, in 2007/08 the input supply programme was extended to cater for some of the irrigation farmers. However, since the programme covered a few isolated schemes as much as 64 percent still relied on the local market for fertiliser supply while 17.9 percent acquired from the private traders. It was noted that during irrigation season most farmers depended on the local market as a source of fertiliser supply. The reason for this trend was that farmers only required a small amount of fertiliser for their crop due to the small size of the plots of land. As a result, although quality is compromised, the farmers prefer to buy from the local markets where the sellers could weigh on the scale whatever amount of fertiliser required; on the contrary, if they were to buy from the private traders, they would be required to buy the whole 50 kilogramme bag.

The farmers cited several problems which they faced when buying farm inputs. These included high costs of the inputs especially for fertiliser as sighted by an average of 89.2 percent. This problem caused an average of 85.6 percent of the farmers to apply inadequate amounts of fertiliser to their crops. In the case of fertiliser supplied through the subsidised input programme, it was revealed that at times three farmers were required to share a 50 kilogramme bag of fertiliser among themselves. Being the major source of fertiliser, this meant that the problem of inadequate fertiliser was a major constraint to agricultural production for most smallholder farmers in the country.

The other major problem faced by the smallholder farmers with regard to agricultural inputs pertained to input markets availability and accessibility. Most of the inputs, including those acquired through the input subsidy programme were to be obtained from designated distributors who were usually located at the trading centres within the rural community. However, in some instances, these distributors were not even available at the trading centre, which meant that the farmers had to travel to the city to acquire the required inputs. Considering that most rural areas are very remote, this

implied high transport costs, a condition which is worsened by the poor road conditions in most rural areas in the country, which renders them inaccessible during the rainy season. As a result, transporters are reluctant to operate in the rural and those who provide the service tend charge prohibitive prices as they take advantage of the situation.

Even for irrigation farming which is done in the dry season when most rural roads are no longer muddy and inaccessible, there are still challenges in input supply as pertains to fertiliser, seed, chemicals as well as the irrigation equipment. This is especially so because use of hybrid planting materials and fertiliser for irrigated agriculture is very necessary if the farmers are to maximise productivity and efficiency on those small plots of land. Thus, if production is to be intensified the farmers need to maximise production by harvesting two or three times a year from their irrigation fields.

To achieve these high levels farmers require use of hybrid seed, fertilisers and pesticides and other chemicals. However, these are very expensive and unaffordable for most of them. As a result, productivity is highly compromised especially when diseases and pests attack the fields. In such cases, most farmers are rendered helpless such that at times they lose the whole crop to pests and disease attacks. The situation is worse when they are growing high value crops such as tomatoes, cabbages and other horticultural crops which are very much prone to attacks hence requires tender care. Farmers usually tend to avoid production of these perishable but yet high value crops due to reasons hinging on availability of inputs. As a result, almost all the irrigation farmers in the area of study were mainly producing green maize.

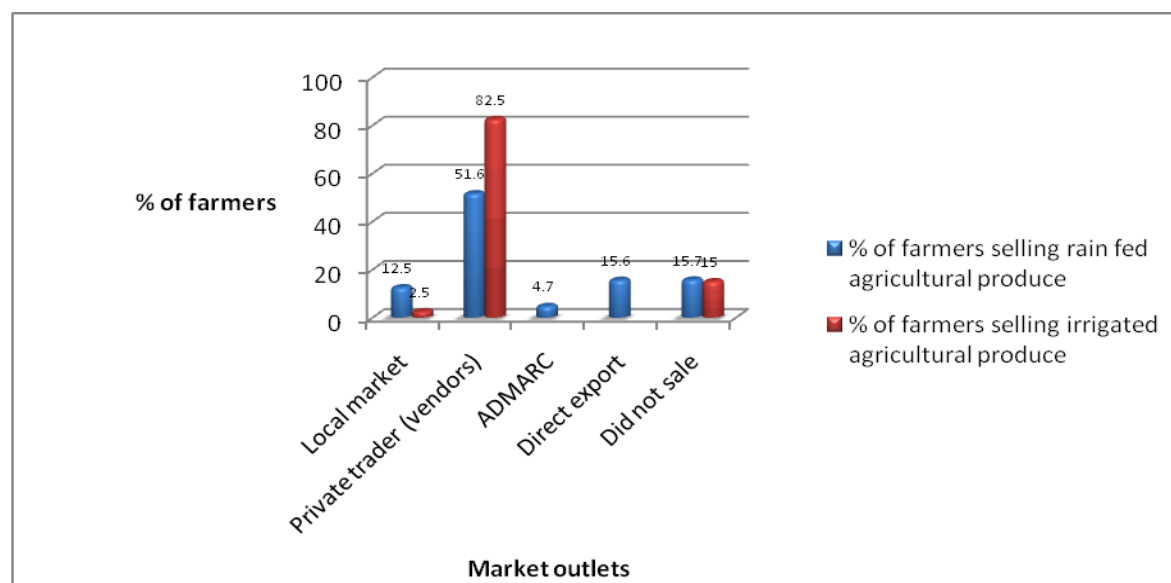
5.1.3.2 Agricultural output markets

Approximately 80 percent of the farmers interviewed indicated that the produce that they realise from both rain fed and irrigation farming agriculture is used for household consumption as well as selling to get income. Only around 15 percent of the households reported that they used their produce

for home consumption only. This shows that only a very small proportion of the households produced some crops entirely for the market. This was especially true for cash crops such as tobacco and in some cases irrigated crops. This signifies that most smallholder farmers mainly produce for subsistence and not for commercial purposes. It also noted that on among the 15 percent of the smallholder farmers who never sold their produce, they not only used the produce for household consumption but also to exchange with agricultural labour during peak periods.

According to the study, the major market outlets for the smallholder farmers in Malawi were found to be the private traders. For rain fed produce, the private traders took up an average of 51.6 percent of the market share in agricultural produce. These private traders are mostly vendors who come to the villages during harvest time and they buy directly from the farmers at farm gate prices. About 15.6 percent of the produce was sold through direct export; this was specifically for tobacco, which was sold to the buyers at the Tobacco Auction Market. The local produce markets absorbed 15.6 percent of the total sales; usually for this type of markets, farmers themselves sold their produce in small quantities as need arise.

Figure 7: Major market outlets for agricultural produce among smallholder farmers in Malawi



Source: Field survey, 2009

For irrigation farm produce, almost 83 percent of the produce was sold to the private traders. These vendors came to buy the green maize directly at the scheme. Only 2.5 percent of the interviewed farmers sold their irrigation produce at the local markets. The remaining 15 percent reported that they did not sell their maize green but they left it to dry for household consumption.

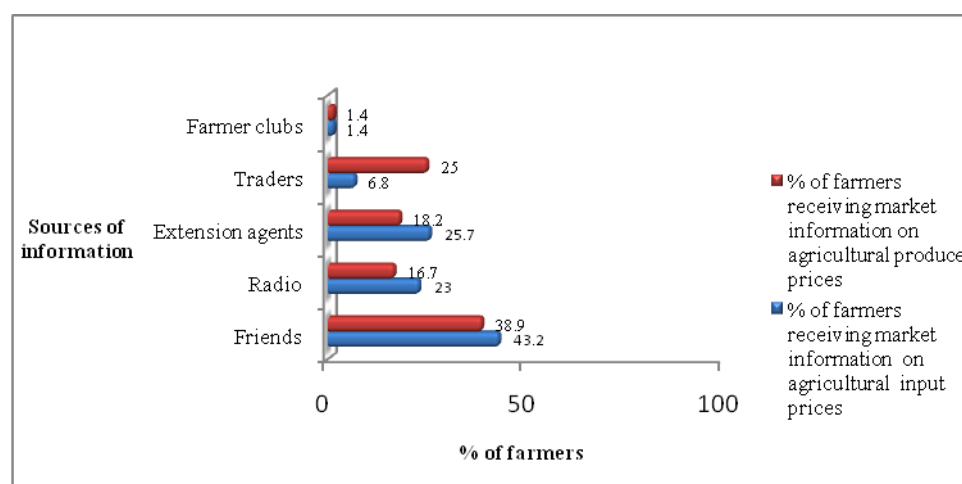
The farmers faced various challenges in the marketing of their agricultural produce, however, they cited low buyer prices and high transport costs as the main challenges. Since most of the farmers could not afford to transport their produce to the urban markets, they ended up selling their produce at farm gate prices to vendors who come right to their villages. Almost 92.1 percent of the farmers indicated that low buyer prices as their main challenge. Being the major buyers and given the limited price controls, vendors offer very low and exploitative prices. Meanwhile, as of 2007/08 ADMARC mainly purchased maize from their main depots at better prices. Unfortunately, most of these depots are in urban centres, which leave most of the farmers in the rural areas with no alternative markets except the private traders who usually offer lower prices than those offered by ADMARC. Another challenge is that ADMARC has cash supply problems such that most of the times, their markets are closed leaving the private traders and the local markets as the only alternatives for the farmers. The low prices offered by these private traders are having a negative impact on maize farmers' incomes. Other challenges faced by farmers on the output market pertain to perishable commodities, especially horticultural crops, which mostly are high valued crops. The problem is that these crops require refrigerated storage facilities and an organised market to avoid post harvest losses due to perishability. Unfortunately, the smallholder farmers lack both the refrigerated facilities and the organised markets. As a result, they lose out on their produce, but to avoid this risk they also tend to avoid cultivating such crops. There is no diversification or value addition to their crops such that profitability of the farming enterprise is not realised by the smallholder sector.

This analysis shows that after the liberalisation policies in 1994, the role of ADMARC in smallholder agriculture was minimised. However, any attempts to privatise it were met with mixed resistances. Most opponents of the idea of privatising ADMARC suggested that this organisation is a strategic body for ensuring national food security, especially considering that private traders have failed to take up their role of providing the social services of ADMARC. Never the less, currently ADMARC fails to fully provide the services it used to due to financial constraints as it relies on government subventions.

5.1.3.3 Agricultural market information systems

The study endeavoured to find out how agricultural market information with regard to both input prices and produce prices was being accessed by the farmers. The reason for this inquiry was to establish whether the farmers were able to make informed decisions when buying inputs or when selling their produce. Unless the farmers are empowered with necessary information regarding price behaviour in both the input and the produce markets, they cannot be able to make progress in their enterprises as they will be prone to unnecessary losses.

Figure 8: Sources of market information for smallholder farmers



Source: Field survey, 2009.

The study established that the majority of the farmers made their decisions based on information gathered from friends. An average of 43.2 percent and 38.9 percent of the farm households made their decisions regarding agricultural inputs and agricultural produce prices respectively, by consulting friends. The agricultural extension development officers were consulted as a source of market information by the 25.7 percent of the farmers mainly with regard to agricultural input prices and to a lower extent on the produce prices. It was established that local private traders played a very significant role in the produce market. Almost 25 percent of the farmers were informed by traders as to how much their products would be sold. This shows how much vulnerable the farmers were to exploitative tendencies by these private traders.

The government's most commonly used channel for communicating to the farmers about agricultural market information is the radio. However, only about 23 percent and 16.7 percent of the farmers utilised this channel to make decisions regarding agricultural inputs and produce respectively. It was also discovered that the farmer clubs which were once the best means of distributing valuable agricultural information to smallholder farmers were no longer being actively utilised for this purpose. The main reason for this could probably be the decrease in farmers producing burley tobacco hence decreased activities of the clubs.

5.2 Factors impacting on the sustainability of agricultural development in Malawi

This section discusses the outcomes or the immediate effects of the government interventions through policies in the agricultural sector on agricultural productivity, income status/poverty levels, the status of the social institutions and the economic environment as a whole. By so doing, it gives the rationale why the smallholder farmers continuously look for external support whether through NGOs, donor projects or government interventions to achieve minimum levels of production instead of sustaining agricultural productivity on their own.

5.2.1 Stability of household income

One of the factors that affect sustainability of agriculture development for smallholder pertains to how stable household incomes for the smallholder farmers are. Stable income assures affordability of inputs for production yearly. However if incomes are not stable the farmer ends being uncertain of the agricultural season because he would be unsure of the means of production. The study, therefore, looked at the diverse income sources the farm households had. The most important sources of income available in Malawi are crop sales, livestock sales, off-farm sales/non-farm income, remittances, and aid.

To capture this data, the households were divided into five income categories, which composed of the following; those earning less than MK5000, between M55000 to MK9999, between MK10000 to MK19999, between MK20, 000 to MK29, 999 and those earning over MK30, 000. Another category included was of those who did not earn anything at all. The sales from crop produce showed that incomes had been slightly increasing over the past three years in all the categories. However, quite interesting was the decreasing trend in the proportion of households that were not earning anything at all from 32.2 percent in 2006 to 12.9 percent in 2008 (see Table 1).

Table 1: Household income trends from crop sales

Income levels	Household income trends from crop sales		
	2006	2007	2008
No income earned	32.2	23.8	12.9
Less than MK5000	25.4	22.2	27.1
MK5000 to MK9999	15.3	23.8	21.4
MK10,000 to MK19,999	13.6	11.1	24.3
MK20,000 to MK30,000	5.1	6.3	4.3
Over MK30,000	8.5	12.7	10

Source: Field survey, 2009.

These observations were compared to the national figures, which uses a threshold welfare indicator to compute a poverty indicator for each individual. The welfare Indicator used was the total annual

per capita consumption expenditure reported by a household, expressed in Malawi Kwacha deflated to February/March 2004 prices. Thus, poverty lines for Malawi stipulates that a poor person is an individual who earns MK16, 165 per year and below, while an ultra-poor person is an individual who earns MK10, 029 per year and below. Using this method, individuals who reside in households with consumption lower than the poverty lines are then labeled either or ultra-poor. Using the minimum food expenditure as an additional measure, the “ultra poor” are identified as those households whose total consumption per capita on food and non-food items is lower than the minimum food expenditure.

Using the narration above, it was observed that at national level, there has been a general decline in the incidence of poverty since 2004 although the figures seems to have remained at 40 percent between 2007 and 2008 (Annex 9a). However, for rural households specifically there has been a steady decline in the proportion of people both in the ‘poor’ and ‘ultra-poor’ classes during the same period (Annex 9b). The decline in poverty rates is attributed to the improvement in food security at household level thereby releasing resources for non-food expenditure.

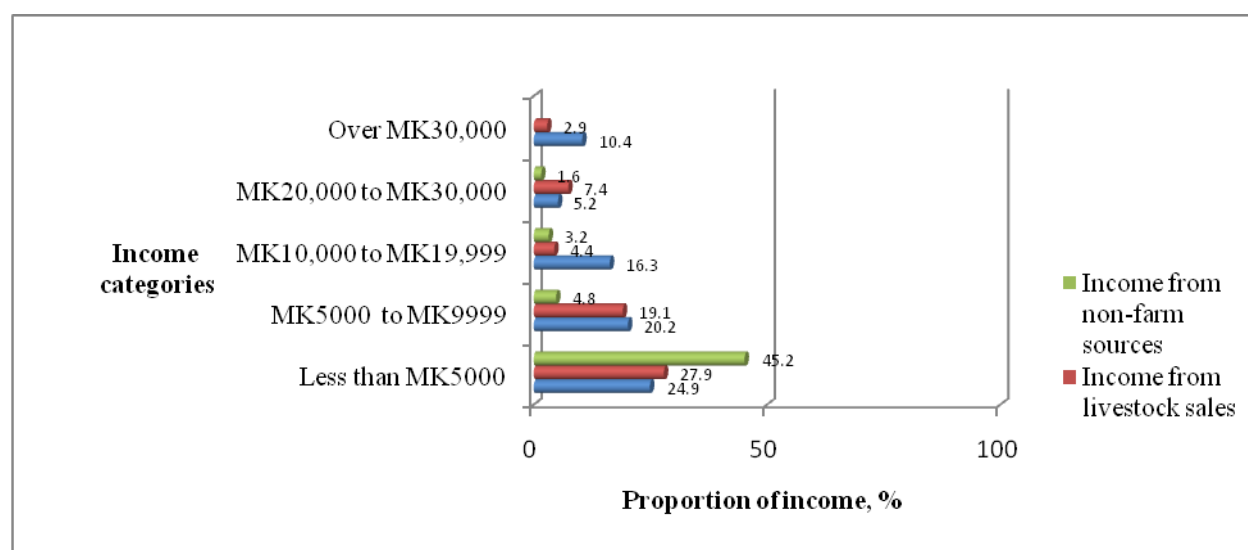
5.2.2 Diversification of the household income base

In order to capture the diversification of the income base of the households, analysis of other income sources (refer to figure 9). A comparison was made between the three major sources of income at a rural household, namely crop sales, livestock sales and non-farm activities. The results showed that about 38 percent of the farm households did not earn any income from livestock farming. As a coping mechanism, the smallholder farmers in Malawi usually sale their livestock in times of crisis. As already stated in 5.4, the most commonly available are local chickens followed by local goats and generally these fetch low prices in the local market. This is worsened by the fact that the livestock are usually sold under stressful circumstances particularly during lean months of December to

February when the households have food shortages. This being the case only 2.9 percent indicated that they got income of over MK30, 000 while the majority (27.9 percent), earned less than MK5000.

Due to the low levels of agricultural production, the smallholder farmers in Malawi are usually involved in other off-farm activities in order earn additional income with which to purchase food during the growing season. Unfortunately, during this time casual labour wages are very low hence off-farm income is very scarce. Due to these factors, the study revealed that there was none who earned more than MK30,000 from non-farm activities while as many as 45.2 percent earned less than MK5000 which is the lowest income bracket. This further shows how much reliant on agricultural sources of income the smallholder farmers in Malawi are and hence the need for its sustainability.

Figure 9: Proportion of household income from various sources



Source: Field survey, 2009.

5.2.3 Empowerment of the household economic base

The Malawi Growth and Development strategy stipulates that the country will achieve increased food security through increased agricultural productivity. It is expected that this will be achieved through increased value addition and increased smallholder productivity while orienting smallholders

to greater commercialization and international competitiveness (Government of Malawi 2006:15). This requires farmer empowerment through agribusiness training so that the farmers regard their agricultural production activities as a business enterprise not just for subsistence. On the contrary, the study revealed that this was far from being achieved. Through the survey, it was observed that almost 71 percent of the smallholder farmers had never been trained in agribusiness skills. Considering that, most of them were irrigation farmers who are supposed to be in the forefront in commercial farming and value addition, the current state of affairs surely needs to be addressed if sustainable agricultural development is to be actualised.

In addition to training, the success or failure of efforts to transform traditional agriculture depends not only on the farmers' abilities and on skills in raising their productivity but also and even more importantly on the social, commercial and institutional conditions under which they function. Specifically smallholder farmers need to have reasonable credit, fertilizer, water, crop information as well as marketing facilities (Todaro and Smith, 2009:460). Thus, the study realizes that smallholder farmers' accessibility to agricultural credits is yet another way of increasing and stabilising agricultural productivity as it also affects their economic base.

However, the results of the study showed that only 33 percent of the smallholder farmers interviewed was able to access agricultural credit either in form of inputs or on cash basis. The rest of the farmers indicated that they have never taken any agricultural credit. The reasons given for failure to access agricultural credits included the following: Collateral for the loans were unaffordable to the farmers, this was reported by 42.9 percent. The processing of the loan was also a disincentive in that the process takes too long such that it does not fit into the agricultural calendar whose events are time bound, and lastly 14.3 percent indicated that they could not afford to pay back the loan.

The government policy on provision of agricultural credit dates back to the Integrated Rural Development Projects' period in the 1970s when the smallholder agriculture was being subsidised.

However, when aid-support for the IRDPs began to dry up, as happened from the mid-1980s onwards, it became clear that there had been growing implicit subsidies to smallholder fertiliser, credit and the “transactions facilitation” tasks which extension staff had undertaken in forming credit groups and liaising between these groups and ADMARC for input supply and output marketing. The implicitly aid-financed subsidies therefore had to transfer to the domestically financed government budget, thereby becoming transparent and triggering IMF and World Bank advice to cut these sharply. This led government commitment to phase out fertiliser subsidies (with a substantial aid cushion through a fertiliser revolving fund). Smallholder agricultural credit was placed on a commercial basis by transferring it to newly created bank, Malawi Rural Finance Company (MRFC). Although MRFC was capitalised with soft loans, its lending has been at commercial rates, and it has managed to survive through a strategy of concentrating on a relatively small elite, mainly of smallholder tobacco growers. Chirwa et al (2006:10) states that currently almost 90 percent of smallholders cannot get agricultural credit, whereas in the heydays of the IRDPs over 30 percent of smallholders were able to access credit, for a range of crops including maize. Thus, farm finance in Malawi “normally” comes from MRFC (for elite tobacco smallholders and a few others), migrants’ remittances and small surpluses gleaned from non-farm businesses. For the great majority of farmers there is no possibility of borrowing to finance the costs of inputs and labour. This much depresses the demand for inputs and agricultural yields.

As mentioned earlier, another area affecting the sustainability of productivity among the smallholder farmers in the country was the unavailability or unreliability of agricultural markets. This challenge greatly constrains the economic base of the farming households in the country. Security of income to smallholder farmers can only be ensured when they receive fair market prices for their output. Studies have shown that small farmers are responsive to price incentives and economic opportunities and with these they are able to make radical changes in what they produce as well as how they produce (Todaro and Smith, 2009:461).

5.2.4 Environment and natural resources management

The Malawi growth and development strategy recognizes that the sustainable use of natural resources contributes towards many of the goals in the country's development agenda; these include fisheries, forestry, and the environment (Government of Malawi, 2006:37). In relation to agriculture, the strategy stipulates that in the implementation of all agricultural activities deliberate efforts are required in ensuring environmental protection through compliance with the environmental and natural resources management laws. This means that even provision of water resources for agricultural purposes should take into consideration ample observance of environmental problems that affect water supply such as soil erosion due to poor farming practices.

Barnett et al (1995:1) states that agriculture is both an economic activity as well as a biological process but it serves a social purpose. Being a biological/ physical process, degradation of the agricultural resource base can lead to falling quantity of the output over time due to erosion, destruction of soil structure as well as water logging just to mention a few. Therefore, for agriculture to be sustainable, cropping systems on the field need to be sustained both biologically and economically.

In view of this, the study looked at several aspects of environmental base management; these included gully reclamation activities, woodlot establishment, soil fertility improvement, afforestation as well as integrated forest management. The respondents mentioned several environmental problems they face. Land degradation was the major problem as it was mentioned by 64 percent of the respondents. This problem has further led to loss of soil fertility. Secondly, 25 percent of the farmers mentioned deforestation as another environmental problem.

To control these problems the farmers indicated that they establish tree nurseries at community level from which they raise tree seedlings to plant in their homes, fields and community woodlots. They also mentioned that they are involved in gully reclamation activities, compost manure making and

utilization as well as contour re-alignment of their fields to check soil erosion. Almost 42 percent indicated that they have community based natural resource management groups in their villages while 57 percent do not have. Out of those that have community based natural resources management groups, about 31 percent reported that they had established woodlots in their villages while 69 percent have not established any planted woodlots.

About 48 percent indicated that their communities still had indigenous woodlots while 51 percent did not have any indigenous woodlots. Both those who had indigenous and those with exotically planted woodlots indicated that their major benefit from the woodlots was that it was a source of energy supply in terms of firewood (73.6 percent) or charcoal (4.8 percent) while 16.7 percent use the woodlots as a source of timber. This shows that there is a continued danger to natural resources especially vegetative cover (trees) due to lack of alternative energy sources in Malawi as almost all rural people rely on firewood for cooking. The Ministry of Agriculture and Food Security (2008a) also revealed that most of the poor and vulnerable people in Malawi still depend on the environment to sustain their livelihoods. Hence the need of designing effective alternative livelihood strategies to ease pressure on environment.

5.2.5 Adoption of agricultural technologies and practices

In order to achieve high levels of agricultural productivity given the current scenario in the country, adoption of agricultural technologies is very important. The most important innovative technologies that accompany agricultural modernisation include use of high yielding varieties, labour saving technologies, pesticides, as well as mechanisation. However, in this study, only a selected few technologies which are being promoted among the smallholder farmers in Malawi were assessed. These innovative technologies include adoption of hybrid /improved maize seed varieties, adoption of modern cropping patterns, adoption of soil conservation and fertility improvement techniques.

As alluded to earlier on, one of the pre-requisites for agricultural transformation or modernisation is use of high yielding varieties. Hybrid maize yields significantly more than composite and local maize. Greater adoption of hybrid maize would certainly increase production. The study observed that on average about 73.6 percent of the smallholder farmers growing maize were using improved / hybrid maize seed varieties as compared to those who used local varieties who averaged about 26.4 percent. At national level, the Famine Early Warnings Systems Network (2007:3) reports that although the proportion of land put to hybrid maize has been increasing, the annual growth rate is very small, estimated at about 1 percent. At the same time composite maize, which is much higher yielding than local maize, is growing at 2 percent a year. Despite this slow change, there has been a significant shift in the overall area planted with each type of maize seed since 1990. In the early 1990s, local maize accounted for almost 90 percent of the area planted, whereas in the last 2 to 3 years, about a third of the area planted to maize has been planted with each type of seed.

Cropping systems also play a major role in increasing crop productivity. There some cases where crops perform better on pure stand while in some instances the crops perform better in a mixed stand. This depends on the whether there is a symbiotic relationship or a parasitic relationship between the crops in question. In this study therefore, it was discovered that on average 43 percent of the maize farmers were practicing mono cropping as compared to an average of 53.9 percent of the farmers who were practicing mixed-cropping. On maize production, the Government has been promoting the mono cropping of maize with reduced spacing between planting stations in order to increase productivity of the crop. However, the farmers mostly tend to grow maize together with crops such as climbing bean varieties, pumpkins, various types of indigenous vegetables and cowpeas among others. Due to scarcity of land, farmers also tend to grow cassava in the maize field; the cassava remains in the field long after harvesting maize because its maturity takes more months than maize. The focus on both planting materials and cropping practices was on maize because for cash crops

such as groundnuts and tobacco most farmers grow them on pure stand. Usually, the farmers use improved varieties of these crops in the first year and in the consequent years they recycle the seed.

On soil fertility improvement technologies, there are a number of technologies being promoted such use of organic manure, contour marker ridges, vertiver hedgerow planting, agro forestry practices and woodlot establishment (refer to 5.5.4). Observing of fallow of fallow is no longer a favourable option among the farmers due to the decreasing farm sizes.

On livestock production, there are also a number of innovative technologies being promoted such as raising improved livestock and livestock housing. However due to the challenges which have already been discussed earlier in this narrative, farmers in the rural area are not adopting as expected. This negatively affects productivity of the livestock development among the smallholders eventually affecting income levels and their livelihoods.

5.2.6 Empowerment of farmer organisations and the local governance structures

Farmer empowerment is very important if sustainability of agriculture is to be achieved. One of the ways of empowering farmers is to offer them skills through training program. Farmers in the area were asked to mention the type of trainings they received with respect to their farming enterprises. They mentioned that after their irrigation groups were formed, they received trainings in various skills such as group dynamics, farming as business, operation and maintenance of irrigation equipment. At community level extension agents visits the farmers, out of many some of the trainings offered include manure making, soil and water conservation measures as well as livestock management and disease prevention skills.

The farmers were also asked about their knowledge of the decentralisation structure at village level. Almost all of them agreed that they know about the existence of the Village Development Committee, which is the lowest level in the decentralisation structure in the Malawi. This committee is at village Group Headman level. However, it was very clear from their responses that most of the

respondent were not very clear about its role with most of them thinking that it runs welfare activities at village level. If these structures are strong, well coordinated and active, the farmers can be able to lobby for more favourable policies at their local assemblies.

At national level, there study observed that there were a number of farmer organisations that were formed with the aim of promoting farmers interests both at policy level and at implementation. Some of the most active are the Tobacco Association of Malawi (TAMA), the National Smallholder farmers' Association (NASFAM) and the Farmers Union of Malawi (FUM). The Malawi Poverty Reduction Strategy points out the need to stimulate the creation of small producers' group, although it places emphasis on their service delivery role (Kachule 2004 cited by Chirwa et al, 2005:22). Agricultural associations such as the Tobacco Exporter's Association of Malawi (TAMA) and others of this nature represent the agro-export sectors. These types of small producer organizations tend to prioritize service delivery over advocacy. However, the National Association of Smallholder Farmers of Malawi (NASFAM) is one national organization in Malawi that combines both service delivery and advocacy. This is a USAID funded association, which has grassroots farmer's associations as members. NASFAM has successfully advocated for legislative changes that benefit small farmers which include its triumph in lobbying for the repeal of a 7 percent withholding tax on small sales of tobacco (Kachule et al cited in (Chirwa et al 2006:22).

Small producer associations can also help small farmers identify themselves as producers and recognize their interests as such. Another farmer organisation, which can play a significant role in this endeavour, is the Farmer's Union of Malawi (FUM). This organisation was established with the express purpose of advocating for farmers.

5.3 Analysis of the findings and discussion of their implications

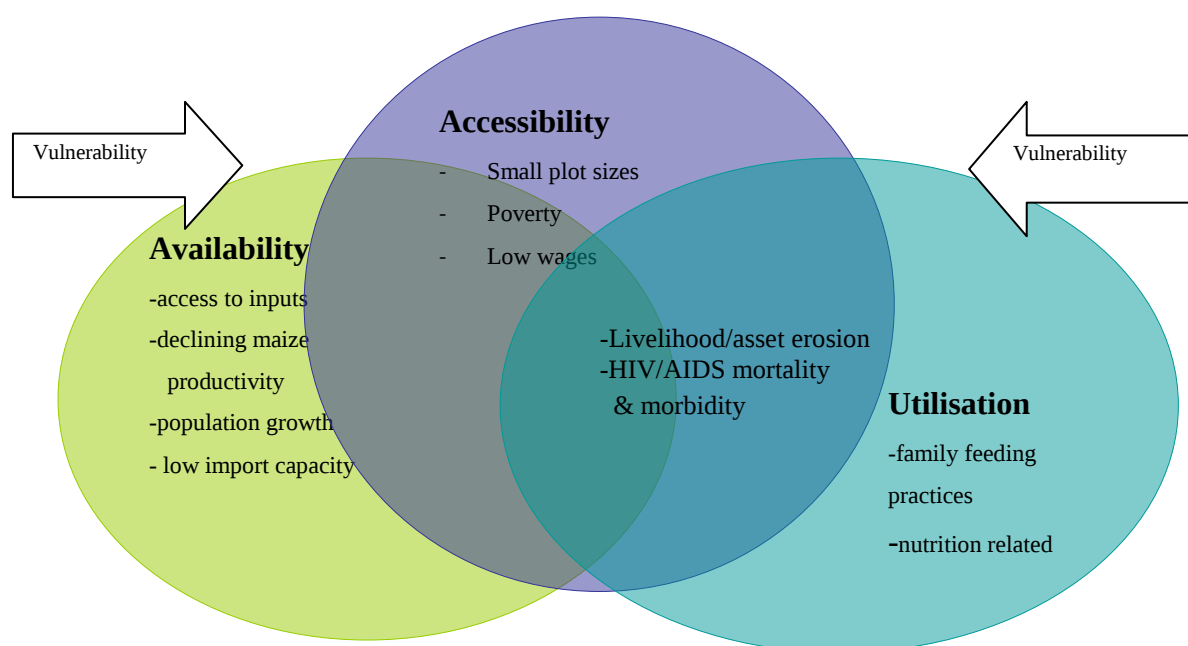
5.3.1 Implications on household food security among the smallholder farmers in Malawi

One of the specific objectives of the study was to analyse the extent to which agricultural development policies and strategies had contributed towards sustainability of agricultural development programmes in general and food security in particular. To achieve this objective the study collected some information on food security issues at household level. This was done in relation to the level productivity in both crop and livestock husbandry as discussed earlier.

The internationally accepted definition of food security refers to the state “when all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life” (USAID, 1995 cited in (Sahley, 2005:7)). Thus, at country level, the concept of food security implies that all Malawians at all times have both physical and economic access to enough nutritious food for an active and healthy life. While attempting to achieve this, the ways in which the food is produced and distributed should be environmentally friendly and sustainable. In addition, the ability to acquire the food need to be ensured. There are three dimensions to food security and these are food availability, food accessibility and food utilisation. These components of food security overlap to characterise the unique food security problems in Malawi. Figure 10 below demonstrates this scenario.

Of late, there has been another crosscutting dimension, which has been added to these three, and this is a dimension of vulnerability. Vulnerability represents the susceptibility of a country or a region within it to food insecurity due to shocks which could be natural, social or economic in origin (Webb and Rogers, 2002). This shows that a strong resilience to shocks is fundamental to food security. For the purposes of this study, much emphasis was given to the first two dimensions namely, food availability and food accessibility. These two dimensions were chosen because they have a direct bearing on agricultural production and hence sustainable agricultural development

Figure 10: Dimensions of food security in Malawi



Source: Sahley, et al. 2005. *The governance of food security in Malawi*. Lilongwe: USAID

5.3.1.1 Food availability

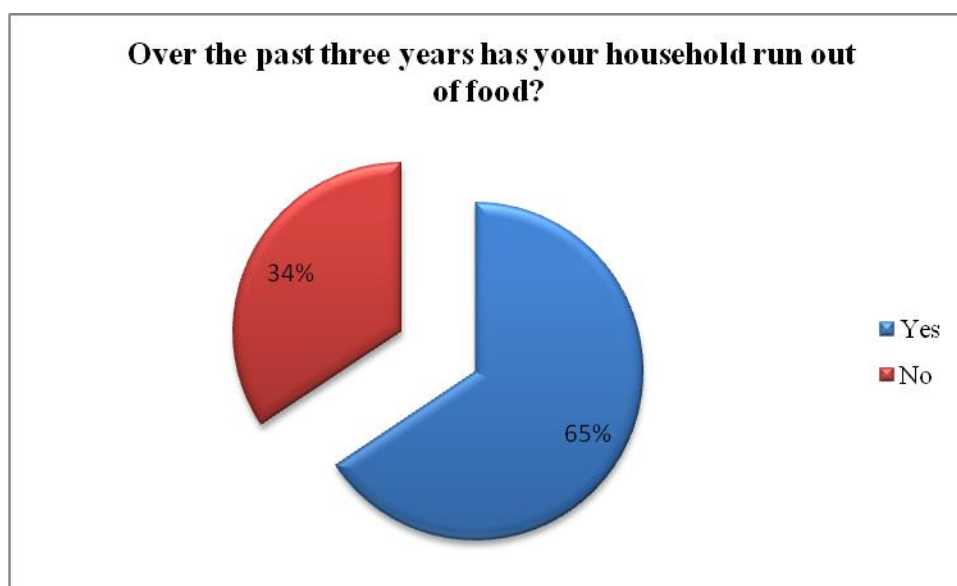
The Food and Nutrition Security policy of Malawi refers to food availability as the condition where food is sufficient in appropriate quantities and qualities supplied through domestic production or imports (including food aid). Thus, factors determining food availability include available food stocks of all the food groups at farm level, commercial, and government stocks. Another factor pertains to volume and stability of the production of foods based on all the food groups both for subsistence and for market-oriented production. Lastly, food availability is also affected by food imports for commercial purposes as well as food aid.

A more reliable approximation of food availability in Malawi can be obtained by examining Malawi's cereal food supply, particularly maize being the main staple which comprise 72 percent of the calories in the daily diet in Malawi. Roughly, 175 kilogrammes per person per year of maize are

required to fill this requirement. For the whole country, this means approximately 200,000 metric tonnes per year all else being equal (Sahley et al, 2005:9).

The results of the study showed that even though the crop production trends for households registered an increase in production for the past three years (refer to figure 5), but only 32 percent of the households never run out of food during the past three years. On the other hand, about 66 percent of the farmers reported that during the last three years they run out of food before the next harvest (refer to figure 9). This shows that the yield realised was not enough to take the household through the year.

Figure 11: Food security status of the farm households over the last three years



Source: Field survey, 2009.

This situation is an improvement as compared to the past trends in food security situation in country. These results are closely related to the situation reported by the Ministry of Agriculture and food Security in its 2007/2008 Inputs Subsidy program Internal Review Report. This report indicated that in 2008 about 22.7 percent had become food secure such that they never run out of food while 77.3 percent were still food insecure, meaning that they run out of food before the next harvest. However,

as a country there was surplus production meaning that food was available and those with income could access it (refer figure 5).

The results further showed that most of the households which run out of food usually do so in the months of December, January and February. This was also an improvement as compared to the past, i.e. before 2006. In the past, most farm households used to run out of food a few months after harvest as early as August (Ministry of Agriculture and Food Security, 2008a:24)

5.3.1.2 Food accessibility

Food accessibility refers to access by individuals to adequate resources (entitlements) to acquire appropriate food for a nutritious diet. Entitlements are defined as the set of all those commodity bundles over which a person can establish a command given the legal, political, economic and social arrangements of the community in which he/she lives including traditional rights, for example, access to common resources (Government of Malawi, 2005a:15).

Although it is a well-known view of food security that aggregate availability of food does not assure every household access to it, however given the dependence on subsistence agriculture, this may not be true for Malawi. As shown in figure 8, the food security components are highly interrelated due to high dependence on smallholder agriculture. Therefore, most families access food by consuming what they produce or by purchasing food in the growing season from income earned from their harvest time sales or off-farm work.

The analysis of results in this study further confirmed this. As reported in 5.3.2 above, an average of 66 percent of the households run out of food before the next harvest. Upon further investigation on how they cope in such situation and the majority of the household, 70 percent, reported that they do piece works most of which is selling their labour in other farmers fields. Payment for these piece-works is made either paid cash or in kind (usually they would be given maize as their payment). The rest of the affected households cope by seeking temporary off-farm employment, selling their

livestock just to mention a few. This shows that most households are below the poverty line, and are unable to afford a minimum basket of food and non-food items. Accessibility to food is critically dependent on income and food price movements.

To substantiate this fact, the 1998-99 integrated household survey found that 65 percent of household incomes fell below the income required to buy a minimum package of food and non-food items (Benson et al (cited in Sahley, et al (2005:10)). Rural households spend 80 percent of their income on food, and over half of their expenditure is the monetary value of the homegrown food that they consume themselves. The balance is food that they purchased from the market when household stocks are depleted. When faced with these shortages, collection of edible plants available in Malawi's small-forested regions and informal food distribution networks have functioned to support access to food. However, the recent income stresses have undermined these household methods of coping (Frankenberger cited in (Sahley et al, 2005:10)). This severe nature of income poverty has led to physical and human asset poverty and general livelihood erosion over time as households have struggled to cope with the droughts that have affected the country from the 1990s through the 2002 crisis. As assets and livelihoods have eroded, the extreme poor have grown in number, food access shortfalls have grown, and the country's vulnerability to food insecurity spikes has increased (Frankenberger cited in (Sahley et al, 2005:10)

This pattern of food access puts households who have little land at greater risk of food insecurity from small disturbances in climate. Malawi has both a rising population density, and inheritance patterns that result in land being equally divided among surviving siblings. Average arable land holdings are now 0.23 hectares per capita. In the southern region this figure is even less. Land is far more inequitably distributed than income in Malawi, because much of the best land is occupied by agricultural estates.

Consequently, the households exclusively reliant on maize resort to the market to fill their food needs for part of the year. This places them at the mercy of highly volatile food prices, which tend to be low at harvest and higher during the growing or the “hungry season” (December to March). In addition, off-farm income is scarce, and growth of non-agricultural sectors is weak. Casual labour wages are especially low in these food-deficit areas when there are more wage seekers than wage buyers.

5.3.1.3 Food utilization

The United Nations Children’s Fund (2004) reports that Malawi is highest ranking among four other countries in the world with more serious levels of chronic malnutrition; these others are Yemen, Ethiopia, and Burundi. It states that 49 percent of Malawi’s children under 5 years of age are stunted because of chronic malnutrition, and remarkably, 40 percent of the children are severely stunted. An estimated 40,000 Malawian children under five years of age die each year from preventable nutrition-related diseases, such as malaria, acute respiratory infection, and gastro-enteritis.

However, because Malawi has relative favourable water sanitation, micronutrient supplementation, and other health measures, much death and disease in Malawi’s children can be attributed to food consumption problems. This is justified by the trends that show that child nutritional status and nutritionally related health programs follow the agricultural calendar, growing worst in the hunger/lean season (UNICEF, 2004). While recommended breastfeeding practices are quite favourable in Malawi, weaning diets are too high in bulky cereals, such as the maize dish, nsima, and too low in other nutrition rich vegetables, fruits, pulses, and animal foods.

5.3.1.4 Vulnerability

As mentioned earlier, vulnerability has been identified as one of the crosscutting dimension to the food security situation. It represents the susceptibility of a country or even a household to food

insecurity due to shocks originating from natural, social or economic causes. Hence, a strong resilience to shocks is fundamental to food security.

However, recurring droughts for over 13 years since the liberalisations have eroded Malawi's household livelihood and productive assets. With little or no resilience to climatic, economic or social shocks, and without coping capacity, households were increasingly vulnerable to food insecurity. Farmland has become a major constraint and source of vulnerability to food insecurity, because more than half of households' income and expenditure comes in the form of food produced by the household.

In addition, although infection rates are lower than in adjoining southern African countries, 14.2 percent of adults between 15 and 45 are infected with HIV and AIDS in Malawi (UNICEF 2004). This condition not only affects the ability of the infected person to utilize food and maintain health and productivity, it also undermines the capacity of the household to gain access and produce food. AIDS mortality lowering the number of productive adults and increases the number of dependent children in a household. Such households must take time away from productive activities to care for sick individuals. Thus, HIV and AIDS pervade the food security problem in Malawi where over 14 percent of adults are affected by the disease. It negatively affects household productive capacity, decreasing agricultural labour output and increasing dependency. It depletes the time and resources of caregivers, who might otherwise be able to produce food and earn income for food.

Finally, most of the population in Malawi faces vulnerability due to lack of diversification in food consumption such that when maize crop fails most people go hungry. For instance, the sampled households who indicated that they run out of food were asked to list what type of foods that they eat during the hunger periods. In response, about 98% of these reported that they still go for maize meal. This verifies what other authors say that in Malawi 'maize is life'.

5.3.2 The agricultural and market development poverty trap

Although liberalisation policies were implemented in Malawi but they failed to grasp the essence of the smallholder development challenge in the country. Actually, liberalisation policy helped to create the agricultural and market development poverty trap (Chirwa et al, 2006:11). For most of rural Malawi, the problem is how to get to the point of diversified and denser commercial activity since investment is held back by the interaction of market failure (particularly for credit) and the risks created by thin markets. The heart of the problem is the risky and high cost services to farmers as well as thin or failing markets. In summary, the agricultural and market development poverty trap is a consequence of the following interactive factors;

Firstly, farmers are poor and face long annual production and sales cycles. They also face climatic and price risks as well as possible shocks from illness. Since, the majority of smallholders are usually in net food deficit, therefore, they have to obtain food from the market through cash crop sales and/or off-farm activities such as short agricultural piecework contracts, petty trade and activities such as local beer brewing. These strategies for satisfying household food needs do compromise production on households' own land, for example, they may have to weed other farmers' field for immediate wages rather than their own fields.

Secondly, farm households away from major roads often experience a low density of commercial activity (commonly referred to as thin markets) and may have to travel a considerable way to buy inputs and sell outputs. Thus, given the small scale on which households might be able to produce marketable products (such as vegetables and fruits in addition to maize and cash crops), unit costs of market access are very high, thereby depressing returns to labour.

Thirdly, output markets are generally characterised by small traders with very limited liquidity. Of course, there are few exceptions for instance within the rural vicinity of urban Lilongwe, whereby the traders may actually harvest green maize or cassava on farmers' land, make payment and transport it by bicycles to the city, providing fairly "thick" markets despite limited liquidity.

Fourthly, in input supply, which is mainly a matter of fertiliser, suppliers face narrow time windows for supply such that fertiliser delivered late or over-stocked has to be stored for another 12 months or so in humid conditions. In addition, there is an uncertain demand, as it is not clear how much farmers will be able to afford. Unpredictable government and donor interventions further complicate the estimation of the cash market for fertiliser. With these uncertainties, a private supplier will tend to err on the safe side by practicing a cautious ordering and stocking policy.

5.4 Conclusion

This chapter looked at the smallholder agricultural activities in Malawi as a system comprised of the social, physical and economic functions. However all these functions have a bearing on the sustainability of the smallholder agricultural sector in Malawi as a system. In other words, these three functions are not independent of each other but rather they work towards one goal, which is increasing productivity of the system both now and in the future.

Under the social components, the study finds that the major challenge to smallholder productivity in Malawi is the decreasing size of the farms due to high population density and continuous fragmentation of the communal land among the family members. In addition, this land issue was worsened by the state policies in the 1960s, which promoted estate production at the expense of small-scale production as a resulted much land was annexed from the smallholder sector. Therefore, prevalence of these small land holdings calls for measures which would increase productivity on those smallholdings so that the food security status of the household is not threatened.

Secondly, the social component also discussed the literacy and education status of the household heads, which revealed that illiteracy is still a major challenge among Malawian smallholder farmers. This negatively affects there understanding and adoption of modern agricultural technologies disseminated by the extension workers thereby compromising on productivity and sustainability of the agricultural system.

The chapter also discussed the economic and the physical components of agricultural smallholder agricultural sector of Malawi. The discussion assessed the production trends and took into consideration the factors that contribute to agricultural productivity as a measure of agricultural sustainability. These factors were both economic and physical factors of production. The study thus revealed that the major economic factors affecting productivity were high input prices especially fertiliser and low prices for the outputs. These two factors have been highly influenced by the policy changes in the agricultural sector of Malawi. Of much importance was the liberalisation policy in the agricultural sector, which was responsible for the removal of the input subsidies in the 1990s and the removal of price controls on the produce market. These negatively affected production among smallholder farmers such that production since then has been low, stagnant and unpredictable.

The study however observed a change in the trends in the last three years (from the 2005/06 agricultural season) as the production in the smallholder sector increased such that the country realised surplus production especially in the main staple crop, maize. This increase in productivity came about due to the change in the government policy to re-introduce the input subsidy programme. Because the farmers could now afford the subsidised fertiliser, they were able to produce enough for their household subsistence requirements as well as had surplus to sale. This has greatly reduced the food insecurity levels in the country as well as livelihoods.

Lastly, the chapter also discussed other factors that affect agricultural sustainability. Among others, these factors include stability and diversification measures of household income, empowerment of the household economic base, which takes into consideration farmer trainings, farmer organisations and availability of agricultural credit facilities. In addition, other factors for agricultural sustainability also include environmental and natural resource base management, farmer adoption of technologies and the empowerment of the local governance structure.

In next chapter, the study goes on to make recommendation as to what strategies should be implemented in order to achieve sustainable agricultural development in Malawi considering the existing challenges in the smallholder sector.

CHAPTER VI

FINDINGS AND CONCLUSIONS

This chapter consolidates the work done from the first chapter where the research problem was presented up to the outcomes of the study in chapter five. Summaries on the major agricultural policies implemented in Malawi and the challenges they pose on the smallholder productivity were drawn. Based on the results of the study, some conclusions regarding the impact of these policies on sustainable agricultural development were deduced and recommendations for the implementation of the study were made.

6.1 Major findings and conclusions of the study

6.1.1 Challenging factors to sustainable agricultural development among smallholders in Malawi and the policy environment

In general, the study revealed that there are various factors that continue to affect the viability and productivity of smallholder agriculture in Malawi. Some of these factors are summarised below.

6.1.1.1 Small and fragmented land holdings

The study revealed that land in Malawi is a critical resource for most rural households, but its distribution is not equitable. Evidence of this problem is the existence of millions of smallholder farmers who cultivate small and fragmented pieces of land with an average per capita cultivated land of averaging 0.23 hectares. On the contrary, the 30,000 estate farmers cultivate 1.1 million hectares with an average landholding of between 10 to 500 hectares. Most of the land under smallholder cultivation is under customary land tenure, whose security is informal in which rights on disposal are restricted, but over time, this customary land has become smaller and fragmented through family sub-divisions.

The study also observed that access to land is linked to poverty in Malawi as it limits the production levels. In short, the study concludes that land size is a binding constraint to commercialisation of maize among smallholder farmers in rural Malawi with empirical evidence showing that in Malawi the adoption of agricultural productivity-enhancing technologies is positively associated with the size of cultivatable land. Therefore, the policy challenge is how to bring the issue of land reform as an integral part of a meaningful agricultural growth strategy.

6.1.1.2 Declining soil fertility

The study established that although a variety of sustainable agriculture technologies have been demonstrated which could restore soil fertility without requiring farmers to make annual expenditures on fertilisers; however, these technologies are challenged by very limited land and labour resources which poorer smallholders have. In other words, there is a high opportunity costs in order to undertake these medium term investments. Among others, these technologies include agro forestry practices and compost manure utilisation but up until now, in spite of promising early adoption of certain technologies, a successful sustainable agriculture technology able to spread rapidly among poor farmers is still unclear.

6.1.1.3 Failure of the agricultural credit markets

The study also illustrated that ever since the start of implementing of the liberalisation policies in Malawi, the government has struggled unsuccessfully to find a policy framework for maize, which would allow farmers to produce for the market with confidence to ensure both national and household food security. The liberalisation policies swept away the country's broad-based and largely successful agricultural credit system (although it was subsidised). Until now, the Government has failed to find a sustainable alternative for any smallholder farmers except for a small elite of cash crop producing smallholders most of which are tobacco growers. These few elite farmers normally access farm credit financing from the Malawi Rural Finance Company. Other smallholder farmers

get their farm financing from migrants' remittances and small surpluses gleaned from non-farm businesses. For the great majority of farmers there is no possibility of borrowing to finance the costs of inputs and labour. This much depresses the demand for inputs and agricultural yields.

Thus, the failure of broad-based agricultural credit markets to develop has held back input supply, which is dependent on a cash market financed mainly by various fragments of supply push from donors and the government. Examples of these supply pushes include the donor financed Starter Pack programme, followed by the Targeted Inputs Programme and recently the government financed fertiliser subsidy programme.

6.1.1.4 Thin agricultural markets (both inputs and outputs markets)

The study results confirmed the fact that internally, markets for agricultural produce and agricultural inputs are generally thin. Thin markets, refers to a situation where there is a low density of commercial activity. The withdrawal of state marketing in agricultural produce and inputs was expected to facilitate the entry of private operators but the results were disappointing. The former state-marketing agency provided two services, which were produce purchases and sales as well as input sales. Out of these two services, Chirwa et al (2006) find that input marketing has been the least attractive to the private sector. In addition, even the efficiency of the private sector in the marketing of agricultural produce has also been questioned because most of the private traders behave as local monopsonists. This means that these private traders becomes sole buyers of a particular commodity in a market which forces sellers of that particular commodity to accept lower prices than the socially optimal price.

6.1.1.5 Rural infrastructure

The study revealed that household's transaction costs in accessing the nearest state market outlet for agricultural inputs and outputs have a negative influence on the area cultivated by the smallholder farmers in Malawi. Access to agricultural markets and related improvements in rural infrastructure

and marketing institutions are especially essential for adoption of new technology and transformation of subsistence-oriented smallholder agriculture. Inadequate road infrastructure imposes significant burdens on cost-minimising smallholder farmers such that farmers faced with high farm-to-market access costs commit less land, fertiliser and other resources to production. In addition, access to other infrastructural services such as telecommunications and electricity also remain limited in Malawi. Since infrastructural services play a very vital role in agricultural development, the challenge is to achieve high accessibility rates for infrastructural services among the rural population given the low base.

6.1.1.6 Budgetary resource constraints to support subsidies

One other important factor that affects sustainability of agriculture in Malawi is the issue of resources. This is especially true because of the failures of the smallholder farmers to afford the means of production on their own thereby necessitating the state to intervene in promoting smallholder production. The recent government policy of providing Agricultural Inputs Subsidies to smallholder farmers demonstrates this factor. These interventions have huge budgetary implications on the government and given the donor-dependence of Malawi's recurrent budget, this poses a question on sustainability of such interventions.

6.1.1.8 Food insecurity

The study notes that Malawi still faces the challenge of achieving self-sufficiency in food production and in ensuring that there is an adequate national food balance. The challenge in achieving self-sufficiency in food production hinges on raising the productivity among smallholder farmers as well as diversifying the food basket. In order to increase productivity to achieve national food security without relying on food imports, intensification of maize productivity and other complementary policies are required. These complementary policies include appropriate technology transfers, free inputs, extension services, infrastructure development, credit schemes and market development,

subsidized inputs and attractive prices for agricultural output. The other issue in addressing food insecurity in Malawi is the question about the change in the food basket in Malawi. Maize is the main staple food such that national food security has traditionally been defined in terms of adequacy of maize production. In addition, maize meal forms the typical diet among rural households. These challenges suggest that a more intensive and commercially viable smallholder agriculture is highly desirable in Malawi to address the issues of chronic food insecurity.

6.1.2 Major agricultural policies implemented in the Malawi

To address the above challenges the study concedes that since independence, Malawi has implemented several major policy changes in the agricultural sector. These policies have had a direct impact on food security especially as regards to maize production and availability. The major agricultural policies implemented in Malawi can be summarised as follows;

6.1.2.1 The large-scale state interventions

From independence in 1964 to the 1970s, Malawi promoted a market-oriented nature of growth, which is an outward-looking strategy for rapid growth based on encouragement of private enterprises, use of market mechanism, favourable treatment of foreign capital, low levels of protection and wage restraint. Through these classical development prescriptions, Malawi was committed to an export-led development strategy based on the country's major agricultural exports consisting of tobacco, tea, groundnuts, and cotton.

This export promotion was pursued together with the desire to advance smallholder peasant production, hence, the bimodal/dualist nature of agriculture in Malawi with estates on side and smallholder farms on the other. In the 1960s, the estate sector was relatively smaller which was entirely dominated by European white settlers, however, it expanded rapidly in the 1970s as new estates were opened on uncultivated or lightly cultivated customary land (land reserved for

smallholders). These new estates were owned by Malawians and generally were capitalised by bank loans with little or no equity as most of the new estate owners had strong political connections. In addition to the estates, the state interventions during this time were also focused on promotion of an agricultural development strategy based on trickle down effects through the “master farmer” programmes. However, this approach created a differentiation of the smallholders with the “Achikumbe” better off while the rest of the peasants were neglected. In summary, the state interventions created inequalities in the agricultural sector in Malawi with the benefits of growth experienced during that time accruing to the few.

6.1.2.1 The Integrated Rural Development Projects

In order to address the inequalities in the agricultural sector, an Integrated Rural Development Project (IRDP) model was pursued as a series of large aid-financed projects from the late 1960s. Under IRDP, rural road infrastructure was much extended and a range of what had been crop-specific marketing boards was combined to form a state marketing parasitatal called ADMARC. ADMARC had a monopsony over most smallholder produce as well as sale of modern agricultural inputs to smallholder farms. Furthermore, because it was later tied in with the smallholder credit system, which was initially part of the IRDP administration, it had an effective monopoly over the key inputs of seed and fertiliser.

In net terms, ADMARC did tend to tax the smallholder sector and transfer the resources realised to invest in estates and other companies controlled by the political elite. However, within this picture of overall taxation of smallholders, ADMARC also tended to moderately cross-subsidise the smallholder maize system. Therefore, food prices were often above import parity, so that it was possible in some years to supply cheaper food to the majority of rural households who were in net deficit. During this time, food self-sufficiency was very important as it was also matter of political prestige.

6.1.2.3 The market liberalisation policies in the 1980s to 1994

Malawi's economy experienced a series of external shocks from later 1970s to early 1980s such as deteriorating terms of trade, steep rises in the price of fuel and external transport problems among others. As a result, the government launched a stabilisation programme to restore the external equilibrium of the economy as well as to improve growth hence the adjustment of various policies to provide better incentives for agricultural production and domestic investments. The situation was exasperated by drought in 1979/80, which consequently led to the need to import maize.

Because of this economic crisis, the country was forced to go through several reforms, which were implemented in phases over the years as part of economic development and increasing agricultural growth. The SAPs addressed inefficiencies associated with centralised public institutions, removed direct public control and involvement in agricultural production, reduced/eliminated public intervention in pricing of agricultural commodities and privatization was also promoted. However, a couple of decades of going through these reform policies, the country's predominantly agricultural based economy still remained fragile, highly subsistence and uncompetitive.

The situation worsened in the 1990's, when the World Bank pressed the government of Malawi to eliminate fertiliser subsidies entirely with a theory that farmers should shift to growing cash crops for exports and use the foreign exchange to import food. This had a negative impact on agricultural productivity as removal of subsidies had led to exorbitant fertiliser prices in the country. At the same time, the Smallholder Agricultural Credit Administration (SACA) system that delivered the subsidised seed and fertiliser to a minority of larger smallholders collapsed. These events of the collapsing of the credit system and the increased cost of fertiliser affected national food security as maize seed and fertiliser were priced beyond the cash means of most smallholders.

6.1.2.4 The universal Starter Packs and the Targeted Input Programs

Due to the inability of the majority of smallholder farmers to access inputs, the state had to intervene in the agricultural inputs markets particularly fertiliser and improved maize seeds. Thus, the government and its cooperating partners introduced the Starter Pack Scheme Programme (1998/99 to 1999/2000) and later the Targeted Input Programme (2000/01 to 2004/05) as a way of improving agricultural productivity. Under the Starter Pack Programme, all smallholder farmers received packages of seed and fertiliser adequate for 0.1 hectares while under the Targeted Input Programme, the focus changed as it targeted specific farmers who were deemed ultra-poor.

During this period, the country managed to produce enough for its population in the first two years of the starter pack programme but productivity declined in the third year due to poor weather conditions, pest infestations and lack of adequate use of inputs because of low purchasing power by the rural population. This situation worsened in 2001/02 where agricultural production was low against national food requirement leading to the food crisis such that a national disaster was declared due to the acute food short falls. Finally, the 2004/05 food crisis led to the re-introduction of the input subsidy programme implemented from 2005/2006 planting season.

6.1.2.5 The Agricultural Input Subsidy programs from 2005 to date

Malawi being a land locked country, the price of inputs is very high that smallholder farmers can hardly afford. The high input prices, national disasters combined with declining soil fertility due to over utilisation of land overtime has resulted reduced maize yield to levels that cannot support food security in Malawi. Government had been losing a lot of forex in importing maize. All these led Government to change its policy in 2005 to focus against the popular thinking of development partners from the West. Therefore, the country re- introduced the input subsidies to smallholder farmers with the aim of eradicating hunger in Malawi by making improved seeds and fertilisers

available to smallholder farmers at affordable price so as to enhance the agricultural sector's productivity and improve food security at both household and national level. The subsidy package include maize fertilisers, maize seed, cotton seed and pesticides, tobacco fertiliser as well as flexible coupons with which farmers can buy any other seeds.

The re-introduction of subsidies in agricultural inputs and the use of improved agronomic technologies led to the country transformed the country from a net importer to a net exporter at least within the three years under review in this study (2005/06 to 2007/08 growing seasons). Consideration the current world economic situation in which fertiliser costs have escalated, high food prices and a high demand for cereals due to bio-fuel production and animal feed production, it can be concluded that subsidizing agriculture to raise productivity of smallholder farmers is cheaper than importing grain. On the other hand, the increased production for maize specifically in the years of good weather patterns has led to active participation of private traders in importing and marketing of agricultural inputs.

Theoretically, the study alluded to the fact that in international academic and aid circles, there has emerged a chain of arguments on the African political economy. One of these is that African politics is characterised as neo-patrimonial and clientist practices which are opposed to the sustenance of a "developmental state". In Africa, the state is weaker and has more need for the political support of clients. Resources are siphoned off from the state by what are generally a small group of individuals and spent largely on consumption. In addition, within African government ministries are thought to be small and vulnerable to political predation, therefore unstable. This has often led to paralysis of smallholder agriculture particularly that of poorer farmers who cannot develop without state support. However, the recent Malawi's subsidised inputs policy story generally does not conform to the neo-patrimonialist-clientist paradigm. The policy was carried out with tolerable effectiveness, by the state bureaucracy, under the instructions of the political leadership.

To summaries the review of the policies, the study conclude that since independence, Malawi's development strategies have focused on improving productivity of land and labour in the agricultural sector with varying degrees in emphasis.

6.1.3 Impacts of the agricultural policies on smallholder agricultural productivity

The study affirmed that the various policies implemented in the agricultural sector in Malawi made impact on the smallholders and some of the major ones are summarized below;

6.1.3.1 Impact on land productivity

The customary land holding system practiced in Malawi has negative effects on land productivity. Due to the fragmentation of land among smallholders as the family grows, the farms have become too small with time to produce enough food for the sustenance of the household. Consequently, the farmers tend to over utilise their land and the only way to extend has turned out to be the cultivation of marginal lands such as hillsides, which are agriculturally unproductive on top of causing land degradation, deforestation and excessive erosion. All these factors combined with excessive soil over mining over time have resulted in declining soil fertility hence reduced maize yield to levels that cannot support food security in the country.

The country has not fully utilized its water resources to intensify agriculture productivity through irrigation, which is one of the ways out of the scenario above. Malawi agriculture is based on rain-fed cultivation with very little irrigation farming taking place, and in most cases such irrigation farming is done by large-scale farmers and smallholder farmers on government schemes. However, currently there is has been a remarkable increase of smallholder land being in irrigated. The recent drive to promote irrigation is mostly through treadle pumps, motorized pumps and river diversion irrigation. Of course, there are questions about the efficiency of large and small scale irrigation with

some arguing that large scale schemes absorb subsidy for the benefits of small numbers of farmers while, on the other hand, treadle pumps are questioned as an appropriate technology for smallholders as the man-power demands to operate such pumps are enormous.

6.1.3.2 Impact on input and output markets

The liberalisation of markets and state withdrawal in various markets led to the erosion of complementary services necessary for the promotion of agricultural growth. These complementary services include extension services, provision of agricultural finance and interventions in product and input markets. Prior to reforms the various markets and services were coordinated through the active participation of the state in the agricultural sector. For example, through the state marketing corporation-the Agricultural Development and Marketing Corporation (ADMARC), smallholder farmers had access to agricultural finance (input credit) and easy access to product and input markets. These services were complemented by an extensive network of agricultural extension services.

However, during the 1990s, there was a progressive reduction in the budget towards extension services resulting in the erosion of technical expertise. Similarly, funding towards agricultural research substantially declined. As a result, the percentage of households in Malawi receiving advice from extension staff declined. Although farmer organisations emerged in the 1990s, they were unable to coordinate these complementary services with many facing constraints in their outreach and operations. The impact of the erosion of extension services is evident among smallholder farmers involved in cash crops production.

Product markets and input markets for agricultural growth are not functioning. Many smallholder farmers are not integrated into the market system. Transaction costs remain high due to low economic activities, low traded volumes of agricultural produce, inputs and agricultural finance (Dorward and Kydd, 2004). There is variable access to input markets and output markets are less

favourable to smallholder farmers. Access to agricultural finance is also limited among smallholder farmers, particularly since the collapse of the smallholder credit scheme within the coordinated structure of ADMARC. Commercial banks and microfinance institutions consider lending to the agricultural sector as a risky investment due to the seasonality of the income stream and the unpredictability of the natural environment particularly for rain-fed agriculture that is practiced in Malawi. Thus, most financial institutions are willing to lend to non-farm activities. However, recent government actions on produce and input markets indicate the desire to revive the role of ADMARC in the purchase and marketing of smallholder agricultural produce.

6.1.3.3 Impact on household and national food security

With active state support in the 1960s and 1970s, Malawi was mostly food secure. However, due to removal of input subsidies during the period of structural adjustments, the country was generally characterized by severe food insecurity particularly in drought years. The natural disasters coupled with high inputs of fertiliser made attainment of food security impossible in Malawi because the smallholder farmer are so prone to both economic and weather related shocks. The re-introduction of the subsidies changed this scenario as the farmers managed to produce enough for their households and had surplus to sale.

In conclusion, the experience of smallholder development in Malawi over 1965 to 1985 reveals that much can be achieved with state support and the intelligent supply of public goods. The post liberalisation experience in Malawi therefore suggests that smallholder agriculture cannot make progress without some state intervention, due to market failures (with exceptions of smallholder cash crops such as tobacco, tea, cotton and coffee).

Thus, the outcomes of the implementation of various agricultural policies proves the fact that unless farmers in Malawi have access to improved inputs for both production and diversification,

unacceptably large numbers of the poor are exposed to hunger with the likelihood of being pushed further below the poverty line. This has been evidenced by the fact that the provision of the means of production in terms of subsidised inputs led to significant transformation of the country from a net food importer to a net food exporter. It also allowed the majority of the households to attain food security as well as lowering and stabilizing maize prices. Therefore, government support in the smallholder sector using agricultural policies that promotes active smallholder farmers participation in food production through provision of input subsidies, use of improved agronomic technologies and intensifying agriculture through irrigation are significant factors towards increased agricultural productivity and sustainable agricultural development in Malawi.

6.2 Recommendations

Although, most economists were initially apprehensive with the re-introduction of fertilizer subsidy as they assumed that subsidies would be likely to introduce distortions in the input markets and ruin the developing private sector input traders, but so far the intended results have been realised. The government of Malawi has since adopted the subsidies as one of the country's agricultural policies. Therefore, since the fertilizer subsidies are the future of agricultural growth policy in Malawi, the challenge remains how to sustain such subsidy levels in the long run given an economic environment with high transportation costs and a volatile exchange rate market. In order to achieve large incremental impact of the subsidy programme beyond the effect of better rainfall, the study suggests an increased participation of the private sector, especially the agro-dealer network. Participation of the private sector input suppliers in the fertiliser program could generally foster the development of the private sector.

However, the varying opinion for and against the current government policy stance in Malawi suggests that this approach still requires a sustainable exit strategy which will not only look at the

inputs market but also at the output markets. This approach will enable producers to sell their produce at higher prices sufficient enough for them to afford agricultural inputs without subsidies.

Nonetheless, in order to maximize the benefits from the agricultural input subsidy programme, there is also need to improve the efficiency of implementation and the use of inputs by smallholder farmers. This, among other issues, entails efficient planning, timeliness in the procurement and delivery of inputs, greater involvement of the private sector, efficiency in targeting of beneficiaries, efficiency in delivery of input supplies to various markets and appropriate use of inputs by smallholder farmers. Addressing these issues will enhance the effectiveness of the agricultural input subsidy programme in increasing maize productivity, which will in turn positively contribute to agricultural growth and poverty reduction.

In addition, research on coordination and industrial policy in developed countries has shown that successful coordination tends to involve a sensitive blend of private, local government and central government activity. In smallholder development in Malawi, three categories of coordination are identified. Firstly, vertical coordination along the supply chain, which is needed to reduce the risks of asset specificity. For instance, missing credit markets are a critical challenge to smallholder farmers because both upstream and downstream their absence inhibits investment in areas such as input supply and in produce buying storage and processing.

Secondly, there is need for horizontal coordination which affects units in the same category, for example smallholder farmers, input merchants and providers of finance. There are a number of motives for engaging in horizontal coordination. One example is where suppliers have advanced inputs to farmers under interlocked contracts, under which farmers have to sell produce to the supplier at a price which allows the supplier to make a profit. An example is the activities of farmer organisations, which may combine to achieve economies of scale in transport, or perhaps to monitor grading activity by private buyers (NASFAM in Malawi does both of these). Finally, the classic

agricultural public goods (research, extension, irrigation infrastructure) are a form of horizontal coordination.

Thirdly, a complementary coordination arises where there are economies of scope for particular organisations, public or private, to provide a number of different services to farmers. For example, in the example just given of interlocking, it may sometimes be efficient to integrate the supply of inputs and finance and the purchase of output. This is a very common pattern in service provision to smallholder cash crop farmers, although less so for food crops, because food may be consumed by the household rather than marketed. This point yields an insight into the particular challenges of servicing smallholder food producers. They are less amenable to complementary service delivery, although this can sometimes be achieved through organisations which encompass cash and food crops. This was one of the strong rationales for creating ADMARC out of a number of crop specific boards.

6.3 Conclusion

The review of the fundamental challenges of smallholder development in Malawi shows that what was implemented in the 1970s to early 1980s provided some solutions to the fundamental problems which have not been yet provided under liberalised markets (again with exceptions for tobacco and some other cash crops). This was the Integrated Rural Development Projects (IRDPs) working hand in hand with the state marketing parasitatal (ADMARC) However; the IRDP-ADMARC as it existed in the mid-1980s was itself defective in many ways and probably financially unsustainable. Finally, the study agrees with Chirwa, et.al (2006:14) that “if broad-based smallholder development is to occur in Malawi, it will require policies and institutions which respond with intelligence and insight to the fundamental challenges and learn from the historical experience of the pre and post

liberalisation periods”. This calls for greater participation of Malawian citizens, civil society, associations and the private sector in the policy debates using various mechanisms.

Secondly, since the smallholder farmers have the monopoly over the production of maize and other subsistence crops, the local institutions such as farmer associations could be used to articulate the interests of smallholder farmers. Political local representatives could use the parliament to debate on policy choices so that the most efficient and effective policy trade-offs are made to promote sustainable development. Donors could strengthen these institutions by building up their capacities of understanding issues so that they can ably participate in national and local agricultural development processes.

Lastly, the role of the state would be to provide the conducive environment for sustainable agricultural development by playing a coordination role. This is so because much as it acknowledged that policy making is participatory and consultative but to a significant degree it has also been noted that the budgeting process is very much isolated from the policy making process. With the developmental state playing a coordination role among the stakeholder, a lot can be achieved to promote sustainability of agricultural development in the Malawian smallholder sector.

BIBLIOGRAPHY

- Altafin, I. 1991. Participatory communication in social development evaluation. *Community development*, (26): 312– 314.
- Ashley, C. And Simon Maxwell. 2001. Rethinking Rural Development. *Development Policy Review*, 19(4):395-425
- Babbie, Earl. 2007. *The Practice of Social Research*. 11th edition. Belmont, California: Thomson wadsworth.
- Barnett, et al (eds). 1995. Agricultural sustainability; economic, environmental and statistical considerations. Chichester: John Wiley and Sons Ltd.
- Bartlett, J.E., J.W Korlik and C.C Higgins. 2001. Organisational Research: Determining Appropriate Sample Size in Survey Research. *Information technology, learning and performance journal*, 19(1): 43-50
- Benin, S., T. Mogues, J. Randriamamonjy, and G.Cudjoe. 2007. *Returns to public agriculture expenditure in Ghana*. Washington, D.C.: International Food Policy Research Institute. (Forthcoming.)
- Benson, T., Machinjili, and Kachikopa, L. 2004, *Poverty in Malawi 1998*, Food Consumption and Nutrition Division Discussion Paper No. 183, International Food Policy Research Institute, Washington.
- Binswanger, Hans P. 1986. "Agricultural Mechanization: A comparative historical perspective". *The World Bank Research Observer*, 1(1): 27-56.
- Bird, K and Booth, D. 2003. *Food Security Crisis in Southern Africa: The Political Background to Policy Failure*. Birmingham: University of Birmingham,
- Bonny, I and Dibua, D. 2003. Deconstructing Ujamaa: The legacy of Julius Nyerere in the Quest for Social and Economic development in Africa. *Afri. J. politic. sci.* 2003, 8(1)

- Borlaugh, N. 1970. *Nobel Peace prize acceptance speech*. International maize and wheat improvement centre. Mexico City.
- Bostein, D. 1995. The Bare Foot Bank with a cheek. *The Atlantic Monthly Company*, 6(276): 40-47.
- Bradford, B and Gwynne, M.A. 1995. *Down to earth: Community perspective on health, development and the environment*. England: Kumarian Press
- Broadbent, K.P. 1990. Information needs for rural development. *Information development*, 6:49–54. Available at idv.sagepub.com/cgi/content/refs/6/1/49
- Buhler, U. 2001. *Participation with 'justice and equity' beyond the new tyranny*. Bradford: University of Bradford
- Chambers, R. 1983. *Rural Development: Putting the Last first*. Harlow: Longman.
- Chenery, H.B., Elkington, Hazel and World Bank. 1974. *Redistribution with growth*. London: Oxford University Press.
- Chilowa, W.1999. The Impact of Agricultural liberalisations on food security in Malawi. *Food Policy*. 23(6):553-569
- Chinsinga, B. 2005. *Practical and Policy Dilemmas of Targeting Free Inputs*, in S. Levy (ed) *Starter Packs: A Strategy to Fight Hunger in Developing Countries?* Oxfordshire: CABI Publishing
- Chipande, G. 1984. *The impact of demographic changes on rural development in Malawi*. Paper presented at the seminar on population, food and rural development. IUSSP.
- Chirwa, E. W. and Zakeyo, C. 2003. *Impact of Economic and Trade Policy Reforms on Food Security in Malawi*. A draft final report submitted to the Food and Agriculture Organisation (FAO) and the African Economic Research Consortium (AERC).
- Chirwa, E.W., Kydd, J., Dorward, A. 2006. *Future scenarios for agriculture in Malawi: challenges and dilemmas*. Paper presented at future agriculture Consortium, Institute of Development Studies, Sussex.

- Chirwa, E. 2007. *Sources of technical efficiency among smallholder maize farmers in Southern Malawi*. AERC Research paper 172. African Economic Research Consortium. Nairobi, November 2007.
- Cleaver, F. 2004. The limits of participation in development. *The Sahel*, 17: 67-82
- Clive. 2007. *A new green history of the world; the environment and the collapse of street civilization*. Penguin Books. New York.
- Cohen M.J. 1987. *Integrated Rural Development – The Ethiopian Experience and the Debate* Uppsala, The Scandinavian Institute of African Studies
- Communication Initiative Network. 2003. *Participatory theories and approaches*. Placed on the Communication Initiative site on 29 March 2003.
- Conway, G.R. 1987. “The properties of agro ecosystems”. *Agricultural systems*, 24(2): 95-117
- Conway G.R and Barbier, E.B. 1990. *After the green revolution: sustainable agriculture for development*. Earth Scan Publications Limited. London.
- Crook, C. R. 2003. Decentralization and Poverty Reduction in Africa: the Politics of Local-Central relations. *Journal of Administration and Development* 23 (1): 77-7.
- Delgado, C.L. 1995. *Africa’s changing agricultural development strategies: past and present paradigms as a guide to the discussion paper 3*. Washington D.C: International Food Policy Research Institute.
- Denning G, et al. 2009. Input Subsidies to Improve Smallholder Maize Productivity in Malawi: Toward an African Green Revolution. *PLoS Biol* 7(1): e1000023 doi:10.1371/journal.pbio.1000023
- Department of Animal Health and Livestock Development. 2009. *Report presented at the Food and Nutrition Security Policy Joint Task Force*. Sun and Sand. Holiday Resort. September, 2009
- Department of Irrigation. 2009. *Annual report 2008/09*. Lilongwe, Malawi.
- Department of Irrigation. 2008. *Monitoring and Evaluation guidelines*. Lilongwe.

Department for International Development (DFID). 2007. *A record maize harvest in Malawi*. Press release 08May, 2007. Available at: <http://webarchive.nationalarchives.gov.uk/+http://www.dfid.gov/casestudies/files/Africa/malawi-harvest.asp>

Devereux, S. 2002. *The state of disaster, causes and consequences of policy lessons from Malawi*. Lilongwe: ActionAid

D'haese, L and Kirsten, J. 2003. *Rural Development; focussing on small scale agriculture in Southern Africa*. Belgium: University of Ghent and Antwerp.

Discussion paper, Malawi financial sector strategy. 2009. Department of Irrigation. 2009. *Monitoring and Evaluation guidelines*. Lilongwe

Dorward, A and Kydd, J., 2004. *The Malawi 2000 food crisis: The rural development challenge*. Imperial College Wye.

Dorward, A., R. Sabates Wheeler and B. Guenther. 2008. *Linking social protection and support to small farmer development: Malawi Case Study*. A paper commissioned by FAO.

Ellis, F. 1998. "survey article: Household strategies and rural livelihood diversification," *The journal of Development Studies*, 35(1): 1-38

Ellis, F. 2000. *Rural livelihoods and diversity in developing countries*. Oxford: Oxford University Press.

Ellis, F and Biggs, S., 2001. Evolving themes of rural development 1950s -2000. *Development Policy Review*, 2001, 19(4): 437 – 488. Oxford: Blackwell Publishers.

Escobar, A. 1995. *Encountering Development: The making and unmaking of the third world*. Princeton, N.J: Princeton University Press

Famine Early Warning Systems (FEWSNET). 2007. *Malawi food security update*. Available at http://www.fews.net/docs/publications_200707_en.pdf.

- Fisher, S. 1981. "Relative shocks, relative price variability and inflation," *Brookings papers on Economic activity*, 2: 381 – 431.
- Food and Agriculture Organisation (FAO). 2008. *The state of food insecurity in the world; high food prices and food security – threats and opportunities*. Available at <http://www.untj.org/files/news>
- Fowler, H.W and Fowler, F.G (eds). 1972. *The Concise English Dictionary*. Oxford: Clarendon Press.
- Francis, C.A and King, J.A. 1998. Cropping systems based on farm derived renewable resources. *Agricultural systems*, 27:67-75.
- Frankenberger, T., Kristina Luther, Karyn Fox, and John Mazzeo. 2003. *Livelihood Erosion Through Time: Macro and Micro Factors that Influenced Livelihood Trends in Malawi Over the Last 30 Years*, CARE.
- Garforth, C. 2005. *The Challenge of Agricultural Extension*, in S. Levy (ed) *Starter Packs: A Strategy to Fight Hunger in Developing Countries?* Oxfordshire: CABI Publishing
- Gilbert, R.A., W.A. Sakala and T.D Benson. 2002. Gender analysis of a nation-wide cropping system trial survey in Malawi. *African Studies Quarterly*. doaj.org
- Goodwin, R. 1978. Wicksell and the Malthusian catastrophe. *The Scandinavian Journal of Economics*. Peterhouse College. Cambridge.
- Government of Malawi. 1999. *The review of Malawi agricultural policies and strategies*. Lilongwe: Ministry of agriculture and Irrigation.
- Government of Malawi. 2000a. *National Irrigation Policy and Development Strategy (NIPDS)*. Lilongwe: Department of Irrigation
- Government of Malawi. 2000b. *Agricultural Extension in the new millennium: towards pluralistic and demand driven services in Malawi. (Policy document)*. Lilongwe: Department of Agricultural Extension Services

Government of Malawi. 2000c. *The Irrigation Act*. Lilongwe. Department of Irrigation.

Government of Malawi. 2001. *Malawi Poverty Reduction Strategy (MPRS)*. 2001 -2005. Lilongwe.

Government of Malawi. 2002. *Malawi National Land Policy*. Lilongwe: Ministry of Lands, Physical Planning and Surveys.

Government of Malawi. 2005a. *Food and Nutrition Security Policy*. Lilongwe; Ministry of Agriculture and Food Security.

Government of Malawi. 2005b. *The Malawi Second Integrated Household Survey 2004-2005(Malawi IHS2)*. Zomba: National Statistical Office

Government of Malawi. 2006. *Malawi Growth and Development Strategy: From poverty to prosperity*. 2006 – 2011. Available at http://siteresources.worldbank.org/MALAWIEXT/Resources/MGDS-20006_final.pdf. Accessed 18 December, 2008.

Government of Malawi. 2009. *National Budget Statement*. Lilongwe: Ministry of Finance

Griffin, Keith. 1979. *The political economy of agrarian change: an essay on the green revolution*. 2nd edition. London: The Macmillan Press Limited

Harrigan, J. 2005. *Food Security Policies and Starter Pack: a Challenge for Donors?* Cited in Levy, S. (ed) *Starter Packs: A Strategy to Fight Hunger in Developing Countries?* Oxfordshire: CABI Publishing.

Imperial College London, Wadonda Consult, Michigan state University and Overseas Development Institute. 2007. *Evaluation of the 2006.07 Agricultural Input Supply Programme, Malawi*. Interim Report. London. Available at: <http://www.aec.msu.edu/fs2/inputs/documents/marchReportFINALXXB.pdf>, Accessed 18 December 2008.

- International Development Association (IDA). 2004. *Community-Based Rural Land Development Project, (Appraisal Document)*, No. 2188-MAI March 15, 2004. Washington, D.C. C.A: IBRD
- International Fund for African Development. 2007. *Rural poverty in Malawi*. Lilongwe: IFAD Malawi.
- Jennings, R. 2000. Participatory process as a new paradigm: The transition of development professionalism. Prepared for the 'community based re-integration and rehabilitation in post-conflict settings' conference. Washington D.C
- Johnson, B.F. 1970. "Agricultural and Structural Transformation in Developing Economies. A Survey Research". *Journal of Economic Literature*.
- Kalinga, O.J.M. 1993. The Master Farmers Scheme in Nyasaland 1950-1962: A study of a failed attempt to create a 'yeoman' class. *African Affairs*, 92:367-388
- Kavinya A., Alam S., Decock A.1994. *Applying DSC methodologies to population issues: a case study in Malawi*. Rome: FAO.
- Kishindo, Paul. 2006. *Dynamics of Land Tenure; a village case study*. Zomba: University of Malawi.
- Krejcie, R.V and Morgan, D.W. 1970. Determining sample size for research activities. *Educational and psychological measurements*, 30:607-610
- Kundell, Jim. 2008. "Water profile of Malawi." In: *Encyclopedia of Earth*. Eds. Cutler J. Cleveland. Washington, D.C: Environmental Information Coalition, National Council for Science and the Environment. Retrieved February 23, 2009 at <http://www.eoearth.org/article/Water_profile_of_Malawi
- Kvale, S. 1996. *Interviews: An introduction to Qualitative Research Interviewing*. London: Sage.

- Lele, Uma J. 1989. *Fertilizer policy in Africa: Lessons from development programs and adjustment lending, 1970 -87. Madia discussion paper, 5.* Washington D.C: The World Bank.
- Levy, S. (2005) *Starter Packs: A Strategy to Fight Hunger in Developing Countries?* Oxfordshire: CABI Publishing
- Lewis, W.A. 1954. "Economic development with unlimited supplies of labour", *The Manchester School*, Vol.22, No. 2, pp. 139-191.
- Lewis,W.A. 1965. *The principles of economic planning; A study prepared for the Fabian society.* London: Unwin Press
- Leornado, Pauline. 1986. *Food in the third World. Past trends and projections to 2000.* Washington: IFPRI.
- Mackee, N. 1992. *Social mobilisation and social marketing in developing communities; lessons for communicators.* Penang: South bound.
- Makoba, W. 2000. Non Governmental Organizations and the Third World development; an alternative approach to development. *Journal of third world studies*, spring 2002.
- Malawi Vulnerability Assessment Commission (MVAC). 2005. *Provisional results of the harvest outcome analysis..* Lilongwe, Malawi: Ministry of Agriculture and Food Security.
- Mason, N., T.S. Jayne, C. Donovan, and A. Chapoto. 2009. 'Are Staple Foods Becoming more Expensive for Urban Consumers in Eastern and Southern Africa? Trends in Food Prices, Marketing Margins, and Wage Rates in Kenya, Malawi, Mozambique, and Zambia.' MSU International Development Working Paper No. 98 June 2009.
- Ministry of Agriculture and Food Security (MoAFS). *The Agricultural Development Programme; Malawi's prioritised and harmonised agricultural Development Agenda 2008-2011. (Final draft).* Lilongwe: Ministry of Agriculture and Food Security

- Ministry of Agriculture and Food Security (MoAFS). 2008a. *2007/08 Agricultural Inputs Subsidy Review report*. Lilongwe, Malawi.
- Ministry of Agriculture and Food Security (MoAFS). 2008b. *Malawi: Renewed maize surplus report*. Lilongwe, Malawi.
- Ministry of Economic Planning and Development. 2005. *Comprehensive Mid-term Review for Malawi (Decade 2001 – 2010)*. Lilongwe, Malawi.
- Mtawali, K. 1993. Trade, price and market reform in Malawi:current status, proposals and constraints. *Food Policy*. 18(4): 300-307
- Mvula, P. Chirwa, E.W and Kadzamira. 2003. *Poverty and social impact Assessment in Malawi; closure of ADMARC markets, Executive summary*. A draft final report submitted to Social Development Department, World Bank and Economic Section/PRSP Support, GTZ.
- National Statistical Office. 1998. *National Survey Data*. Zomba, Malawi
- National Statistical Office (NSO). 2008. *National Population Census*. Zomba
- Nicholson, H. and Schreiner, S. 1973. *Community Participation in the Decision Making Proces*. Jeynes: Open University Press.
- Nyerere, Julius. 1968. *Ujamaa: Essays on Socialism*. Dares Salaam: Oxford University Press
- Obare, G.A., S.W Omamo and J.C Williams. 2003. Smallholder production structure and rural roads in Africa: a case of Nakulu District in Kenya. *Agricultural Economics*, 28:245-254
- Porter, Micheal E. 2004. *Competitiveness in rural US Regions; Learning and Research agenda*. Havard Business School: Institute for strategy and competitiveness.
- Quinn, V. 1986. *Malawi: Agricultural Development and Malnutrition*. A paper presented at the workshop on statistics in support of African food strategies and policies. Brussels, May 1986.
- Rahnema, M and Bawtree, V. 1997. *The Post-development Reader*. London: Zed Books Ltd.

- Ranis, G and Fei, J.C. 1961. A theory of economic development. *The American Economic Review*, 51(4): 533-565
- Ritson, Christopher and Swinbank, Alan. 1988. "The common Agricultural policy, customs unions and mediterranean basin." *Journal of common market studies*, Blackwell publishing, 27(2): 97-112.
- Rutherford H. 1980. *Farming System in the Tropics*. London: Oxford University Press.
- Sahley, C., Groelsema, B., Marchione, T. and Nelson. D. 2005. *The governance Dimensions of food security in Malawi*. Lilongwe: USAID Malawi.
- Sahn, E.D and Arulpragasam, J. 1991. The stagnation of smallholder agriculture in Malawi: A decade of structural adjustment. *Food Policy*, 3(16): 219 – 234
- Samater, I. M. 1984. From 'growth' to 'basic needs'; the evolution of development theory. *Monthly review*, 36(1).
- Sen, A. 1981. *Poverty and Famines: An Essay on Entitlement and Deprivation*. Clarendon Press, Oxford
- Smale, M. 1995 "Maize is Life": Malawi's Delayed Green Revolution. *World Development*, 23, 819-831
- Stevens, R.D. 1977. *Tradition and dynamics in small-farm agriculture: Economic studies in Asia, Africa and Latin America*. Iowa: Iowa State University Press.
- Steven, R.D and Jabara, C.L. 1988. *Agricultural principles: Economic theory and empirical evidence*. Baltimore: Johns Hopkins University Press.
- Spedding, C.R.W., Walsing, J.M. and Hoxey, A. M. 1981. *Biological efficiency in agriculture*. New York: Academic Press Inc.
- Spring, Anita. 1995. *Agricultural Development and Gender Issues in Malawi*. Maryland: University Press of America

Tchale, H., Kumwenda, I., Worbst, P. and Mduma, J. 2009. Technical efficiency of smallholder farmers in Malawi in the post reform era; which policies matter? Lilongwe: Malawi Agricultural Sector Investment Programme.

Scott, James. 1998. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven, Conn.: Yale University Press.

Stark, N. 2005. *Effective rural governance: what is it? Does it matter?* Washington, D.C: Rural Research Institute.

Todaro, M.P and Smith, S.C. 2009. *Economic development, 10th edition*. USA: Addison Wesley.

United Nation Children's Fund (UNICEF). 2004. *State of the World Children*. available at: <http://www.unicef.org/search.php?q=state+of+the+world%27s+children+2004&Go.x=0&Go.y=3>

United Nations Development Programme. 1990. *Human Development Report 1990*. New York. Oxford University Press.

United Nations Human Development Programme. 2008. *Human development report 2007/2008. Fighting climate change; human solidarity in a divided world*. Palgrave Macmillan.

White, A., Sadarandan, N.K., Ascroft J. (eds). 1994. *Participatory communication. Working for change and development*. Sage: New Delhi.

World Bank . 1986. *Poverty and hunger*. Washington D.C: World Bank

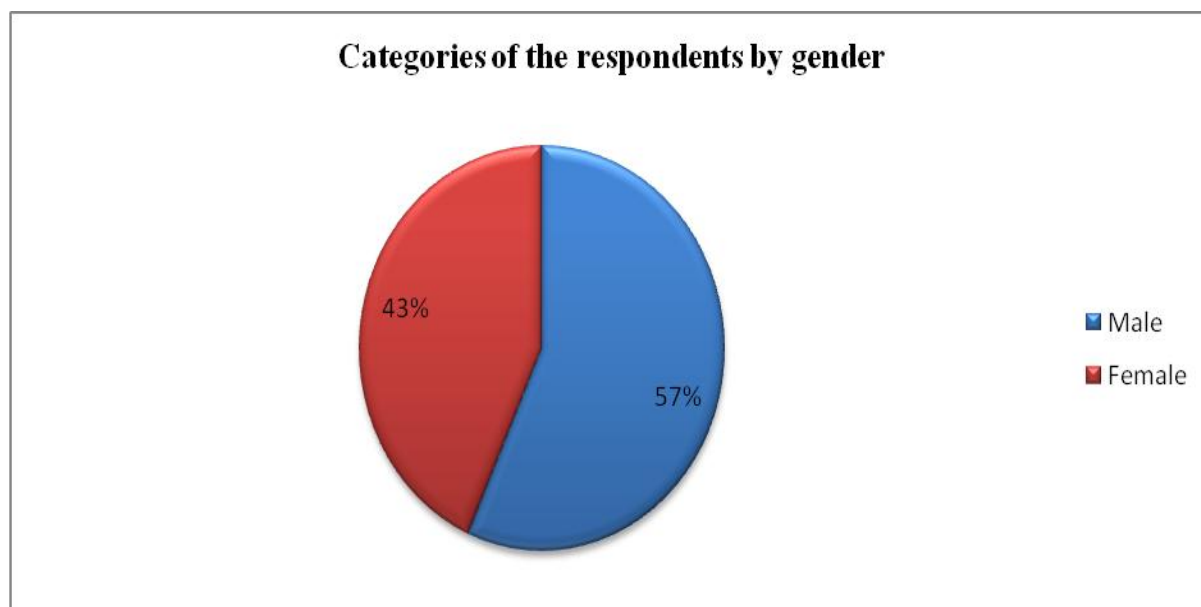
World Bank. 1990. *World Development Report 1990. Poverty: World Development Indicators*. New York: Oxford University Press.

World Commission on Environment and Development. 1987. *From one earth to one world: An overview*. Oxford: Oxford University Press.

Zeitlin, A. 2007. *Development and the dual economy*. Available at <http://users.ox.ac.uk/~exet1357>.

ANNEXES

Annex 1: Categories of respondents by gender



Source: Field Survey, 2009

Annex 2: Composition of households in the community by age and gender of the household

heads

Gender of the household Head	Age of the household head					Total
	less than 18 years	between 18 and 35 years	between 36 and 50 years	between 51 and 65 years	above 65 years	
Male	1.32	42.11	35.53	14.47	3.95	97.37
Female	0.00	0.00	1.32	1.32	0.00	2.63
Total	1.32	42.11	36.84	15.79	3.95	100

Source: Field survey, 2009

Annex 3: Composition of households in the community in relation to household size and age of the household heads

Age of the household head	Percentage household composition				Total
	less than three members	between 3 to 5 members	between 6 to 8 members	over 8 members	
less than 18 years	0.00	1.32	0.00	0.00	1.32
between 18 and 35 years	3.95	31.58	5.26	1.32	42.11
between 36 and 50 years	1.32	17.11	15.79	2.63	36.84
between 51 and 65 years	1.32	7.89	3.95	1.32	15.79
above 65 years	0.00	2.63	1.32	0.00	3.95
Total	6.58	60.53	26.32	5.26	100.00

Source: Field Survey, 2009

Annex 4: Education and literacy level of the household heads

Education level of the household head	Literacy level of the household head (%)			Total
	can only read	can read and write	cannot read and write	
No formal education	1.32	1.32	23.68	26.32
Junior primary education	0.00	30.26	3.95	34.26
Full primary education	0.00	30.26	0.00	30.26
Junior certificate	0.00	2.63	0.00	2.63
Completed secondary school Education	0.00	5.26	0.00	5.26
Diploma and degrees	0.00	1.32	0.00	1.32
Total	1.32	71.05	27.63	100.00

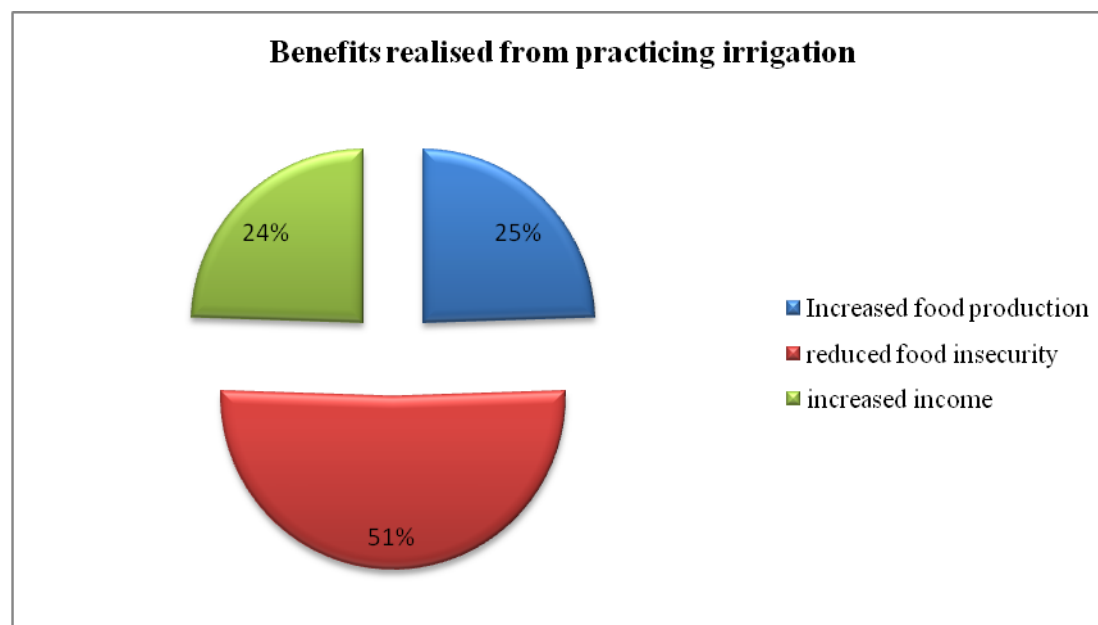
Source: Field Survey, 2009.

Annex 5: Type of the main dwelling owned by the households

Type of building materials		Frequency	Percent	Valid Percent	Cumulative Percent
Roofing	grass thatched roof	66	86.8	86.8	86.8
	Iron sheets Roof	10	13.2	13.2	100.0
Walls	unbaked bricks	16	21.1	21.1	21.1
	Baked bricked	18	23.7	23.7	44.7
	Mud walls	42	55.3	55.3	100.0
Floor	Mud floor	72	94.7	94.7	94.7
	Cement	4	5.3	5.3	100.0

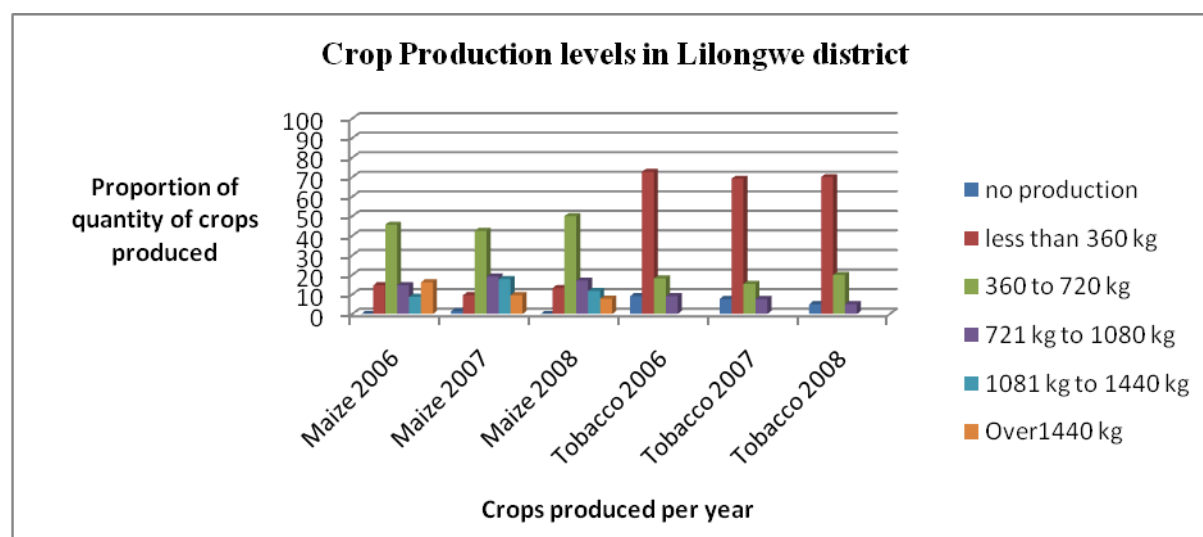
Source: Field Survey, 2009.

Annex 6: Benefits realised from irrigation farming



Source: Field survey, 2009.

Annex 7: Production levels of various crops in Lilongwe district



Source: Field Survey, 2009.

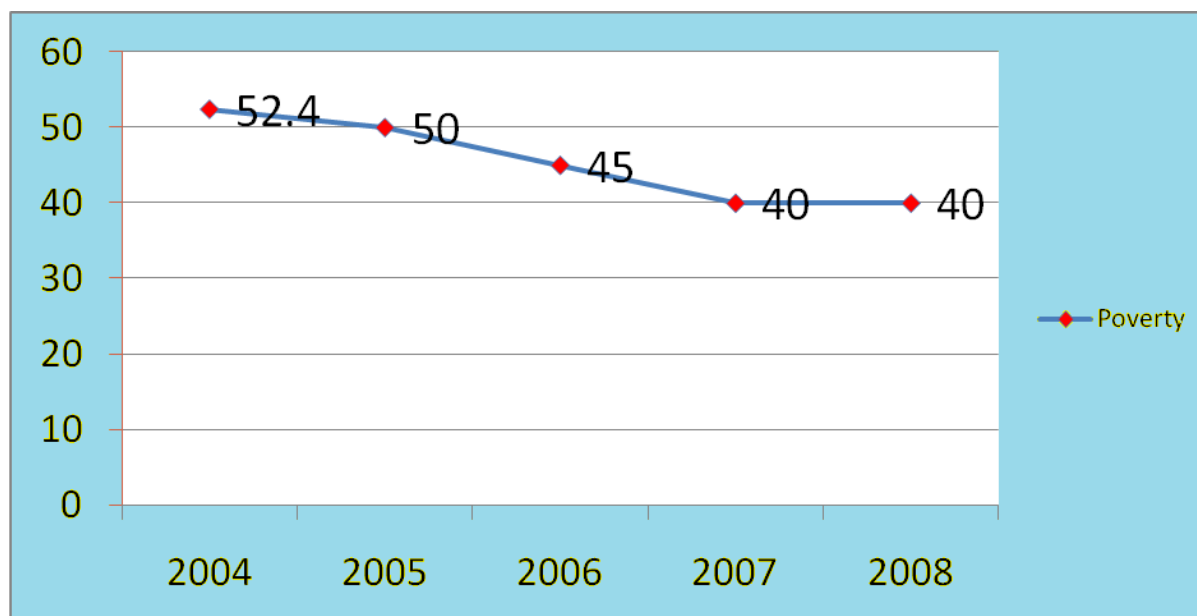
Annex 8: Smallholder cash crop production

CROPS	2005/06	2006/07	2007/08	2008/09
Groundnuts	203,071	273,757	260,573	293,948
Tobacco	121,600	117,412	160,238	208,154
Cotton	58,569	63,290	76,861	72,664
Pulses	344,586	415, 551	400,865	499,933
Sesame	291	504	909	679
Sunflower	5,450	5,910	5,745	8,087
Coffee	2,091	1,403	2,623	4,191
Paprika	2,127	1,808	2,215	2,388
Chillies	1,445	1,109	1,574	1,338
Irish potatoes	527,831	594,003	673,344	775,629

Source; Ministry of Agriculture and Food Security (2009)

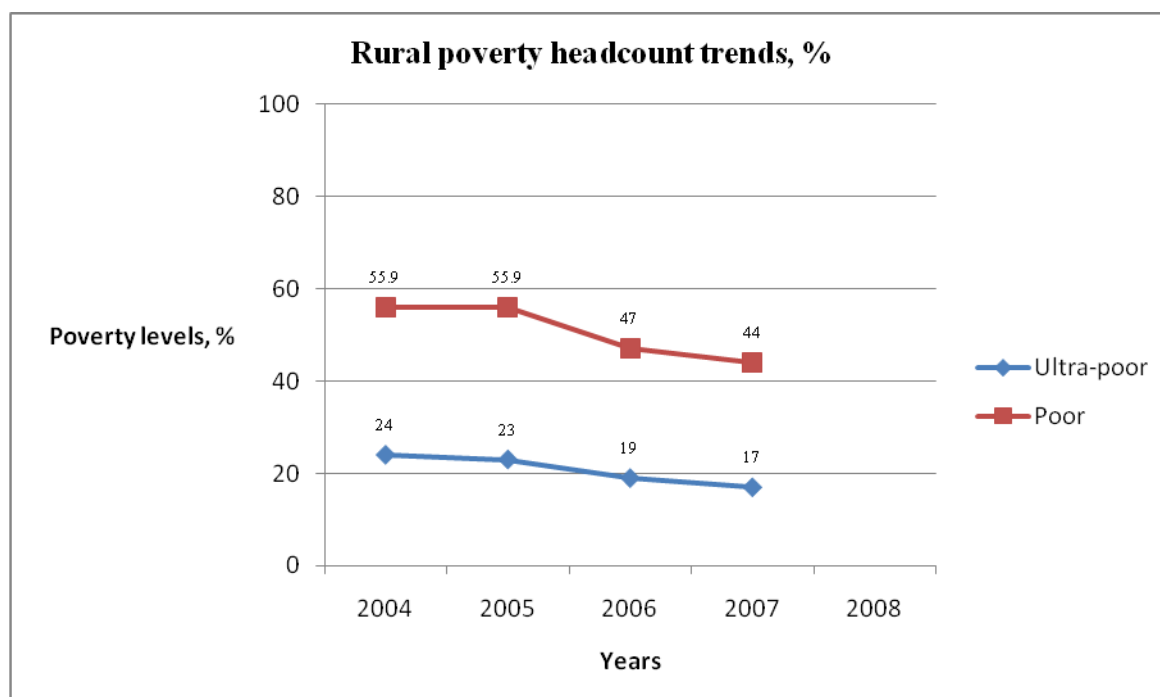
Annex 9: Poverty trends

(a) National poverty trends over the years, %



Source; National Statistical Office (2009)

(b) Rural poverty trends



Source; National Statistical Office (2009)

Annex 10: Statistical table for determining sample sizes from given populations

N	S	N	S	N	S
10	10	220	140	1,200	291
15	14	230	144	1,300	297
20	19	240	148	1,400	302
25	24	250	152	1,500	306
30	28	260	155	1,600	310
35	32	270	159	1,700	313
40	36	280	162	1,800	317
45	40	290	165	1,900	320
50	44	300	169	2,000	322
55	48	320	175	2,200	327
60	52	340	181	2,400	331
65	56	360	186	2,600	335
70	59	380	191	2,800	338
75	63	400	196	3,000	341
80	66	420	201	3,500	346
85	70	440	205	4,000	351
90	73	460	210	4,500	354
95	76	480	214	5,000	357
100	80	500	217	6,000	361
110	86	550	226	7,000	364
120	92	600	234	8,000	367
130	97	650	242	9,000	368
140	103	700	248	10,000	370
150	108	750	254	15,000	375
160	113	800	260	20,000	377
170	118	850	265	30,000	379
180	123	900	269	40,000	380
190	127	950	274	50,000	382
200	132	1,000	278	75,000	382
210	136	1,100	285	1,000,000	384

Note: N is population size, S is sample size

Source: Krejcie, R. V. & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30, 607-610.

Annex 11: Household questionnaire

SUSTAINABLE AGRICULTURAL DEVELOPMENT IN THE SMALLHOLDER AGRICULTURAL SECTOR IN MALAWI

A. Control panel identification

ADD: District:

EPA: Village:

Name scheme Date of interview.....

B. Household identification

1. Name of respondent:.....

2. Sex of respondent 1. Male ☐ 2. Female ☐

3. Name of head of household (HH) if respondent is not the HH.....

4. Sex of household head. 1. Male ☐ 2. Female ☐

5. If respondent is not the household head, what is the relationship of respondent to the head of household?

1. Wife ☐ 2. Daughter ☐

3. Son ☐ 4. If other (specify)

6. Household composition and characteristics

Name of household member	Sex	Age	Relationship to the household head	Education level	Marital status	Main Occupation			Literacy level

If occupation is 3, specify:.....

Codes

Sex: 1 = male;
2= female

Age:
1=Less than 18 years;
2= between 18 and 35years;
3=between 36 and 50 years
4= between 51 and 65years;
5= above 65 years

Relation to the**Household head:**

1=Household head
2=Spouse of the household head=
3=Son=
4=Daughter
5= Father
6=Mother
7=Brother
8=Sister
9=Son in-law
10=Daughter in-law=
11=Brother In-law=
12=Grand child
13=Nephew/niece
14=other relatives
15=Not related

Education level:

1=no formal education;
2= junior primary education;
3= Full primary education;
4=Junior Certificate:
5=completed Secondary School Education;
6=diploma and degrees;
7=If others, specify

Marital status:

1=Married;
2=single;
3=Divorced;
4=Widowed
5=polygamy;
6=others (specify)

Main Occupation:

1=farming;
2=fishing;
3=Non –farm related employment;
4 = House wife;
5= Student;
6=If others, specify

Literacy level:

1=Can read;
2=Can write;
3= Can read and write;
4= cannot read and write

7. Children in the school-going age category (5years and above)

Sex	Number of children going to school?	How many attend primary schools?	How many attend secondary schools?	How many should be in school but are out of school?	Reasons for not being in school 1=long distance 2=lack of school fees 3=lack of uniform 4=lack of interest 5=hunger 6=pregnancy 7=other (specify)
Girls					
Boys					

8. Describe the type of the main dwelling owned by the household

Type of residential main house	Type of Roof	1= grass thatched 2= iron sheets, 3=tiles	
	Type of Walls	1=unburnt bricks 2= burnt bricks 3= sticks and mud	
	Type of Floor	1=mud; 2= cement	

9. Land holding characteristics of the household; how many gardens do you have?

No. of garden	Location of garden		Area, ha. 1. < 0.1 2. 0.1 - 0.2 3. 0.2 -0.3 4. 0.3 -0.4 5. >0.4	Do you own this land 1. Yes 2. No	If yes, how did you acquire this land 1=Inherited from parents 2=Rented, how much, Mk 3=Allocated by the chief 4=Allocated by Government 5=purchased 6= other (specify)
	1.Upland	2. Dambo land			

10. Do you have any land left for fallow? 1=Yes 2= No

If no, state reason:

C. AGRICULTURAL PRODUCTION

1. Fill the table below on crops grown in summer (rain fed crops) for the last 3 years

Crops grown in 2008/09	Did you use improved varieties	Cropping pattern used	Cultivated Land (acre)	Production in Kgs/bags	Major Constraints	Extension service provider	Comment on extension service
Crops grown in 2007/08	Using improved varieties	Cropping pattern used	Cultivated Land (acre)	Production in Kgs/bags	Major Constraints	Extension service provider	Comment on extension service
Crops grown in 2006/07	Using improved varieties	Cropping pattern used	Cultivated Land (acre)	Production in Kgs/bags	Major Constraints	Extension service provider	Comment on extension service

Codes for crops

1. Tobacco
2. Local maize
3. OPV maize
4. Hybrid maize
5. Millet
6. Sorghum
7. Soya beans
8. Cowpeas
9. Beans
10. Groundnuts
11. Garden peas
12. Cassava
13. Sweet potatoes
14. Irish potatoes
15. Fruits
16. Vegetables
17. If others, specify

Codes for use of improved varieties

- 01=yes
02=no

Codes for cultivated land, ha

1. < 0.1
2. 0.1 - 0.2
3. 0.2 -0.3
4. 0.3 -0.4
5. >0.4

Codes for production, kgs

1. <500
2. 500 –10,000
3. 10000 – 20,000
4. 20,000 -40,000
5. >40,000

Codes for constraints

- 01=shortage of land
02=Lack of credit facilities
03=inadequate Labour
04=Diseases05=Pesticides
06=Shortage of improved seeds/seedlings
07=inadequate fertilizer
08=lack of Extension services
09=lack of access to technologies
10=poor market structure
11=If others, specify

Codes for extension service provider

- 01=Project staff
02=Project's trained farmers
03= govt

04= If other (specify)

02=Inadequate

1. Sole / mono cropping
2. Intercropping
3. Crop rotation
4. Rely cropping
5. Mixed cropping

Codes comment on extension services

01=Adequate

Codes for cropping patterns

2. Is your household participating in irrigation activities? If no, go to question 6

1. Yes
2. No

3. If not practicing irrigation, state the reasons why?

1. No land
2. No irrigation facilities/resources
3. River Lack of knowledge

4. Not interested
5. If others, specify

4. If yes, what type of irrigation systems are you using?

1. Watering can
2. Treadle pump
3. River diversion / gravity fed irrigation
4. Motorised pump irrigation
5. If others, specify

5. If yes what is the source of your irrigation water?

1. River/stream
2. Rain water harvesting/ storage tank
3. Dam
4. Shallow wells

6. How did you acquire your irrigation equipment?

1. Acquired using personal money
2. Donation by the project
3. Loan from the project

4. Loan from other lending institution
5. Borrowing
7. Other, specify

6. How did you learn about the irrigation technology?

- 1= from the project
2. =Government Extension Workers

- 4 =Fellow Farmers
- 5=Radio
6. Other, specify

7. Did you receive any training on irrigation farming?

1. Yes
2. No

8. If yes, who provided that training?

1. The project
2. Government Extension Workers
3. Fellow farmers

4. Radio
5. Others, specify

9. What are the major constraints in your irrigation farming?

- 1=Lack of equipment
- 2=Expensive equipment
- 3= Water shortage

- 4=lack spare parts
- 5=expensive spare parts
- 6=Inadequate capacity of technology

10. How do you deal with these constraints?

.....

11. How has irrigation farming benefited you?

1. Increased food production
2. Reduced food insecurity
3. Increased income

4. Other specify

12. Fill the table below on crops grown under irrigation (in winter) in the last three years

Crops grown in 2008/09	Using improved varieties	Cropping pattern used	Cultivated Land (acre)	Fertiliser used 1. Yes 2. No	Manure use 1. Yes 2. No	Production in Kgs/bags	Major Constraints	Extension service provider	Comment on extension service
Crops grown in 2007/08	Using improved varieties	Cropping pattern used	Cultivated Land (acre)	Fertiliser used 3. Yes 4. No	Manure use 3. Yes 4. No	Production in Kgs/bags	Major Constraints	Extension service provider	Comment on extension service
Crops grown in 2007/08	Using improved varieties	Cropping pattern used	Cultivated Land (acre)	Fertiliser used 5. Yes 6. No	Manure use 5. Yes 6. No	Production in Kgs/bags	Major Constraints	Extension service provider	Comment on extension service

13. What were the sources of your farm inputs (seeds and fertilizer, distance from the house, prices, and timing of delivery, quality and quantity during the last growing season?

Year	Farm input	Main source	Distance (km)	Prices (MK/kg)	Timing for delivery	Quality of input 1=good 2= bad	Season planted 1=Summer 2= winter
2006	Seeds (use codes for crop in C1)						
	Fertilisers						
Year	Farm input	Main source	Distance (km)	Prices (MK/kg)	Timing for delivery	Quality of input 1=good 2= bad	Season planted 1=Summer 2= winter
2007	Seeds (use codes						

	for crop in C1)						
	Fertilisers						
2008	Seeds (use codes for crop in C1)						
	Fertilisers						

Codes for source

1. Own seed
2. ADMARC
3. Farmers world
4. Chipiku stores
5. The project
- 6= friends
- 7=Local market
- 8=other specify

Codes for amount

1. <10kg

2. 10 -20kg
3. 20 – 50kg
4. >50kg

Codes for remarks

1. Recycled
2. Bought
3. Gift
4. Loan

Codes for fertiliser

- 1= 23:21:0 + 4S

- 2= CAN

- 3=Urea

- 4=Compound fertiliser

- 5 =other, specify

Codes for timing of delivery

- 1= early enough for timely delivery
- 2=just on time
- 3=a bit late but still applied
- 4=too late for application
- 5=other specify

14 What are the main problems that you face when buying farm inputs and selling crop produce?

Marketing problem		Buying farm inputs 1=Yes 2= No	Selling farm produce 1=Yes 2= No
High prices	1		
Low prices	2		
Poor roads	3		
Lack of market information	4		
High transport costs	5		
Late deliveries	6		
Inadequate amounts	7		
Poor quality	8		
Other specify	9		

15 How did you use the produce realized from irrigated farming

1. For household food consumption
2. For sale
3. For both food and sale

4. Other specify

17. How did you use the produce realized from rain fed farming

1= for household food consumption

2= for sale

3= for both food and sale

4= other specify

18. If the produce was sold, indicate where the crop was sold, how far are the selling points from your house and the income trends for your farm produce during the past three years?

Type of Crop (use crop codes)	1= irrigated 2= rain fed	Market 1= ADMARC 2=local market 3=scheme management/association 4= private traders 5=Direct export 6= other specify	Distance (km) 1 < 1km 2= 1km to 3km 3=3km to 5km 4 > 5km	Quantity sold (if produce was not sold by weight, specify unit of sale)	2006/07	2007/08	2008/09

19. What are your sources of marketing information for both your farm inputs and crop produce

Market for;		Source of market information 1= friends/ relatives 2=Radio 3=Extension agent 4=traders 5= farmers club/association 6= If others, specify
Farm inputs	1	
Crop produce	2	

A2. LIVESTOCK PRODUCTION

20. Do you keep livestock?

1= Yes

2= No

21. If yes, fill the table below

Livestock type 1=Local chickens 2=broilers 3=layers 4=Goats 5=Cattle 6=Pigs 7= Rabbits 8= Sheep 9=Guinea Fowls 10= Pigeons 11=Other(specify)	Number			System of production for each species 1=free range 2=stall feeding 3=Tethering 4= herded grazing 5=formulated feed 6=free range & supplementation 7 = Intensive 8=others (specify)	How did you acquire your livestock? 1=Bought, 2= pass on, 3=Project 4=Other loan specify 5= Gift 6=Other (specify)	Why do you keep livestock? 1=meat 2=milk 3=sale 4=funeral and other rituals 5=prestige 6=security 7=manure 8=eggs 8=other (specify)	Trend over 5 years 1=increasing 2= decreasing 3=static	Using improved breeds? 1=yes 2=no	If no, why? 1=not available 2=difficult to access 3=difficult to manage 4=other (specify)
	2006	2007	2008						

22. Is there any livestock drug revolving scheme? 1=Yes 2 = No

23. If yes, how does it operate?

24. If no, how do you access drugs for your livestock?

1=through the project
2= through area veterinary officer
3=do not treat
4=other (specify)

25. If the animals not treated using drugs, how do you control diseases?

01=traditional medicine
02=call for vet
03=slaughter sick animals
04=sell sick animal
05=other (specify)

26. Have you received any training in livestock production?

1=yes 2=no

27. If yes, what areas of livestock production were covered?

1 = disease control
2 = feeding
3 = feed formulation
4 = housing
5 = breeding
6 = other (specify)

28. Record the following information on livestock; breeds, extension service, marketing and constraints

Species	Breeds	Housing			Vet services	Marketing	Constraints
		Housing	Type	Roof			
Cattle							
Goat							
Sheep							
Pigs							
Chickens							
Ducks							
Guinea fowl							
Rabbits							
Others (specify)							

Codes for roof

01=Not roofed
02=adequately roofed

03=inadequately roofed

Code for breeds

01=local
02=exotic
03=cross

Codes housing

01=housed in dwelling unit

02=khola (specify)

Codes for type

A=Raised khola
B=Deep litter
C=battery cage

Codes for vet services

01=Not available
02=Adequate
03=Not adequate
04=partially adequate

Codes for marketing

01=Not available
02=Informal
03=Formal
04=Both formal & informal

Codes Constraints

01=Poor feeding
02=Poor housing
03=poor health
04=lack of market
05=low prices
06=other specify

B. HOUSEHOLD FOOD SECURITY

29. Over the past 3 years has your household run out of food? 1= Yes 2 = No

30. If yes, in which month did your household run out of food? How long do you think the food available will last you this year(forecast and fill last the last two columns where applicable)

2006	2007	2008

1=Jan 2=Feb 3=Mar 4=Apr 5=May 6=Jun 7=Jul 8=Aug 9=Sept 10=Oct 11=Nov 12=Dec

31. If your HH did not produce adequate food in any one of the years what were the reasons? (Multiple responses allowed)

2002/03	2003/04	2004/05	2005/06	2006/07

1=Drought

2= Crop damage due to pest & diseases

3=Land shortage

4= Poor soils

5= Excess rain

6= Not enough labour

7= Inadequate seed

8= Lack of fertilizer

9= Sold most of the harvest

10=premature harvest

10= theft

11= Other Specify

32. Are you or any member of your household participating in the following activities

Activity	1= Yes 2= No
1 = Piece works	
2= Irrigation farming	
3= Food for work programme	
4= Input for work programme	
5= Cash for work programme	
6= Input subsidy programme	
7= Soil conservation activities	
8= Agro forestry activities	
9= Rain water harvesting activities	
10= Other specify	

33. How does the household cope with food shortage?

Activity	Tick (Multiple responses allowed)
1 piece works	
2 Seek temporary off-farm work	
3 Borrow grain	
4 Borrow money	
5 Receive food aid	
6 Sell farm equipment	
7 Sell livestock	
8 Sell household assets	
9 Sell family land	
10- substitute meals/food for less preferred food	
11- reduce number of meals served	
12- reduce quantity of food per	
13- business	
14 Other (specify)	

34. What energy foods do you eat during these seasons? (tick)

	Maize	Cassava	Sweet potato	Irish potato	Other
May – July					
Aug – October					
Nov – Jan					
Feb – Apr					

C.

HOUSEHOLD INCOME AND ASSETS

C1. INCOME

Please describe the amount of household income from various sources during the last 3 years.

1. Income from livestock production

Source of Income	Amount (MK)
1.1 Sale of Livestock	
Cattle	
Chicken	
Goats	
Pigs	
Rabbits	
Sheep	
Fish	
Other livestock, if any	
Sub-Total	
1.2 Sales of Livestock Products	
Milk	
Meat	
Egg	
Other specify	
Sub-Total	
Total Cash Income from Livestock & Livestock Products	

2. Annual Income from crop sales

Type of Crops	Amount (MK)
1. Maize	
2. Sorghum	
3. Millet	
4. Cassava	
5. Irish potatoes	
6. Sweet potatoes	
7. fruits	
8. vegetables	
9. Other 1 (specify _____)	
10. Other 2 (specify _____)	
Total Cash Income from Crop Production	

3. Income from different sources (off-farm income, non-farm income, aid, remittance, etc)

Types of Income	Amount (MK)
Salaries/wages/payments from ganyu / piece works	
Income from petty trade such as oxcart hire, bicycle hire, etc (tick)	
Remittances/income from transfers	
Bee keeping	
Other income source, please specify	
Total income from other sources	

C2. ACQUISITION OF HOUSEHOLD ASSETS

4. Which of the following assets does the household posses?

Type of Asset	No. of Assets	Period of Use
Buildings		
1 Brick house with grass thatch		
2 Brick house with iron sheets		
3 Mud house with grass thatch		
4 Mud house with iron sheets		
Household assets		
5 Chairs		
6 Tables		
7 Beds		
8 Bicycle		
9 Radio		
10 Mattress		
11 Other (specify)		
Farm Implements		
12 Hoes		
13 Ox-carts		
14 Axe		
22 Pangas		
23 Sickle		
25 Other (specify)		

D. ECONOMIC BASE OF THE HOUSEHOLDS

D1. BUSINESS SKILLS

- Have you ever been trained in small business skills development?
1=Yes 2=No
- What type of training did you do?

1=Bee keeping	4=carpentry	8=mushroom production
2=livestock and crop production as business	5= Soap making	9=solar drying
3=Weaving	6=Local bakeries	10=feed mixing
	7=Oil pressing	11=other (specify)

3. Who organized the training?
1=Project staff 2=Government 3=other (specify)
4. How has the training affected your income status
1=Income increased 2=Income reduced 3=No change 4=other (specify)
5. What organizations in the area are engaged in offering credit facilities?
.....
6. What types of credit facilities are offered?
1= Cash 2= Farm input 3= Other specify
7. Have you ever taken any type of credit?
1= Yes 2= No
8. If yes, what type of credit?
1= Loan 2=Farm input 3= Cash 4= other specify
9. From which organization did you acquire credit facility
1=MRFC 2=Pride Malawi 3=APIP 4=FINCA 5=other (specify)
10. Has there been any significant change with the credit facility you acquired?(explain)
1=Income increased 2= Sold assets to repay loan 3=No change 4= other (specify)
11. What problems do you face with accessing credit?
.....
12. Where do you sell your agricultural produce?
1=ADMARC 2=Private traders 3=NASFAM 4= local market 5=other (specify)

D2.ENVIRONMENT AND NATURAL RESOURCE MANAGEMENT

13. What are main environmental problems in your area?
1= land degradation 2=Floods 3=drought 4=loss of soil fertility 5=deforestation
14. Do you have any community based natural resources management groups in this area?
1=yes 2=No
15. What types of activities are done by the Natural Resources Management groups?
1=integrated forestry management
2= tree nursery establishment and management
3= Wood lot establishment
4=gully reclamation
5= other (specify)
16. Do you have a woodlot in the area? (tick)
- | Type of woodlot | Yes | No |
|---------------------------------|-----|----|
| Planted <i>Yobyala</i> | | |
| Indigenous <i>Yachilengedwe</i> | | |
17. What are the major benefits from the woodlot?
1=Firewood 2=Charcoal 3= Timber
4= Bee keeping 5= other specify
4= other (specify)

E. AGRICULTURAL AND ENVIRONMENTAL TECHNOLOGIES/ AND PRACTICES

1. Adoption of some recommended practices or technologies

Technologies	Adopted? 1= yes 2=no	If no, why? 1=Lack of resources 2= Lack of materials 3= Not interested 4=Not exposed 5= Limited technical staff 6=Other (specify)	If yes, did you get any training on the technologies? 1=yes 2=No	Who introduced the technology? 1=The project 2=Government extension workers 3=Other NGOs (specify)	What type of support did you get? 1=crop seed 2=tree seeds 3=Polythene tubes 4=chemicals 5=Vetiver grass 6=pesticides 7=Fingerlings 8=Planting materials 9=training 10=Other (specify)	What are the benefits associated with the technologies being practiced? 1=improved soil fertility 2=increased yield 3=Timber wood 4=Fuel for cooking 5=Increased agricultural production 6=Increased income level 7=Increased number of livestock 8=Availability of manure for crop production 9=Other (specify)
compost manure making						
Afforestation						
Agro forestry						
Small-scale irrigation						
Vetiver grass planting						
contour ridges						
Other (specify)						

H. SUSTAINABILITY

1. What strategies have been put in place to ensure continuity of the activities/technologies after the end of project?

Activity	Strategy/ institutional arrangement
1-Arable agriculture	
2-Horticultural production	
3-Soil and water conservation	
4=irrigation	
5= food preservation	
6livestock multiplication	
7-food security	
8-Natural Resource Management	

2. What problems do you encounter to access the institutional support that you need?

3. If the project / government was to continue with its programmes what sort of interventions would you recommend.

G. DECENTRALISATION STRUCTURES

35. do you understand the roles of Area Development Committee (ADC) and Village Development Committee (VDC)
1 = yes
2 = No

36. If yes, what are the roles

ADC _____

VDC _____

END OF QUESTIONS, THANK YOU VERY MUCH FOR YOUR TIME!