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# Paradoxical Constraints to Agricultural Intensification in Malawi: The Interplay Between Labor, Land and Policy

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***PARADOXICAL CONSTRAINTS TO AGRICULTURAL  
INTENSIFICATION IN MALAWI: THE INTERPLAY  
BETWEEN LABOR, LAND AND POLICY***

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**Abstract**

*The relationship between population growth and agricultural change has been much debated in the academic literature. The existence of seasonal, rural labor shortages as well as untilled land in the densely populated, southern African nation of Malawi is somewhat of a paradox given neo-Malthusian and Boserupian expectations in such a situation. The objective of this paper is to explore the population and agricultural change dynamics of the Malawian small-hold farming sector in relation to the theoretical discourse. The current agrarian situation in Malawi is explained in terms of agricultural and labor policies of colonial and post-colonial governments, local labor dynamics, and the country's geographical characteristics. The neo-Marxist or political economy perspective best explains the population and agricultural change interactions in Malawi. This framework's attention to the colonial legacy, international capitalism and class-based national policies is highly appropriate to the Malawian case.*

**Keywords**

Agricultural intensification, population, Boserup, Malthus, political economy, rural labor, Malawi.

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## Introduction

The relationship between population growth and agrarian change has been of long-term interest to geographers, anthropologists, ecologists, and economists. Two of the most prominent perspectives in this field are Thomas Malthus' pessimistic view of population induced environmental degradation (Menard and Moen, 1987) and Ester Boserup's optimistic view of agricultural intensification stimulated by population growth (Boserup, 1965). Agricultural intensification refers to both a greater frequency of land use as well as higher crop yields (output per unit area) related to increasing use of labor, irrigation and fertilizer inputs. A number of studies undertaken in Sub-Saharan Africa either support the case of Malthus (e.g., Morgan and Solarz, 1994; Okafor, 1993; World Bank, 1990a) or Boserup (e.g., Adams and Mortimore, 1997; Mortimore, 1989; Pingali *et al.*, 1987). The objective of this paper is to explore the population and agricultural change dynamics of the Malawian small-hold farming sector in relation to the theoretical discourse. I begin with a summary of current agricultural trends in densely populated Malawi and then briefly review theoretical perspectives on population growth and agrarian change. I relate these trends and perspectives to recent studies suggesting that farmers are not cultivating all of their available land because of household labor constraints. Several explanations are considered for the seemingly paradoxical situation in Malawi (i. e., a densely populated country with labor constraints and untilled land) that neither Malthus nor Boserup would have predicted. I then examine the theoretical implications of the combination of factors identified in Malawi and conclude with policy implications.

My analysis is based on a review of recent studies (Carr, 1988; UNICEF, 1993; Pearce *et al.*, 1996; Alwang and Siegel 1999), including select

aspects of fieldwork undertaken by Earl and Moseley (1996). My own research relied on the use of semi-structured interviews, rapid rural appraisal techniques and secondary data sources to develop livelihood system profiles for different agro-ecological zones in Malawi.

### **Background**

The southern African nation of Malawi is one of the most densely populated countries (106 persons per square kilometer in 1999) in Sub-Saharan Africa (CIA, 1999). The non-urban population density varies widely, from 251 persons per square kilometer in Thyolo District in the south of Malawi to 20 persons per square kilometer in Rumphi District in the north of the country (World Bank, 1995; UNICEF, 1993). This compares with an average population density of 20 persons per square kilometer for Sub-Saharan African countries in general (World Bank, 1990b). The country's population growth rate (2.5% per annum), while high by world standards, is about average for Africa (WRI, 1998). The population of 10 million people is predominantly rural (90%) and heavily dependent on subsistence agriculture (80%) (UNICEF, 1993; CIA, 1999). Most agriculture in Malawi is rain dependent and there is little irrigation. Maize is the dominant crop and per capita maize production has declined over the last two decades from 204 kilograms in the early 1970s to 161 kilograms in the late 1980s (UNICEF, 1993).

Of small-hold farmers, 72% cultivate less than one hectare of land, 21% cultivate between one and two hectares, and 6% cultivate over two hectares (World Bank, 1995). This breakdown varies somewhat from actual landholdings, wherein 56% of small-hold farmers were reported to have less than one hectare of land, 3170 have between one and two hectares, and 13% have over two hectares (UNICEF, 1993).<sup>1</sup>It has been

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<sup>1</sup>The terms 'landholding size' and 'area under cultivation' are often used interchangeably in Malawi, leading to some confusion.

#### 4 / Discussion Paper Series

estimated that 60% of smallholder households experience transient food insecurity even in productive years (UNICEF, 1993). These statistics describe a country that fits the **neo-Malthusian** paradigm of rapid population growth, dense population, small per capita land holdings, and declining agricultural production. This said, other trends in Malawi's rural sector, such as untilled land and labor constraints, make little sense in a **neo-Malthusian** framework. The rest of this paper explores this paradox.

#### **Perspectives on Population Pressure and Agrarian Change**

There are four general theoretical traditions that attempt to explain the relationship between population growth and agrarian change: **neo-Malthusian**, **Boserupian**, **neo-liberal** economic, and **neo-Marxist** (Kates *et al.*, 1993).

##### *The Neo-Malthusian Perspective*

The concern that food production is not capable of keeping up with population growth was first articulated by Thomas **Malthus** in his famous 1798 paper "Essay on the Principle of Population." (Menard and Moen, 1987) This argument has been **re-articulated** in the modern era by a number of **neo-Malthusians** (e.g., Ehrlich, 1968; MacDonald, 1989; Ehrlich and Ehrlich, 1990; Dasgupta, 1995). **Neo-Malthusians** believe that population has the potential to outstrip agricultural production, inducing land fragmentation, environmental deterioration, poverty, and famine. In his book, The Population Bomb, Paul Ehrlich (1968: 37) suggested "As food got scarcer, economic laws of supply and demand began to take effect in the underdeveloped countries . . . Marginal land began to be brought into production - as evidenced by reduced yields per

acre... Food production...is falling behind population growth.” Neo-Malthusians view land as the major constraint to agricultural production. Labor, on the other hand, is viewed as an abundant factor of production. In the words of Gillis *et al.* (1987:158) “Malthus believed that... the rise in population growth would create an increase in labor supply, which would press against the fixed land resources.. .“

The neo-Malthusian view is the dominant perspective in most of the mainstream literature as well as among bilateral and multilateral aid agencies. Not surprisingly, most externally funded assessments of the Malawian agricultural sector also conform to this perspective. For example, UNICEF (1993:23) highlighted its concern over the ability of agricultural production to keep up with population growth in a recent annual report.

The population issue in Malawi is a most crucial one. Unless urgent action is taken to reduce fertility and population growth, current demographic trends will exacerbate and reinforce poverty. Malawi’s single major natural resource, agricultural land, is under severe pressure from rapid population growth and increasing population densities per square kilometer of agricultural land.. .As a result, landlessness, malnutrition, unemployment, and hence poverty can be foreseen as increasing in the next two decades.

Furthermore, UNICEF (1993:30) argued that labor in Malawi is too abundant to be absorbed by the agricultural sector. “There are signs that agriculture will be unable to absorb the growing number of entrants into the labor force, considering that land resources are finite.”

## 6 / Discussion Paper Series

### *The Boserupian Perspective*

Ester Boserup developed her theory of agrarian change in response to, what she perceived as, the flawed **Malthusian** perspective. Rather than agricultural production constraining population growth, Boserup (1965: 11) saw population growth as the “major factor governing agricultural developments.” Boserup argued that increases in population lead to increases in agricultural intensification (defined by Boserup in terms of the frequency with which land is cropped) (Boserup, 1965). “The theory rests on the assumption that the ‘problem’ of population pressure gives rise to its own solution.. .“ (Lele and Stone, 1989: 8) Boserup hypothesized that as population increased, farmers would gradually fallow their land for shorter and shorter periods due to increasing land scarcity. As fallow periods were shortened, soil fertility would decline. To maintain productivity in a short fallow system it would be necessary to have increasingly greater labor inputs (Boserup, 1965 :117-118). Boserup assumes that labor is abundant and land scarce in a country with a dense and rapidly growing population. According to Boserup, sparse population leads to less intensive agriculture. Sparse population may be a natural state or a response to external circumstances.

### *Neo-Liberal Economic Perspective*

Neo-liberal economists suggest that positive outcomes are dependent on sound economic structures and policies rewarding farmers for intensifying production, specializing and entering the ‘free’ market (Kates *et al.*, 1993). Several scholars have documented how market opportunities operate as incentives to intensify agricultural production independent of population density (e.g., Anderson, 1989; Hakinson, 1989; Netting *et al.*, 1989; Ramaswamy and Sanders, 1992; Goldman, 1993).

*Neo-Marxist or Political Economy Perspective*

The neo-Marxist or political economy perspective essentially builds on the internal dynamic suggested by Boserup, taking into account forces exerted on the local context by the larger political and economic system. Neo-Marxists often criticize Boserupians, and cultural ecology analysis in general, for focusing on local dynamics to the exclusion of relevant economic and political processes operating at broader scales. Neo-Marxists argue that the colonial legacy, international capitalism and class-based national policies have created conditions that inhibit intensification and its developmental spin-offs. More generally, political economists believe there is a link between the distribution of power and productive activities (Greenberg and Park, 1994) While neo-Marxist analysis of rural dynamics has been undertaken for a variety of African contexts (e.g., Franke and Chasin, 1981; Blaikie, 1985; Watts, 1987; Connelly, 1994; Derman and Ferguson, 1995), this approach has not been applied to the population and agricultural change dynamics of the small-hold farming sector in Malawi.

**'Overpopulation,' Labor Constraints and Untilled Land:  
Paradox or Paradigm?**

Recent studies in Malawi conclude that labor is a major constraint to agricultural production and intensification, particularly among poor households (Carr, 1988; UNICEF, 1993; Pearce *et al.*, 1996; Alwang and Siegel, 1999). Pearce *et al.* (1996) explored this issue in a more disaggregate fashion in the Salima District of central Malawi in 1996 where population densities are similar to the national average (Figure 1). In this district it was found that almost one half of land held by the poor and wealthy, and one quarter of the land held by middle income

## 8 / Discussion Paper Series

households, was left uncultivated in 1993/94 (Pearce *et al.*, 1996). Furthermore, all income groups reported that labor shortages were the most common reason for not cultivating available land. Few households reported drought risk or high input costs as reasons for not cultivating more land. Nor did families indicate that they left land fallow to improve soil fertility (Pearce *et al.*, 1996). This situation contradicts the theoretical assumption that land, not labor, should constrain agricultural production in a densely populated country.



**Figure 1. Location of Karonga and Salima Districts within Malawi**

Labor constraints are exacerbated when poorer households must engage in *ganyu*<sup>2</sup> or piece work labor for wealthier farmers during the ‘hungry season,’ a period before the new harvest when household grain stocks are depleted. During the hungry season (Nov - Jan), households face the difficult decision of working in their own fields (to assure next year’s crop) or engaging in *ganyu* to feed the family in the short term (Table 1). Examination of the choices faced by poorer smallholders in the Salima District creates better understanding of the dynamic between the labor supply and land. It has been estimated that 225 kilograms of maize per person per year is needed to provide 90% of annual food needs, assuming the other 10% will be derived from vegetables or meat.<sup>3</sup> At this rate, the average Malawian household of 4.9 persons (GOM, 1993) would need to harvest 1103 kilograms of maize in a year. Surveys in Malawi suggest an average maize yield of 822 kilograms per hectare using traditional practices, few agricultural inputs, and a minimum labor requirement of two adults per hectare (Pearce *et al.*, 1996). The average household in Malawi has two adults, the labor resources to farm one hectare of land, and is able to feed itself for 9 months of the year (822 kgs / 1103 kgs = 75% of annual requirements). For the remaining three months of the year, one household member is assumed to engage in *ganyu* to bring in extra food. One day of *ganyu* labor will generate enough food to feed the family for one meal a day (Pearce *et al.*, 1996). The problem is that by engaging in *ganyu* during the agricultural season, the family will no

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<sup>2</sup>The term ‘*ganyu*’ is Chichewa (or Chinyanja) referring to any type of casual or non-permanent work. *Ganyu* is performed by both men and women in Malawi. Compensa-

<sup>3</sup>This estimate is based on a requirement of 1900 kcals per day and assumes losses of 18% for seed, wastage and processing. The 1900 kcals per day figure does not refer to adults but to a ‘per capita’ requirement, i.e. the mean requirement across the age range in a typically composed developing country population (Earl and Moseley 1996; UNICEF 1993).

## 10 / Discussion Paper Series

longer be able to farm as much of its own land. As such, a conservative estimate is that *ganyu* leads to a 25% reduction in the amount of land the household can farm, although it could be as high as a 50% reduction since one half of the household labor force would be occupied otherwise during the critical farming period. This reduction means that poor households are only capable of farming .5 to .75 hectares of land, well below the average holdings for this group in Salima District and a surprisingly close estimate to area actually farmed (Table 2).

**Table 1. Piece Work Labor Calendar for Various Agricultural Tasks**

Activity	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Land Preparation												
Ridging												
Weeding												
Banking												

Source: Pearce, J., A. Ngwira and G. Chimseu. 1996. "Living on the Edge: A Study of the Rural Food Economy in Mchinji and Salima Districts of Malawi." Lilongwe: Save the Children Fund (UK).

**Table 2. Land and Labor Constraints for Poor Households in Salima District**

Land holdings vs. Area Cultivated (hectares)			Proportion of Household Food Requirements Derived from Farming Given Labor Constraints (% food needs)		
Average land holding	Actual average area cultivated	Predicted area that could be farmed given labor constraints	Maximum requirements that could be produced with two adults	Actual requirements produced with labor off-take	Predicted requirements produced with labor off-take
1.2	.67- .79	5 .75	75%	40%	37.5-56%

Source: Adapted from data presented in Pearce, J., A. Ngwira and G. Chimseu. 1996. "Living on the Edge: A Study of the Rural Food Economy in Mchinji and Salima Districts of Malawi." Lilongwe: Save the Children Fund (UK).

### **Possible Explanations for the Population-Agrarian Change Dynamic in Malawi**

There are a number of possible explanations for why a densely populated country like Malawi faces labor shortages and has failed to intensify agricultural land use. These explanations are related to four sets of circumstances: colonial labor practices, government agricultural policies, contemporary *ganyu* labor, and Malawi's dearth of livestock.

#### *History of Labor Migration*

Malawi, formerly Nyasaland, was a backwater colony for the British as it possessed no great mineral resources (Pryor, 1990). Given this lack of resources, and the perception that Nyasaland was overpopulated, the country was seen as a source of labor for other colonies in the region that had more developed mining activities. This position as a labor supplier was formalized when Nyasaland was part of the Central African Federation with Southern and Northern Rhodesia (Zimbabwe and Zambia respectively) between 1954 and 1964.

In 1950, the colonial government estimated that 487,000 males from the Nyasaland Protectorate were employed in the formal economy. Of this number, 146,000 were employed outside of the country (Barber, 1961). These men generally were employed in South African or Northern Rhodesian mines or on commercial farms in Southern Rhodesia. The fact that 487,000 males were taken out of the indigenous economy is rather remarkable. In fact, Barber (1961:237) noted that "many more adult males from Nyasaland are outside the indigenous economy of the territory than remain within it." Removal of one-half of the adult male workforce must have had a profound impact on subsistence agricultural

## 12/ Discussion Paper Series

systems. Although much of the estate labor within the Nyasaland was seasonal, this work coincided with the peak agricultural season of the subsistence economy (Barber, 1961 ). At the time, the colonial government assumed that per capita agricultural output was declining because of overpopulation, causing extensive agriculture and land degradation. What the colonial government failed to realize is that extensive agriculture might have been the rational choice in the face of labor shortages. Despite previous decades of labor recruitment, the colonial government did begin showing signs of concern in the 1950s.

Formal recruiting from Nyasaland has been brought under control and a ceiling placed on the numbers who can be drawn out of the territory by this means. Further, the migrant labor agreement of 1948 between the three Central African governments has recognized the right of Nyasaland to retain within its borders sufficient adult males to meet its own economic requirements and to maintain its social structure. (Barber 1961: 237-238)

I suggest that colonial policies that encouraged the removal of labor from the subsistence economy interfered with the normal process of intensification. Extensive agricultural practices continued because labor was continually removed from the local economy. Intensification would have been more **likely** if sufficient labor was available when land resources became exhausted. **Boserup** (1965) herself suggested that the removal of labor from the subsistence economy would interfere with the normal process of intensification.

*Government Agricultural Policy*

Malawian Government policy towards the agricultural sector fails to recognize that seasonal labor constraints are a problem. This blindness to rural labor constraints has, perhaps, been abetted by a **neo-Malthusian** belief that the rural sector has an abundance of labor. Exacerbating this problem have been colonial and post-colonial government policies that heavily emphasize the cultivation of maize monoculture. This is reflected in the fact that nearly 70% of the land under cultivation in 1992 was in maize (**Majid** and Adams, 1998).

Malawian farmers traditionally planted the majority of their food crops as **polycultures**, *i.e.*, as a mixture of complimentary crops in the same field. The practice of intercropping (or polyculture) has declined because of policies that encourage maize monoculture (Earl and Moseley, 1996). In the late 1980s, it was estimated that only about 15% of Malawi's cropping area was planted in **polycultures** (Lele and Stone, 1989). Traditional crop mixtures include a number of combinations with maize, e.g., maize and groundnuts, maize and cassava, and maize and pulses. Polycropping systems both reduce and spread out labor demands because they have: 1) multiple harvest periods, 2) fewer weeds, 3) nitrogen fixing crops, 4) lower levels of soil erosion, and 5) decreased insect related crop loss.

Rather than one concentrated harvest period, multiple interplanted crops translate to multiple harvest periods. Labor inputs related to harvesting are then spread over a greater period of time. Weed control is an advantage of intercropping that is especially relevant to the Malawian situation. As the reader will recall from the *ganyu* labor calendar (Table I) presented earlier, weeding is a key activity at the height of the *ganyu*

## 14/ Discussion Paper Series

labor season. Weeds are reduced when one crop, through competition with weeds, provides a reduced weed environment for the other crop (Vandermeer, 1989). Nitrogen fixing, decreased soil erosion, and decreased insect related crop loss, lead to reduced input costs and greater yields for Malawian farmers.

The decline of polycultures and rise of maize monocropping began in the colonial era. The British colonial administration encouraged maize cultivation in a number of its southern African protectorates, including Nyasaland. This allowed for regional maize trade and a stable food supply for mine workers in South Africa and Northern Rhodesia. Malawi's first post-colonial government under Hastings Banda (1966-1994) also strongly encouraged maize production. Maize production was encouraged in order to meet national food self sufficiency objectives and to garner foreign exchange on the regional maize market (Pryor 1990).

The president also benefited personally from expanding maize production in Malawi. Under Banda, the maize economy of Malawi was tightly controlled, from seed sales to the retailing of maize meal, through the President's personal ownership of two companies: Press Holdings (which managed the national supermarket chain) and the Agricultural Development and Marketing Corporation (the parastatal responsible for marketing and distribution of agricultural commodities) (Majid and Adams 1998). Agricultural extension efforts focused on the dissemination of a technological package of hybrid maize seeds and chemical inputs that were incompatible with traditional intercropping practices. Although the situation has improved in recent years with some changes in government policy, 50 years of government policies emphasizing maize monocultures caused planting, weeding and harvest periods to lose traditional variation. This 'telescoping' of labor demands

into very distinct periods has contributed to serious labor bottlenecks at critical junctures in the agricultural season.

*Ganyu: Safety Net or Surplus Appropriation?*

In 1996, my colleagues and I found *ganyu* labor to be one of the most important income and food generating strategies in Malawi, especially for poorer households (Earl and Moseley, 1996). Other studies have arrived at the same conclusion (e.g., UNICEF, 1993). It is tempting to view *ganyu* as an important safety net in the Malawian rural economy because it is a vital source of food and income that allows a household to bridge the 'hungry season.' For example, in particularly bad years *ganyu* laborers may be employed when there is no real work to be undertaken, implying that wealthier farmers play a welfare role (Pearce *et al.*, 1996; Earl and Moseley, 1996). The ability of the *ganyu* labor market to expand in difficult years may also help avert major famine.

As described above, *ganyu* labor may also detract from the agricultural production of poor farmers. The impact of labor diversion from densely populated areas is unclear in the literature. In a comparative study of African countries, Hyden *et al.* (1993) found that there is no evidence to suggest that rural-to-urban migration slows agricultural intensification. However, the study did indicate that lack of intensification is most pronounced in southern Africa due to a more established urban work force and the relegation of small-hold farmers to marginal lands. However, with the exception of some districts in Malawi (e.g., Thyolo), farmers have not been displaced in large numbers to the most marginal lands. Nor does Malawi have a very significant urban workforce. What Hyden *et al.* (1993) and others fail to highlight is the timing of labor opportunities. In the absence of higher yields, small-hold farmers must

## 16/ Discussion Paper Series

work at some point during the year. Timing of this work determines whether or not this is detrimental to agricultural intensification.

The timing of *ganyu* labor is critical. *Ganyu* labor not conflicting with a farmer's own agricultural work appears to have potential benefits since there would be limited opportunity costs. However, *ganyu* labor detracting from a farmer's agricultural output is more problematic. It is important to understand why farmers would opt to engage in *ganyu* labor over preparing their own fields. One explanation is that *ganyu* wages are at least slightly higher than the discounted marginal return on farming additional land. The discounted marginal return on farming additional land could be quite low given presumed high rates of time preference for food insecure families (*c.f.*, Bardhan, 1996; Moseley, 2000). The more desperate the household, the lower the *ganyu* wages family members may be willing to accept. Pearce *et al.* (1996:28) reported that "[m]ost commonly a day's work only generates enough maize for one day or one meal." Interestingly, the rich complain of *ganyu* labor shortages following good production years when laborers are only willing to work for higher *ganyu* wages (Earl and Moseley, 1996).

Small *ganyu* labor wages suggest that the wealthy are taking advantage of the poor, especially following years of low subsistence agricultural production when the poor have the most difficulty bridging the hungry season. In fact, increasing poverty benefits the local elite as it allows them to hire increasing amounts of labor to intensify production on their own lands. Exacerbating this cycle are government agricultural extension efforts that largely benefit wealthier farmers. The government emphasis on high external input maize monoculture has meant that wealthier farmers are able to improve production while the poor are left out of the process (when they are unable to purchase hybrid seeds,

fertilizers and insecticides). Increasing wealth differences in the small-hold farming sector mean that wealthy farmers are able to hire increasing numbers of *ganyu* laborers, further exacerbating the situation in which poor farmers find themselves. The *ganyu* system ensures that limited labor resources are concentrated on the lands of the wealthy (Pryor, 1990), while hindering intensification on the lands of the poor.

*The Role of Livestock in Agricultural intensification*

Boserup's agricultural intensification hypothesis is dependent upon the presence of domestic animals to produce organic fertilizer. "There is a close association between the systems of fallow and the techniques for fertilization . . . Fertilization under short fallow is mainly or wholly provided by manure from.. drought animals.. ." (Boserup, 1965: 25). The problem is that livestock holdings in Malawi are relatively small compared to other African countries (Earl and Moseley, 1996). There are a few locations in Malawi where livestock concentrations are much higher. One of these locations is central Karonga (Figure 1), where even the poorest 10% of households typically own two to three head of cattle (Earl and Moseley, 1996). In this area, despite the fact that 75% of households only cultivate half a hectare of land (UNICEF, 1993), even the poorest 10% of households are nearly self-sufficient in food production. These poor households also engage in *ganyu less* often than in any other area of the country (Earl and Moseley, 1996). The use of livestock for fertilization purposes may be a major reason the poor in Karonga are more self-sufficient than their counterparts in other districts.

Rather than encouraging the use of organic fertilizers to enhance soil fertility, the Government of Malawi has long pushed inorganic fertilizers (particularly in the 1980s). The cost of inorganic fertilizers is

## 18/ Discussion Paper Series

prohibitively expensive for the majority of Malawian farmers. Using 1995 prices, it would cost a minimum of 576 kwachas to fertilize .5 hectares of maize (Pearce *et al.*, 1996), which is beyond the reach of the 60% of rural households that make less than 600 kwachas (40 USD) per year (World Bank, 1995). Overall, the use of inorganic fertilizer has decreased by 30-40% since subsidies were removed in 1995/96 as part of the structural adjustment program (Majid and Adams, 1998).

### Theoretical Implications

Of the four theoretical traditions relating population growth and agrarian change, which one most adequately explains the dynamics of the situation in Malawi? While many aspects of agrarian change in Malawi appear to fit the neo-Malthusian model (e.g. rapidly growing population coupled with declining agricultural yields), labor shortages and untilled land in a densely populated country are difficult to explain from this perspective. The classic neo-Malthusian scenario would have entailed an oversupply of labor, little to no untilled land, and stagnant yields.

Neither has a Boserupian outcome occurred in Malawi because intensification has not accompanied increasing population densities. Boserup failed to account for the absence of sufficient organic inputs (especially animal wastes) in some African farming systems. Organic inputs are necessary to stabilize soil fertility during the intensification process. Boserup did correctly predict that the off-take of labor (in the form of contemporary *ganyu* practices and historical labor migration) would mitigate against agricultural intensification. However, Boserupians have not attempted to distinguish between seasonal labor bottlenecks and more general labor shortages. It is also unclear whether Boserupian intensification may occur at any point in history when the

conditions are ripe, or whether the impact of labor migration during the colonial era on the agrarian change process is irreversible. Zimmerman (1994: 117) and others have discussed how new interpretations of historical time suggest an irreversibility of such events.

The **neo-liberal** economics perspective explains the behavior of wealthier farmers who are responding to economic structures and policies by intensifying production, specializing and entering the 'free' market. A process that could eventually result in a large, landless, rural workforce and a small number of wealthier farmers. However, the **neo-liberal** economic perspective fails to adequately explain the predicament of the large number of poorer farmers who only are marginally involved with the market. These farmers are not able to respond to market forces because their sub-subsistence situation implies that they need non-market based assistance to make fundamental changes in production strategies.

The **neo-Marxist** perspective best explains the current situation in Malawi because of this framework's attention to the colonial legacy, international capitalism and class-based national policies. A review of labor practices in the colonial era demonstrated how the small-hold sector was depopulated, offering an explanation for why agricultural production in Malawi did not intensify while it did in other African contexts (e. g., Kenya and Nigeria). The drive to increase maize production for the regional market and to meet national food self-sufficiency objectives was done without a clear understanding, and even misperceptions, regarding seasonal labor requirements. Malawi's first president also benefited personally from expanding maize production. Analyzing local *ganyu* labor markets from a class-based perspective helped illuminate the unfair nature of local labor exchanges. Finally, **neo-Marxist** analysis was probably no more likely than other theoretical lenses to identify the problem of limited livestock in Malawi.

## 20/ Discussion Paper Series

### Conclusion and Policy Implications

Malawi's relatively high population densities and declining small-hold agricultural production have led government officials and international aid workers to problematize Malawi's rural development in terms of over-population, surplus labor and scarce land resources. This characterization corresponds to neo-Malthusian expectations that pervade main stream development literature on Africa. The Boserupian interpretation of population and agricultural change also would have anticipated surplus labor and scarce land resources in a densely populated country. Evidence suggesting that farmers are not cultivating all of their available land because of household labor constraints is seen as a paradox for a densely populated country when the situation is examined using neo-Malthusian and Boserupian theoretical lenses.

In this paper, I largely have relied on the political economy perspective to examine agricultural dynamics in Malawi. This framework's attention to the colonial legacy, international capitalism and class-based national policies has been particularly helpful for understanding why Malawian small-holders face seasonal labor constraints and why they have failed to intensify agricultural production. First, seasonal labor bottlenecks have been particularly acute in Malawi because government policy and economic signals have reduced the variety of crops being farmed, and by extension, the time frame for critical labor inputs. Second, colonial era policies depopulated the labor pool of the subsistence sector at a historical juncture when agricultural intensification might naturally have occurred. Third, *ganyu* labor markets divert limited labor resources to the wealthy, discouraging intensification on the land of poorer households. This dynamic is exacerbated by growing wealth differences at the local level, a process that has been abetted by agricultural

extension efforts focused on high external input, maize monoculture. Finally, the limited availability of organic inputs in Malawi, in the form of animal manure, means that it is difficult to stabilize soil fertility when farmers begin to use **land** with increasing frequency. Declining marginal returns to labor (related to decreasing soil fertility) discourage farmers from spending additional time on their own farms.

I conclude by outlining policy and program recommendations related to the constraints identified in this analysis. These recommendations do not address structural problems (as such suggestions are often impractical in the short term), but are rather agricultural and development approaches that apply to the problems of seasonal labor constraints, limited income, and declining soil fertility. The recommendations pertain to: alternative crops, intercropping, agroforestry, and the timing of food for work.

#### *Alternative Crops and Intercropping*

Both pre- and post-colonial governments heavily promoted the cultivation of maize monoculture in Malawi. A strategy of encouraging low external input crops and intercropping would make agricultural extension efforts more accessible to the poor and help spread out labor demands over a longer period.

One example of a low external input food crop is cassava, an important secondary food crop in Malawi and the dominant food crop in some areas such as Nkhata Bay District. Cassava production has not been encouraged in the past because there is no national or international market for this food crop. An important aspect of cassava is that planting and harvest can occur year round (Ead and Moseley, 1996). This is especially relevant to households facing a labor bottleneck. Cassava also

## 22/ Discussion Paper Series

produces much higher yields than traditional maize in Malawi. Between 1991 and 1997, cassava yields per hectare were three to five times higher than those for local maize (Majid and Adams, 1998). This translates to considerably more calories per hectare given that the caloric values of maize and cassava are roughly equivalent. Cassava has been affected by disease in recent years in Malawi but the situation appears to be improving (Earl and Moseley 1996). While cassava is high in calories, it does not have the same nutritional value as some of the grain crops.

Intercropping should also be encouraged by the agricultural service. As discussed earlier, intercropping has a number of beneficial aspects that are relevant to the constraints faced by Malawian small-hold farmers, including: multiple harvest periods, fewer weeds, nitrogen fixation, reduced soil erosion and decreased insect related crop losses. The labor demands for these systems are more spread out, yields higher and input costs lower. Reducing costs is especially important since most Malawian smallholder farmers have few financial resources to draw upon. Higher yields imply more food for the household and the possibility that the household could get by with less *ganyu*.

### *Agroforestry and Green Manure*

One of the greatest problems in Malawian farming systems is declining soil fertility. While the government has long pushed inorganic fertilizers as the solution to this problem (particularly in the 1980s), the costs of these inputs make them prohibitively expensive for the majority of Malawian farmers. Livestock are an important source of organic fertilizer. Integrating livestock and farming systems may be a viable strategy in northern Malawi where population densities are lower, but this is a solution with limited potential in southern Malawi where rural

population densities are as high as 275 persons per square kilometer. Lele and Stone (1989:34) note that “[t]his option is precluded in the Southern region as no land is available for growing fodder.”

A form of agroforestry (mixing plants and trees) known as alley cropping could help address the organic matter deficit. An alley cropping system using the leguminous *Leucaena* increases soil nitrogen, generates green manure *in situ*, and produces animal fodder (Brewbaker, 1987; Banda *et al.* 1994). Green manure refers to decomposing leaf litter that serves as organic fertilizer. Under this system, the farmer plants strips of *Leucaena* interspersed with strips of a food crop. The *Leucaena* fixes nitrogen for the neighboring food crops. As the *Leucaena* grows (and begins to block sunlight from the food crop), it may be cut back. These cuttings may either serve as green manure or as animal fodder. This system has two or three shortcomings: 1) it may require additional labor to establish, 2) it takes up more land (this may not be a problem as none of the households surveyed by Pearce *et al.* (1996) were farming all of their available land), and 3) soil conditions may not be right for *Leucaena* to fix nitrogen (in which case the soil must be inoculated with bacteria). It has been noted that organic fertilizers and alley cropping have yet to be widely adopted in Malawi (UNICEF 1993: 80).

#### *Food-for- Work Timing*

In the medium term, poorer households will continue to rely on piece work labor until their own agricultural production improves. Aid agencies often organize food-for-work programs in years of food shortage. Rather than organizing these programs during the hungry season, when *such* work conflicts with agricultural activities, food-for-work opportunities in the off-season (April to August) would be of

## 24/ Discussion Paper Series

genuine assistance. Given the effort involved in establishing some agroforestry systems, it is suggested that food-for-work may have a role to play in establishing alley cropping systems. The process of establishing and experimenting with agroforestry systems should be a joint exercise that involves villagers as willing participants and scholars in their own right.

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