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Employment options and challenges for rural households in Malawi

An agriculture and rural employment analysis of the fifth Malawi Integrated Household Survey, 2019/20

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ABSTRACT

Malawi has suffered from weak economic growth since its independence in 1964. Over 50 percent of the population live below the poverty line, unable to produce enough or to otherwise obtain sufficient income to meet all of their basic needs. Poverty is concentrated in rural areas. Smallholder agriculture dominates employment in rural Malawi. However, with continuing population growth, the average landholding size for smallholder farming households is declining, resulting in many being unable to produce sufficient food to meet their own needs. To escape poverty, rural households increasingly must diversify their sources of income, but many lack the human and financial capital to do so. In this report, a detailed examination is provided of the agricultural production, non-farm employment patterns, and overall incomes obtained by farming households across Malawi using data from the fifth Malawi Integrated Household Survey (IHS5), conducted in 2019/20. The analysis demonstrates that most poor farming households will never be able to escape poverty through their farming alone, even with substantially higher crop productivity. Rainfed cropping remains the primary form of agricultural production for farming households in Malawi. While increasing numbers are engaging in irrigated farming during the dry season, the returns from such farming are inconsistent and low. More importantly, off-farm income sources, particularly temporary ganyu wage employment, are now critical to the livelihoods of most rural households, particularly those with small cropland holdings. The common assumption that agriculture is at the center of the livelihoods of rural households across Malawi no longer holds. Of equal importance is their ability to obtain sufficiently remunerative off-farm employment. In developing strategies for rural economic and human development in Malawi, accelerating agricultural production growth, particularly through increased productivity, and increasing the returns to farming are necessary, but incomplete solutions. Equal attention must now be paid to how workers in farming households can also qualify for and obtain good off-farm jobs. Without increases in such employment opportunities, the economies of most rural communities across Malawi are likely to stagnate and poverty will deepen among households living in them.

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LIST OF ABBREVIATIONS

CEM	Country Economic Memorandum
GAP	*Guide to Agricultural Production and Natural Resources Management in Malawi* (manual for best practices in farming published by the Ministry of Agriculture, Government of Malawi)
HH	household
IHS	Integrated Household Survey, Malawi
MK	Malawi kwacha (currency)
NSO	National Statistical Office, Government of Malawi
USD	United States dollars (currency)

Note: In April/May 2019, MK 710 ≈ USD 1.00.

This is a revised version of the Working Paper originally distributed in March 2023. The original analysis of off-farm income sources subsequently was found to have overlooked remittances from biological children of the head of household or the household head's spouse who were 15 years old and over and did not live in the household. Inclusion of this income increased the mean total annual net income per capita for farming households from MK 154,920 in the original analysis to MK 168,210 in the revised analysis presented here.

CHAPTER 1. INTRODUCTION

Despite varied efforts by Malawi's leaders and its development partners since Malawi obtained its political independence in 1964, Malawi continues to experience weak economic growth. Over the past 20 years, the share of the population living below the poverty line and unable to meet its basic consumption needs has stubbornly remained at just over 50 percent. Malawi's population remains predominantly rural—the 2018 census classified 84 percent of the population as rural residents (National Statistical Office 2019). Similarly, poverty remains predominantly a rural phenomenon—94 percent of all poor households in Malawi are found in rural communities. The rural poverty headcount for Malawi is 57 percent, a poverty prevalence level three times above that in urban centers, at 19 percent (Caruso and Cardona Sosa 2022).

The principal economic activities for rural households across Malawi historically have been in smallholder agriculture, primarily through producing rainfed crops using traditional production technologies. For most, farming remains the foundation of their livelihood— over 93 percent of rural workers (ages 15 to 64 years) who are employed work in the sector (IFPRI 2022). The rural population recently has been growing by 2.9 percent annually (National Statistical Office 2019). While not all rural residents as they attain working age will farm, most will, working on cropland to which they have use rights by virtue of being a member of the local community under customary communal land tenure arrangements. In consequence, the average size of agricultural landholdings for rural households is declining at a roughly comparable pace to the increase in rural population—data from rounds of the Integrated Household Survey (IHS) for Malawi shows the average landholding size for households that produced any crops fell from 0.80 ha in 2010/11 (IHS3) to 0.70 ha in 2019/20 (IHS5). While Malawi is well-endowed with agricultural resources, for a growing number of rural households every year, farming on the small parcels of cropland to which they have customary access with little change in their agricultural productivity levels alone does not offer sufficient returns to enable them to meet the basic needs of their members. Rural households will increasingly need to turn to other employment than in agriculture to avoid or to escape poverty. The principal economic activities for rural households across Malawi in the future will likely be much more diversified beyond agriculture alone than has been the case historically. However, it is not immediately clear what off-farm employment rural workers might obtain to reliably provide the income they require to meet the needs of their households. For many, the human and financial capital necessary to obtain such sufficiently remunerative employment places such work out of reach for them.

Across the four substantive chapters of this report, we consider three dimensions of the production levels and incomes of farming households in Malawi and how well those contribute to their being able to meet the basic needs of their members.

- The first of the four chapters, Chapter 2, consists of a detailed profile of the agricultural activities of all Malawian households in 2019/20 (IHS5). Households are categorized into four groups based on economic, residential, and demographic characteristics—commercially oriented smallholder farmers; other productive rural households; productive urban households; and households that are not economically productive. This analysis builds on and updates work from an earlier household survey (IHS4) that examined differences in the agricultural livelihoods of Malawian households based on the same typology (Benson 2021). A temporal dimension is added by also analyzing the comparable IHS dataset from 2010/11 (IHS3) to identify any changes in agricultural activities for the Malawian population as a whole between 2010/11 and 2019/20.

- The analysis then turns to focus exclusively on farming households in Malawi and how well their income from both their own agricultural activities and from non-agricultural sources allows them to meet the basic needs of their members. We consider the possibilities for enhancing the income streams that these households can derive both from higher productivity agriculture or by diversifying into or specializing in off-farm income-earning activities. In Chapter 3, the flows of income from various sources for farming households, as reported for 2019/20 (IHS5), are computed to assess the importance of agricultural income in total household income. While the specific income streams that farming households obtain from the various cropping systems and from livestock are examined in this analysis, we also examine the prevalence and magnitude for these households of income from long or short-term wage employment, the returns obtained from household enterprises, and from other sources, including social safety net programs. We find that agricultural income from crops and livestock production on average makes up about one-third of the total annual net income of farming households in Malawi. Only a small share of farming households—primarily those with relatively larger cropland holdings—are able to rely primarily on returns from their own farming to meet the needs of their households.

- Chapter 4 extends the discussion in Chapter 3 by examining twelve crops that farming households most commonly produce to estimate production levels and the net returns they obtain from those crops. The analysis is then extended for seven of these crops to determine whether or not most farming households producing each of those crops, if they were able to raise their productivity level closer to the potential maximum yield level for the crop, would they then be able to rely primarily on the income from their own farming to meet their welfare needs, whether directly through subsistence production or indirectly through the market, and not remain in or fall into poverty. What types of smallholder farming households could reliably farm at higher levels of productivity to keep themselves out of poverty? The main insight gained is that, even with substantially higher productivity levels, most farming households with relatively small landholdings are not going to be able to obtain sufficient income from the crops they plant on their land to meet their basic needs. Such farming households will need to diversify their sources of income beyond agriculture, as most already are doing.

- For those farming households that are unlikely to be able to use their farming to keep out of poverty, in Chapter 5, we identify what available employment options may offer them better economic prospects. Almost three-quarters of farming households rely on casual short-term *ganyu* employment to supplement their farming income. Half of non-farming households also have members that engage in *ganyu*. However, wages from such casual employment are low and *ganyu* work is highly seasonal. Permanent wage employment opportunities are few and the data indicate that the share of working-age individuals with salaried work is declining over time. In part because wage employment opportunities are rare, more than a third of farming households have members that operate commercial enterprises. However, the sorts of enterprises members of farming households operate often run only during the dry season and most, but not all, generate relatively limited net returns. Moreover, the risk of net commercial losses is relatively high, particularly for enterprises involving trade in non-agricultural products. Many farming households scramble to expand their income sources beyond farming, but few find significant success in pursuing such off-farm employment. Overall, we find that there are few employment opportunities open to poor farming households in Malawi that will enable them to raise the consumption level of their household above the poverty line.

These analyses are done primarily through a weighted analysis of the latest national representative household survey for Malawi, the 2019/20 IHS, the fifth in the survey series (IHS5) (National Statistical Office 2020). The survey is described in Text Box 1.1. Through these analyses, a more

detailed understanding is offered of the challenges and opportunities for farming households in Malawi to meet the welfare needs of their households both within and outside of farming. The analyses clearly show that how best to provide rural Malawians with employment opportunities that will enable them to sustainably meet the needs of their households is and will continue to remain a central development challenge for the country.

Text Box 1.1. The fifth Malawi Integrated Household Survey of 2019/20

This analysis of agriculture and rural employment in Malawi used the dataset from the fifth round of the Malawi Integrated Household Survey (IHS), which was conducted by the National Statistical Office (NSO) of the Government of Malawi. The IHS has been implemented by NSO since the first IHS round of 1998/99. Since the second round of 2004/05, the questionnaires for each IHS round have been very similar in terms of content, specific question design, and recall periods, facilitating temporal comparisons across survey rounds.

The IHS5 was administered to 11,434 sample households across Malawi from mid-April 2019 to mid-April 2020. The sample was chosen using a stratified two-stage design

- The 28 districts of Malawi plus the four major urban centers—Lilongwe, Blantyre, Zomba, and Mzuzu—constituted the 32 strata for the survey.
- The primary sampling units, from which households were randomly selected, were the enumerations areas (EA) defined for the 2018 Malawi Population and Housing Census. To implement IHS5, 717 EAs were selected nationally. The number of EAs randomly selected in a stratum was generally between 20 and 24 to allow for enumeration of sample households in two enumeration areas in the stratum in every month of the survey year This was done to gain insights on seasonal differences across households. The three exceptions to this were that only two EAs in total were enumerated in Likoma, the Lake Malawi island district for which survey logistics were challenging, resulting in a small sub-sample there, while 36 and 34 EAs were selected for the Lilongwe rural and the Lilongwe city strata, respectively, given their large populations.
- Within each selected EA, generally 16 households were randomly selected. All of the selected households in an EA were interviewed within the same month of the survey year.

The IHS surveys are representative of the population of Malawi at national, district, and urban/rural levels. The IHS datasets include household-level sampling weights for use in generating population-level estimates.

Four detailed questionnaires were used for the IHS5—household, agricultural, fisheries, and community. For the analyses presented in this report, data collected using the household questionnaire, with 23 modules, and the agriculture questionnaire, with 21 modules, were used. Shortly after the survey was completed, a quantitative consumption-based poverty analysis for Malawi using the IHS5 dataset was conducted under the leadership of NSO (National Statistical Office 2021). Among the outputs of that analysis is a constructed data file on household consumption and poverty status that is publicly available. These data were also used in the analysis here.

Full reporting on the IHS datasets is available on the NSO website: http://www.nsomalawi.mw. The Living Standards Measurement Study program of the World Bank, primarily through its Integrated Surveys on Agriculture project, has supported the design and implementation of the IHS survey series since IHS2. All IHS datasets from the second round onwards, together with full documentation and supplementary files, are available for download from the microdata library of the World Bank: http://microdata.worldbank.org.

Source: (National Statistical Office 2020).

This report has been prepared as a background paper for a new Malawi Country Economic Memorandum (CEM) that the World Bank will publish in 2023 at the request of the government of Malawi. The fourth in a series (2004, 2010, 2018), the forthcoming CEM aims to contribute to establishing a

more effective policy framework for job creation, strengthening markets, and accelerating economic transformation across Malawi. Since agriculture remains the dominant livelihood for most Malawian households and is critical to the well-being and economic prospects of their members, this employment-focused background paper on agriculture is to inform the contents of the broader CEM.

Text Box 1.2. Malawi 2063, the development vision for the country and the role agriculture plays in achieving it

The current formulation of the development vision for Malawi, the Malawi 2063 document, was launched in January 2021. The goal is "to propel the country towards achieving economic independence, inclusive wealth creation, self-reliance and a high quality of life for all its citizens" by 2063 (National Planning Commission 2020, 1). Malawi is to be "a self-reliant industrialized upper-middle-income country (p. i)" by that year. 2063 was targeted because that is when Malawi will have attained 100 years of self-governance.

The vision is anchored on three economic development pillars—agricultural productivity and commercialization, industrialization, and urbanization. However, of equal prominence are seven factors viewed as being indispensable to achieving the Malawi 2063 development vision. These 'enablers' are mindset change to instill a culture of self-reliance in achieving inclusive wealth creation, effective governance, enhanced public-sector performance, private sector dynamism, significant human capital development, provision of supportive economic infrastructure to promote domestic economic activity and spur foreign direct investments for wealth creation, and environmental sustainability. "The seven enablers will reinforce each other and catalyze implementation towards the realization of the aspirations of each of the pillars (p.12)."

The three pillars are not to stand in isolation from each other but in an "ecosystem". As the agricultural sector expands through increased productivity and commercialization, it will supply increasing amounts of raw materials for industrial processing and reliably produce healthy and nutritious food for local food systems. Agro-based industries in turn will provide increased employment and economically anchor Malawi's growing urban centers.

The vision for Malawi's agricultural sector under Malawi 2063 is to "shift from low productivity and subsistence-oriented agriculture to a highly productive and commercialized agriculture system with manufacturing linkages (p.13)." Several broad initiatives will be undertaken to bring about this transformation:

- Improve agricultural productivity and create well-functioning agricultural markets to generate income, release agricultural labor, and stimulate demand in other sectors.
- Embark on extensive agricultural commercialization programs. While agricultural marketing parastatals are part of the vision, they will operate in "alliance with the private sector, in a transparent and accountable manner, and independent of political interference (p.15)."
- Promote improved practices and sustainable management of land, water, and other natural resources. These practices should build the resilience of farmers to better manage climate-related or other adverse shocks to their livelihoods and welfare.
- Diversify agriculture beyond maize for food security and tobacco as the main cash crop.
- Increase the use of modern technologies, including mechanization. As part of these efforts, "large commercial farms and cooperatives shall be supported and strengthened (p.16)."
- Expand access to agricultural finance and targeted agricultural insurance.

To operationalize efforts to realize this vision, five and ten-year Medium-Term Development Plans will be formulated that are closely aligned to both the pillars and the enablers of Malawi 2063. Extensive monitoring will be done to track progress in implementing the vision and to ensure that no one is left behind.

Source: (National Planning Commission 2020).

The government and its development partners are expected to use the CEM to inform public and internal debates around the content of new medium-term development strategies that are aligned with the development vision for the country, Malawi 2063 (National Planning Commission 2020), the agricultural content of which is sketched out in Text Box 1.2. The ambition for this report is to inform these strategic policy debates with sound and reasonably comprehensive evidence on the development potential and welfare impact of more productive smallholder agriculture and expanded rural employment opportunities.

The agricultural sector in Malawi, while dominated by household-level production, also includes a relatively large commercial estate sector. Estates generally involve larger areas of land obtained through freehold ownership or through long-term leasehold arrangements, on which crops are produced for sale, particularly into Malawi's export markets. These crops include more capital-intensive forms of tobacco (particularly flue-cured), tea, sugar, soyabean, crop seed of various sorts, and some maize, among others. The most recent estimate is that estates in Malawi occupy 1.35 million ha (Deininger and Xia 2017), while our IHS5 analysis suggests that farming households cultivated a bit under 2.50 million ha.

Despite their large footprint in rural Malawi, agricultural estates do not feature in the analyses here. This is an important limitation of this study in terms of its salience for agricultural development strategy formulation. The IHS, as a household survey, offers virtually no information on estates, their operations, and their commercial performance. While workers in some of the farming households in the IHS5 sample are employees of or are seasonal tenant farmers on those estates, no specific attention is paid to these estate-linked sub-samples in the analyses that follow. Consequently, readers should recognize that the smallholder focus of this report does not reflect the entire range of possibilities for how the agricultural sector might contribute to achieving Malawi's development ambitions.

Indeed, given the relatively discouraging prospects for farming households, particularly those with smaller cropland holdings, to significantly increase the income they obtain from their farming, strategies for accelerating growth in agricultural production in Malawi necessarily must be wholistic in nature and extend beyond smallholder production alone. Improving the productivity of the estate sub-sector should be a central element in any agricultural sector strategy for the country. The most recent study of crop production on estates across Malawi found that only about 40 percent of estate land was being cultivated (Deininger and Xia 2018). The development vision for the country laid out in Malawi 2063 will not be achieved without taking full advantage of these underutilized estates, even if efforts are made to significantly increase the crop productivity of farming households, particularly those farming relatively larger cropland holdings.

While the analyses here have been done in an objective manner, there is a subjectively-formed but conceptually and empirically supported model of rural development underlying these analyses. This is discussed in more detail in Chapter 2. In its operations, the model operates and generates outcomes that are close to, but not perfectly aligned with, those laid out in Malawi 2063. Among the most important outcomes of this model are a Malawi with:

- A much smaller share of rural households engaging in farming, but those that do farm are significantly more productive and obtain much higher incomes than is now the case;
- All workers, but particularly those in rural communities, having access to substantially expanded options for generating the income they need to meet the basic needs of their households, particularly outside of agriculture; and
- Sharp and permanent reductions in rural poverty.

Several generations of not-fully-successful policy reforms and strategic programs to sustainably increase agricultural productivity in Malawi and provide better-paying jobs in rural communities demonstrate that these outcomes are not easy to achieve. This paper provides a close description of the challenges hampering such progress. However, the steps needed to achieve the agricultural transformation and expanded employment that will be required to realize the development vision for Malawi and how they should be sequenced and prioritized will require additional analysis, debate, and informed leadership.

CHAPTER 2. ECONOMIC DIFFERENTIATION AND CHANGE AMONG MALAWIAN HOUSEHOLDS, WITH A FOCUS ON AGRICULTURE

In a chapter in a 2021 book on agricultural development and food security in Malawi written by one of the authors of this report and published by the International Food Policy Research Institute, the argument was asserted that commercial smallholder farmers needed to be placed at the center of any policies and strategic programs that seek to foster rural economic transformation and to assure food security for Malawi (Benson 2021). This subset of smallholders is uniquely positioned within rural communities to serve as an engine of economic growth. Moreover, this perspective rejects the view that the bulk of the population of Malawi is made up of a relatively undifferentiated mass of smallholder farming households engaged in low-productivity farming of food crops. Viewing all farming households as having a similar role in contributing to the economic performance of the agriculture sector is misguided and results in missed opportunities for promoting longer-term rural economic development and for sustainably improving the welfare of rural communities.

Conceptual model of rural economic development centered on commercial farming households

This model of rural economic development in which a vibrant commercial smallholder farming sector animates rural nonfarm economic activities operates as follows:[1] As the productivity of commercial farming households rises, their farm production expands, and their incomes increase. With increased income, they will demand more of the goods and services that their less agriculture-focused neighbors produce. These goods and services are those that are labor-intensive, require limited capital in their production, and typically are not marketed outside of the local community—construction and building repair services; transport; education, health, and other social services; furniture and handicraft-making; and food and beverage processing, among others. This consumption linkage diffuses many of the economic gains commercial smallholders make from their more productive farming to those other rural households, deepening local markets, accelerating local economic activities, and improving access to food for economically active households in these communities, including the poor.

As this pattern of rural economic development continues, the returns less agriculture-focused rural households obtain from their nonfarm activities begin surpassing those that they can obtain from their low-productivity farming. Many of the households producing goods and services for the local market will expand their activities to serve wider markets, propelling some specialization in local rural employment patterns and further increasing their income. In so doing, many will transition from being poor, subsistence-oriented households that engage in some farming to become nonfarming households specialized in livelihoods outside of agricultural production. Moreover, potentially large shares of the cropland that these less agriculture-focused rural households currently use will increasingly be made available for more productive use by commercial smallholder farming households, further accelerating agricultural and rural economic growth. There is considerable empirical evidence, particularly from Africa and south Asia, that rapid agricultural production growth by small commercial farming households can be an effective driver of poverty reduction. However, context matters—the broader political and economic context and the local structure of agricultural

[1] An extensive research literature on the linkages between the smallholder farming sector and the rural nonfarm sector in developing countries goes back at least 50 years. Haggblade, Hazell, and Reardon (2007) provide a detailed overview of several dimensions of this research. The mechanisms of how this model of rural economic growth operate at the rural community level have been most clearly described by Mellor (2017; 2014). Timmer (2015) examines the same issues, but adopts a more strongly macroeconomic perspective focused on the structural transformation of rural and national economies.

production are important determinants of the level of the impact of this improved agricultural productivity on poverty (Haggblade, Hazell and Dorosh 2007; Mellor and Malik 2017).

In the 2021 IFPRI book, after this model of rural economic development was sketched out conceptually, some of the challenges to its operationalization in rural communities in Malawi were then examined and discussed. These include:

- Access to land, the dominance of customary communal land tenure systems, and the importance of those customary rights to land to the economic and social security of community members all will constrain the ability of commercially oriented farming households to significantly expand the areas they farm.
- As the scale of production of commercially oriented smallholder households increases, the mobilization of sufficient labor at key points in the farming season beyond that available within the household historically has proven to be a quite challenging hurdle to surmount in expanding agricultural production. As will be discussed in Chapter 5, rural communities in Malawi are characterized by underemployment of available labor in aggregate annually. However, rainfed farming systems demand close timing of farming operations, which puts heavy demands on labor at specific points in the cropping season. This creates labor bottlenecks for any commercially oriented smallholder farming households operating at scales that require labor beyond what is available in their household—at the same time as those commercially oriented farming households urgently require additional labor, their neighbors who might supply that labor have a strong economic preference to work on their own crops (Benson 2021, 108).
- The availability of markets that provide reliable commercial incentives for farming households is foundational to the model. However, agricultural markets in Malawi currently are deficient in this regard. Market transactions can be an important source of risk to household livelihoods and welfare. Farming households are uncertain as to whether they always will find buyers in those markets who will offer them a profitable price for their crops, while households seeking to buy agricultural produce—most notably, their staple maize—similarly cannot be certain that they always will find on offer in the market the commodity they seek at a price they can afford (Dorward, et al. 2009). Stability in seasonal price patterns is a critical component in establishing reliable commercial incentives for farming households (Timmer 2015). There are important policy components to strengthening agricultural markets in Malawi. These include ensuring predictable government engagement in agricultural marketing and trade, providing public services to enable markets to operate more efficiently, adopting policy stances that are supportive of agricultural market traders, and expanding participation in regional markets by farmers and other actors in Malawi's agricultural commodity value chains.

Overall, the continuing dominance of a subsistence orientation in the agricultural activities of rural Malawian households calls into question how realistic such a development approach would immediately be for communities in rural Malawi.

Empirical appraisal of practicality in Malawi of the model of rural economic development

Because the rural economic context of Malawi does not allow for its straightforward application, an empirical appraisal was done in the 2021 book to better understand how practical it would be to implement such a rural economic development strategy in Malawi. What would be the scope and scale of the effort to implement a strategy focused on enhancing the agricultural production of commercially oriented farming households and expanding remunerative nonfarm livelihood opportunities for other productive households? Ideally, we would wish already to find a relatively large share

of economically productive rural households engaged in commercially-focused agriculture, while at the same time other rural households are found to increasingly engage in livelihoods outside of agriculture that enable them to better meet the basic needs of their members.

For the appraisal of whether the rural development model has potential in the context of Malawi, a household typology informed by the model was applied to the fourth IHS dataset of 2016/17. Four categories of households were defined:

- **Commercially oriented smallholder farmers** are those that produce considerably more crop output than they consume within their own households. For the analysis, rural households that were not ultra-poor (consumption below the food poverty line) and that reported selling more than a quarter of the maize they harvested were placed in this category.[2] The analysis for the 2021 book was centered on achieving food security through agricultural market development—hence, the focus on Malawi's principal food crop, maize. However, by focusing only on maize sales, this category may erroneously exclude farmers who specialize in the production of crops other than maize for sale, while only growing enough maize sufficient to meet their own household needs (Text Box 2.1).
- **Other productive rural households** are subsistence-oriented rural households that engage in some farming while also pursuing a diverse set of generally unskilled, labor-intensive livelihood-earning activities. Making up the bulk of the rural population, for the analysis, this is a residual category of rural households that do not fall into either the commercial farming or the not economically productive categories.
- **Not economically productive** households are found both in rural areas and urban centers. Such households are ultra-poor, and more than half of their members are nonworkers (those younger than 15 years and older than 64).
- **Urban households** are resident in urban centers and rural towns and primarily specialize in economic activities outside of agricultural production. For the analysis, this is a residual category of urban households that do not fall into the not economically productive category.

Using the IHS4 dataset, a set of tables that profiled the households in each category were developed for the 2021 book. The headline finding from this earlier analysis was that the size of the commercially oriented smallholder category was surprisingly small at 5.5 percent of all Malawian households. The low share of the population falling into this group, which is the engine for economic growth under this model of rural economic development, may call into question how realistic rural economic development policies and programs centered on such households would be. It seems unlikely that significant improvements in household livelihoods and in the performance of the Malawian economy can emerge from efforts to increase the role that such a small group of rural households plays in their local economies.

However, the IHS4 analysis was extended to earlier IHS rounds to examine how the relative sizes of these household categories have evolved since the IHS2 of 2004/05. This showed that the share of commercially oriented farming households among all Malawian households has remained low but relatively steady over this period. Commercially oriented smallholder farming households,

[2] While the total value of crop production that was sold could have been used to define households in this category, the sales of maize alone was used for analytical simplicity. Of farming households in Malawi, 88 percent produce maize and the crop is planted on over 70 percent of the cropland of farming households.

Gross sales as a share of maize harvested was used to define households in this category rather than net maize sales. Information on food crop sales and consumption is not sufficiently harmonized in the IHS to determine annually whether a household is a net maize seller or a net maize purchaser. Information on crop sales is collected on a seasonal basis, while that on food purchases is based on food consumption recall over the previous seven days. Consequently, households were categorized as commercially oriented if they reported selling more than a quarter of their harvested maize annually.

though relatively few in Malawi, are not withering away over time, despite an agriculture sector that overall is facing shrinking landholdings with, at best, only limited improvements in levels of agricultural productivity. Consequently, the conclusion was drawn in the 2021 book that a window of opportunity for rural economic development through focusing on commercially oriented smallholders remains open. With effective market development and increased agricultural productivity, the share of Malawian households that are commercially oriented farming households can be expected to grow.

Text Box 2.1. Errors of exclusion and inclusion associated with the definition of "Commercially oriented smallholder farmer" used in empirical appraisal of the model of rural economic development in Malawi

The definition of commercially oriented smallholder farmers used in the empirical analysis in this chapter is based on households that sold more than a quarter of the maize they reported harvesting. While justified for an analysis centered on food security, this is an imperfect measure of the varied forms the commercial orientation of farming households might take, resulting in either errors of exclusion or inclusion in categorizing some households.

- A farming household that produces significant quantities of groundnut for sale while growing only enough maize for own consumption would be excluded from the "Commercially oriented smallholder farmer" category and erroneously be considered non-commercial. IHS5 analysis shows that 9.7 percent of all households in the three categories other than the "Commercially oriented smallholder farmer" category (93.0 percent of all households) sold more than 25 percent of the groundnut they reported harvesting.
- Farming households that produce crops that are not commonly retained for household consumption but are produced for sale—tobacco, soyabean, sunflower, or cotton—and that do not also sell more than a quarter of the maize they produce would erroneously not be considered commercially oriented. The IHS5 data shows that 15.5 percent of all households in the three categories other than the "Commercially oriented smallholder farmer" category reported producing one or more of these cash crops.
- Alternatively, a farming household that obtains only a small maize harvest, but sells most of it to meet immediate cash needs and then relies on wages from ganyu labor later in the year to purchase the maize they require would be considered commercially oriented under the definition used here—31.4 percent of households in the "Commercially oriented smallholder farmer" category reported obtaining more income from *ganyu* labor than from crop production.

Certainly, other household agricultural production scenarios that similarly result in possible categorization errors could be constructed. Such errors may undermine or muddle the insights drawn from certain policy analyses.

Source: Author's weighted analysis of the Malawi Integrated Household Survey of 2019/20 (IHS5).

In discussions on the content of this background paper on agriculture and rural employment for the 2023 Malawi CEM, several stakeholders asked that the 2016/17 IHS4-based tables from the 2021 book be updated using the 2019/20 IHS5 dataset as a component of the paper. As the structure of the two datasets is similar, the same definitions of the household categories could be used, and updated tables could be developed by adapting the IHS4 analysis relatively easily for the IHS5 dataset. These updated tables using IHS5 are presented in this chapter.

As the rural economic development model is centered on commercially oriented smallholder farmers, the characteristics of households in this category are highlighted in the updated tables. These

households make up only 7.0 percent of all Malawian households—a larger share than the 5.5 percent seen in the IHS4 from 2016/17, but not substantially so. Given this low prevalence of commercially oriented households, the characteristics of households in the "other productive rural households" category are also of interest. It is households in this category that are most likely to transition to a more commercial orientation in their farming, as well as also being the rural households most likely to increasingly specialize in nonfarm livelihoods. The tables in this chapter present tests of differences in estimates of the characteristics of households in the two categories. The results of these tests provide some guidance on the opportunities, barriers, and types of support required for other productive rural households to increase their agricultural productivity and commercialization levels or to pursue economic activities outside of farming.[3]

To identify any changes in the characteristics of the Malawian population, the updated tables additionally present those characteristics from both IHS5 in 2019/20 and IHS3 in 2010/11. While the 2021 book chapter was based on an analysis of the IHS4 dataset from 2016/17, it was decided to use the IHS3 here instead to capture trends over a longer period. Moreover, the rainfed cropping season referenced in the IHS4, that of 2015/16, was poor, particularly in the Southern region, resulting in widespread food insecurity during the IHS4 survey period. For agricultural production, the reference cropping seasons for the IHS3 and IHS5 both were more comparable and closer to the norm.

Table 2.1: Location and poverty characteristics of households in the different economic categories, 2019/20

Characteristic	All IHS5 (2019/20) households	Commercially oriented smallholder farmers	Other productive rural households	Not economically productive	Urban households
Population ('000s): Individuals	18,134	1,242	10,884	3,266	2,742
Households	4,123	290	2,623	555	655
Share of households in population, % [a]	100.0	7.0	63.6	13.4	15.9
Rural North	*10.7*	*10.6*	*82.9*	*6.5*	*0.0*
Rural Central	*34.9*	*11.8*	*68.2*	*20.0*	*0.0*
Rural South	*38.1*	*4.6*	*81.2*	*14.2*	*0.0*
Urban	*16.3*	*0.0*	*0.0*	*2.3*	*97.7*
2016/17 (IHS4) (Benson 2021)	*100.0*	*5.5*	*66.6*	*9.2*	*18.7*
Poor (value of consumption per capita below basic-needs poverty line), %	42.5	27.1	39.5	100.0	12.4
Ultra-poor (value of consumption per capita below food poverty line), %	15.8	0.0	3.6	100.0	0.3
Housing quality—floor, roof, or walls constructed of modern materials, % of households	67.9	74.7	65.1	45.3	95.3
Observations, IHS5	*11,434*	*816*	*7,211*	*1,358*	*2,049*

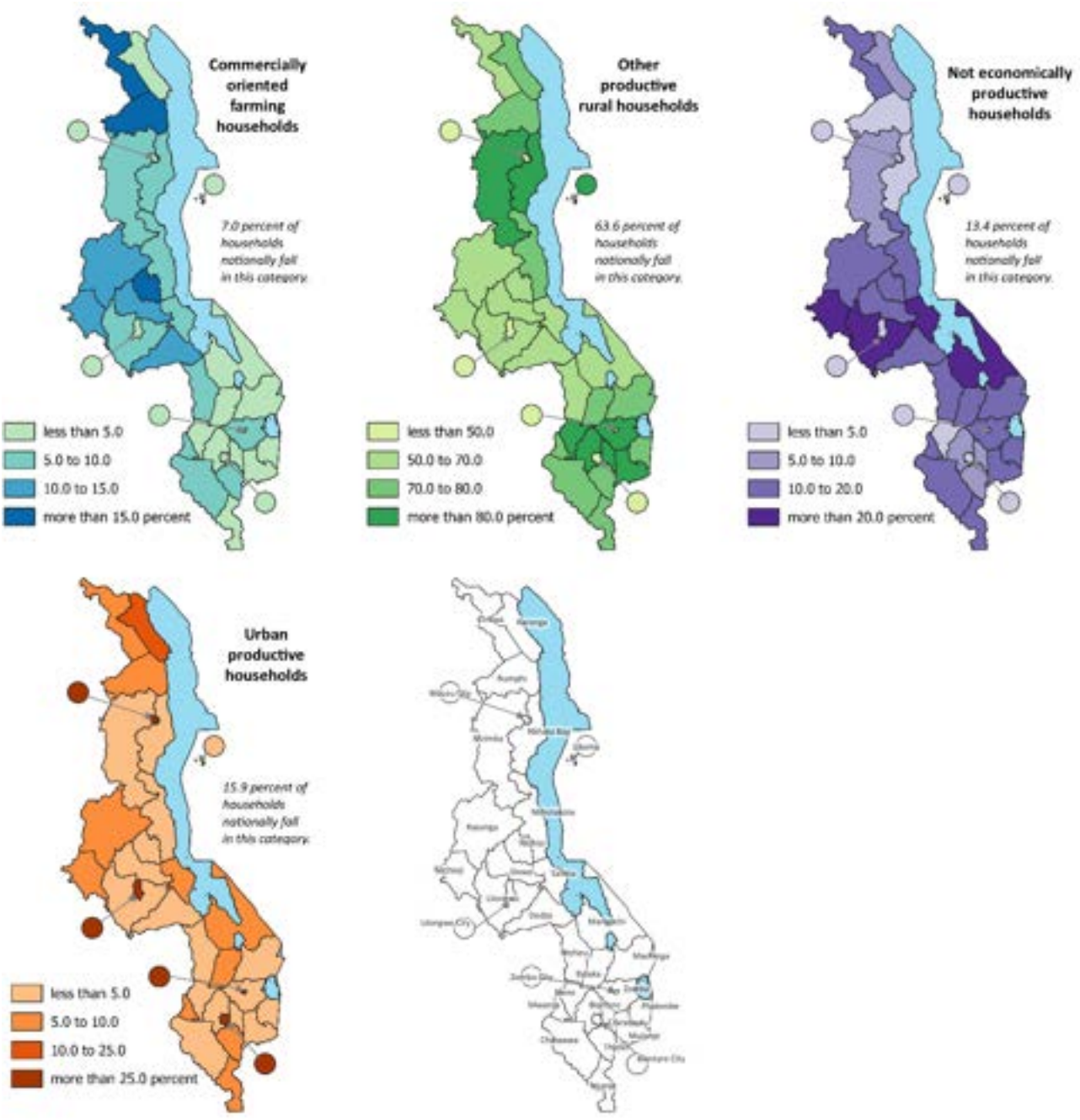
Source: Author's weighted analysis of the Malawi Integrated Household Surveys of 2016/17 (IHS4) and 2019/20 (IHS5).
The Urban population is defined as residents in the four major urban centers of Malawi, district headquarter towns (*bomas*), and other market centers with urban characteristics as determined by the National Statistical Office of Malawi.
[a] For the second panel, the statistics in the second column are column totals, while the statistics in the third to sixth columns are row totals.

Table 2.1 shows the weighted results of this categorization of the IHS5 survey households. The share of households made up of those in the commercially oriented smallholder category is slightly larger than what was found in the IHS4 analysis, but not significantly so. Processes of rural economic transformation centered on such households likely advanced little, if at all, between 2016/17

[3] The other two categories of households, the economically unproductive and urban productive households, are of more limited interest for the analyses here, but statistics for them are presented in the tables to provide a comprehensive record.

and 2019/20. The relatively large rise in the share of households categorized as not economically productive is the most noteworthy and troubling change over this period.

Figure 2.1: Maps by district and major urban centers of the share of households that fall into the four economic categories, 2019/20



Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey. [4]

[4] Urban productive households dominate the four urban centers, with only households in the not economically productive category also being found there. However, in most of the other IHS5 strata defined by districts, typically one or two enumeration areas that NSO defines as urban were randomly selected among the about two dozen enumeration areas generally selected as primary sampling units in the first stage of forming the IHS5 household sample (see Text Box 1.1). These are enumeration areas in district market or administrative centers. However, in creating the IHS5 sample in Karonga district, among the 24 enumeration areas selected in total, five urban enumeration areas were randomly selected in this primarily rural district. This anomaly is apparent in the map in Figure 2.1 for 'Urban productive households'.

Figure 2.1 maps the share of households in the 32 survey strata of IHS5—comprising the 28 districts of Malawi plus the four major urban centers—that are in each of the four categories. The districts with a disproportionate share of commercially oriented farming households are those in the mid-altitude plateau areas of Northern and Central regions. These are the areas of Malawi best suited agroecologically for the production of maize and rural population pressures are not as strong as in the upland areas of the Southern region, which also is well-suited agroecologically for maize production. Rather we find in the Southern mid-altitude area of the Shire Highlands a disproportionately high share of households that are productive, but are not as strongly commercial in their maize production as are farming households in a similar agroecology in the other two regions.

Both Mzimba district in the Northern region and the rural part of Lilongwe district (excluding Lilongwe city) in Central region are exceptions to these patterns. Further study will be needed to understand why farming households in Mzimba are not selling a greater share of their maize, as do households in districts located also in the mid-altitude plateau neighboring Mzimba—Rumphi and Chitipa in Northern region, and Kasungu, Dowa, and Ntchisi in Central region. Farmers in Mzimba certainly could do so. Lilongwe (rural) is exceptional in its somewhat lower-than-expected share of productive farming households overall, both commercially and not commercially oriented in their maize production, despite being situated at the heart of the areas of both maize and tobacco production in Malawi. Rather, it has among the highest prevalence of not economically productive households among all districts—over 22 percent of households in Lilongwe (rural) fall in this category. This high prevalence of extremely poor households with high numbers of dependents in Lilongwe also would require more investigation to determine whether this pattern has endured over time or, rather, may be specific to the IHS5 sample. Mchinji similarly has an unexpectedly high share of households falling into this category, despite also being located in the mid-altitude plateau agroecological zone.

Basic demographic characteristics of households in each category are presented in Table 2.2. Commercially oriented households are more likely to be headed by men and by younger individuals than are other productive rural households. Significant changes across almost all these characteristics are seen between 2010/11 and 2019/20—of particular note is the large rise in the share of households that are female-headed in the general population. At the same time, female-headed households are underrepresented in the commercially oriented farming household category.

Table 2.2: Demographic characteristics of households in the different economic categories, 2019/20

Characteristic	All IHS5 households	Commercially oriented smallholder farmers	Other productive rural households	Not economically productive	Urban households	All IHS3 households
Household size, members	4.4	4.3	4.1	5.9	4.2	4.5 ***
Dependents (under 15 or over 64 years of age)	2.1	2.0	2.0	3.5	1.7	2.3 ***
Dependents to household size ratio, mean	*0.46*	*0.44*	*0.45*	*0.61*	*0.36*	*0.48* ***
Household head age, years	43.1	42.5 **	43.9	44.1	39.5	42.3 ***
Under 35 years of age	*35.6*	*36.8*	*35.2*	*30.2*	*41.3*	*40.3* ***
35 to 64 years of age	*51.3*	*52.1*	*49.9*	*55.2*	*53.1*	*47.5* ***
Over 64 years of age	*13.1*	*11.1* ***	*14.8*	*14.6*	*5.6*	*12.2*
Female-headed households, % of households	31.0	23.2 ***	32.7	38.9	21.0	23.8 ***
Observations	*11,434*	*816*	*7,211*	*1,358*	*2,049*	*12,271*

Source: Author's weighted analysis of the Malawi Integrated Household Surveys for 2010/11 (IHS3) and 2019/20 (IHS5).
Note: Asterisks on the statistics for 'Commercially oriented smallholder farmers' present the statistical significance of differences in the statistic between households in this category and those is the 'Other productive rural households' category. Asterisks on the statistics for 'All IHS3 households' present the statistical significance of differences in the statistic between these households and those in the 'All IHS5 households' category. * = $p < 0.10$, ** = $p < 0.05$, ***= $p < 0.01$.

Although members of urban households have the highest education levels, commercially oriented farming households have higher levels than other rural households (Table 2.3). Moreover, these statistics show increases in the education received by the younger generation—maximum education levels within households are markedly higher than the levels achieved by the heads of those households and maximum attainment levels among all household members are higher in 2019/20 than in 2010/11. Rising levels of human capital in rural communities will almost certainly be an important component of rural economic transformation, even if the impacts may not be seen for decades and a range of complementary investments also will be needed to advance local rural economies.

Table 2.3: Educational attainment within households in the different economic categories, 2019/20

Characteristic	All IHS5 households	Commercially oriented smallholder farmers	Other productive rural households	Not economically productive	Urban households	All IHS3 households
Educational attainment of household head, % of households						
No formal education	15.9	10.4 ***	17.0	26.6	5.0	23.2 ***
Some primary	58.4	58.8 **	62.5	65.5	36.1	54.3 ***
Some secondary	22.4	29.6 ***	18.8	7.9	46.1	19.3 ***
Beyond secondary	3.2	1.2	1.7	0.0	12.8	2.9
Maximum educational attainment in household, % of households						
No formal education	3.1	2.0 ***	4.0	1.8	1.2	6.9 ***
Some primary	56.4	47.9 ***	60.2	79.9	24.8	59.8 ***
Some secondary	36.0	47.5 ***	33.3	18.2	56.9	29.8 ***
Beyond secondary	4.4	2.6	2.4	0.1	17.1	3.5 ***
Observations	*11,434*	*816*	*7,211*	*1,358*	*2,049*	*12,271*

Source: Author's weighted analysis of the Malawi Integrated Household Surveys for 2010/11 (IHS3) and 2019/20 (IHS5).
Note: Asterisks on the statistics for 'Commercially oriented smallholder farmers' present the statistical significance of differences in the statistic between households in this category and those is the 'Other productive rural households' category. Asterisks on the statistics for 'All IHS3 households' present the statistical significance of differences in the statistic between these households and those is the 'All IHS5 households' category. * = p < 0.10, ** = p < 0.05, ***= p < 0.01.

There has been a slight, but statistically significant, decline in the share of households that engaged in any crop production between 2010/11 and 2019/20 (Table 2.4). More notable is the relatively sharp increase over this period in the share of households that engage in irrigated crop production—by over 10 percentage points.[5] For many households, this addition of irrigated farming to their livelihoods portfolio may reflect their inability to meet the basic needs of their households through rainfed production alone. Irrigated farming also permits households to exploit both their farmland and labor more fully over the year. Note that a larger share of commercially oriented farming households engages in irrigated farming than do other productive rural households.

As discussed in the introduction, over time average landholdings for farming households in Malawi are declining in size due to rural population growth. For all that produced crops, household landholdings were 0.70 ha on average in 2019/20—0.10 ha smaller than in 2010/11 (Table 2.4). Examined at a per capita level, it is particularly in the Southern region that the size of landholdings dropped most significantly over this period. In contrast, no significant change was seen in per capita landholding sizes in the Northern region. Among farming households, the average landholdings

[5] 'Irrigated' is used throughout this report as a shorthand for farming in the dry season. About a quarter of the plots used by farming households for dry season crop production were reported to not have been irrigated. Rather, the crops grown in these plots relied on residual soil moisture for their growth during the dry season. See Text Box 4.1.

of those that are commercially oriented (1.07 ha) are about half again larger than the average landholding for all farming households (0.70 ha). At least for rainfed production, a commercial orientation is strongly associated with a farming household having relatively larger landholdings.

Table 2.4: Agriculture-related characteristics of households in the different economic categories, 2019/20

Characteristic	All IHS5 households	Commercially oriented smallholder farmers	Other productive rural households	Not economically productive	Urban households	All IHS3 households
Engaged in any crop production in previous year, %	78.7	100.0 ***	86.1	89.7	30.7	82.7 ***
Of those that did so, rainfed only	76.8	68.5 ***	76.5	77.9	88.9	88.0 ***
… irrigated only	1.7	2.1	1.6	1.4	3.0	0.2 ***
… both irrigated and rainfed	21.5	29.4 ***	21.9	20.7	8.1	11.8 ***
Cropland area used in past season, ha						
Average, all households	0.56	1.07 ***	0.60	0.54	0.17	0.67 ***
Average, households that produced crops	0.70	1.07 ***	0.69	0.59	0.56	0.80 ***
Per household member, all households	0.14	0.28 ***	0.16	0.10	0.05	0.17 ***
Per household member, households that produced crops	0.18	0.28 ***	0.19	0.10	0.16	0.20 ***
Northern region	0.23	0.33 ***	0.23	0.11	0.15	0.22
Central region	0.21	0.30 ***	0.22	0.12	0.19	0.23 **
Southern region	0.15	0.21 ***	0.15	0.09	0.14	0.18 ***
Rent in some land, % of all households	8.8	20.0 ***	8.8	6.9	5.6	8.7
Cropland rented in, ha, average for households renting in	0.45	0.67 ***	0.42	0.28	0.48	0.51 *
Rent out some land, % of all households	0.9	0.9	0.9	1.1	0.3	0.4 ***
Hire in agricultural labor, % of all households that produced crops	21.1	41.3 ***	19.9	5.3	45.8	16.7 ***
Amount of hired in labor, for those hiring in, hours/ha cropland over past cropping year	26.9	23.2	25.7	19.1	39.5	20.7 †
Observations	*11,434*	*816*	*7,211*	*1,358*	*2,049*	*12,271*

Source: Author's weighted analysis of the Malawi Integrated Household Surveys for 2010/11 (IHS3) and 2019/20 (IHS5).
Note: Asterisks on the statistics for 'Commercially oriented smallholder farmers' present the statistical significance of differences in the statistic between households in this category and those is the 'Other productive rural households' category. Asterisks on the statistics for 'All IHS3 households' present the statistical significance of differences in the statistic between these households and those is the 'All IHS5 households' category. * = p < 0.10, ** = p < 0.05, ***= p < 0.01; †= could not compute.

Although renting-in of land is not common among farming households in Malawi, commercially oriented smallholders are more than twice as likely to do so than are other households. Very few households surveyed in either round of the IHS reported renting-out any of their land.

Hiring in agriculture labor to supplement household labor became somewhat more common between 2010/11 and 2019/20. Commercially oriented smallholders and urban households that farm are much more likely than other households to employ outside labor. However, outside labor is not used any more intensively by commercial smallholders than by other rural households that make use of such labor. Urban households engaged in crop production use hired-in labor most intensively.

Table 2.5: Crop production and sales for households in the different economic categories, 2019/20

Characteristic	All IHS5 house-holds	Commer-cially oriented smallholder farmers	Other productive rural households	Not econom-ically productive	Urban households	All IHS3 house-holds
Maize (any) production, % of households	74.4	100.0 ***	80.7	85.6	28.2	80.0 ***
Sold any maize, % of households	*15.7*	*100.0* ***	*10.3*	*9.0*	*5.4*	*13.1* ***
Share of maize harvest sold, for households that sold any	*30.7*	*45.4* ***	*14.4*	*27.6*	*37.7*	*31.7*
Local maize production, % of households	*42.4*	*45.6*	*47.5*	*51.8*	*12.8*	*45.0* **
Improved maize production, % of households	*37.9*	*63.7* ***	*39.9*	*39.3*	*17.2*	*45.9* ***
Rice production, % of households	5.2	4.5 **	6.5	4.6	1.1	4.2
Other grain production, % of households	8.9	6.4 ***	10.7	10.9	1.2	6.5 ***
Cassava production, % of households	9.5	7.1 ***	12.0	8.4	1.7	9.2
Sweet potato production, % of households	6.7	7.6	7.7	7.3	1.5	3.5 ***
Irish potato production, % of households	2.8	9.0 ***	3.0	1.6	0.6	1.3 ***
Groundnut production, % of households	21.4	38.6 ***	23.7	21.0	5.1	22.4
Sold any groundnut, % of households	12.5	27.1 ***	13.3	13.0	1.9	8.2 ***
Share of groundnut harvest sold, for households that sold any	59.7	60.4	58.0	67.2	60.6	46.9 †
Bean and cowpea production, % of households	20.4	37.0 ***	21.8	18.7	8.5	10.4 ***
Sold any bean and cowpea, % of households	5.8	18.0 ***	5.7	5.2	1.3	2.4 ***
Share of bean and cowpea harvest sold, for households that sold any	66.5	67.4	66.2	67.9	61.6	55.7 †
Pigeonpea production, % of households	23.3	18.5 ***	27.9	23.6	6.4	17.5 ***
Sold any pigeonpea, % of households	9.2	12.4	11.2	7.2	1.5	4.9 ***
Share of pigeonpea harvest sold, for households that sold any	59.6	63.6	58.4	60.4	76.0	58.6 †
Soyabean production, % of households	12.4	24.1 ***	13.0	14.4	3.5	4.7 ***
Sunflower production, % of households	1.0	2.6 **	1.1	0.8	0.0	0.6
Tobacco production, % of households	4.3	13.2 ***	4.5	3.2	0.3	12.3 ***
Cotton production, % of households	0.8	1.0	0.9	0.8	0.0	1.6 ***
Observations	*11,434*	*816*	*7,211*	*1,358*	*2,049*	*12,271*

Source: Author's weighted analysis of the Malawi Integrated Household Surveys for 2010/11 (IHS3) and 2019/20 (IHS5).
Note: Asterisks on the statistics for 'Commercially oriented smallholder farmers' present the statistical significance of differences in the statistic between households in this category and those is the 'Other productive rural households' category. Asterisks on the statistics for 'All IHS3 households' present the statistical significance of differences in the statistic between these households and those is the 'All IHS5 households' category. * = p < 0.10, ** = p < 0.05, ***= p < 0.01; †= could not compute.

The cropping patterns of the different types of households are presented in Table 2.5. Over time, there has been a reduction in the share of all households producing maize. Nonetheless, maize remains the dominant crop grown in Malawi. The share of households that sell any of the maize they produce, while small at only about one-fifth of all maize producers, has risen slightly over time. The definition of commercially oriented farming households includes relatively significant levels of maize sales, so their higher maize sale levels are not surprising. Such households are considerably more likely to grow improved maize varieties than are other households.

The share of households that produce any roots and tubers is low, although the shares of households producing sweet potato and those producing Irish potato both rose between 2010/11 and 2019/20. Irish potato is significantly more likely to be produced by commercially oriented smallholders than by households in the other categories, while the same households are much less likely to produce cassava.

Significantly larger shares of households produced bean and cowpea and produced pigeonpea in 2019/20 than in 2010/11, while the share producing groundnut did not change. Groundnut, bean,

and cowpea are more likely to be produced by commercially oriented smallholders than by households in other categories. However, these crops remain important for own consumption—while more than half of households that produce groundnut will sell some of their harvest, those that do will still keep about 40 percent of what they produced for home use. Less than one-quarter of bean and cowpea producers sell these crops, but if they do, they sell about two-thirds of what they harvest. Pigeonpea is more commonly produced by households in the "other productive rural" category. This reflects in part the geography of the production of pigeonpea, which is predominantly produced in southern Malawi, where a much smaller share of farming households is commercially oriented than in the other two regions (Table 2.1). Less than half of pigeonpea-producing households sell any of their harvest, but those that do so sell about 60 percent of what they harvest. Considerable amounts of pigeonpea are exported annually from Malawi to south Asia, so there is an active pigeonpea market in southern Malawi.

As they are cash crops, commercially oriented smallholders are significantly more likely than households in other categories to produce soyabean, sunflower, and tobacco. About three times more households reported producing soyabean than tobacco in 2019/20, which is the reverse of the relative pattern of production of the two crops in 2010/11. Moreover, the data show a significant drop in the share of households producing tobacco. These patterns may reflect lower barriers to the production and marketing of soyabean compared with tobacco and greater demand for soyabean than in the past. Few households produce cotton and there are no significant differences in propensity to produce the crop across household categories.

The share of households owning livestock dropped between 2010/11 and 2019/20, as did the number owned by those with animals. Commercially oriented smallholders are significantly more likely to own cattle, goats, sheep, and pigs than are households in other categories and, of those that own these animals, to own larger numbers of them (Table 2.6). Poultry ownership is common across all household categories, with urban households somewhat more likely than rural households to own chickens and other fowl, although not significantly so. However, cattle ownership is quite rare across all households, with less than 10 percent of households having any. The limited landholding size for most rural households imposes important constraints on cattle ownership related to grazing and feed production, whereas goats, sheep, and pigs can be more effectively raised in small areas. Almost half of households own at least one of these smaller livestock types.

Table 2.6: Livestock ownership of households in the different economic categories, 2019/20

Characteristic	All IHS5 households	Commercially oriented smallholder farmers	Other productive rural households	Not economically productive	Urban households	All IHS3 households
Own livestock, % of households	40.3	63.3 ***	45.5	30.1	17.6	43.8 ***
Tropical Livestock Units (TLU) owned, of those owning	0.61	1.03 ***	0.59	0.26	0.56	0.80 **
Own cattle, % of households owning livestock	9.1	16.3 ***	9.1	3.1	6.0	9.3
Own goats, sheep, or pigs, % of households owning livestock	48.1	60.2 ***	48.3	45.2	30.8	52.5 ***
Own poultry, % of households owning livestock	71.0	69.4	71.4	66.7	75.7	73.2 *
Observations	*11,434*	*816*	*7,211*	*1,358*	*2,049*	*12,271*

Source: Author's weighted analysis of the Malawi Integrated Household Surveys for 2010/11 (IHS3) and 2019/20 (IHS5).
Note: Asterisks on the statistics for 'Commercially oriented smallholder farmers' present the statistical significance of differences in the statistic between households in this category and those is the 'Other productive rural households' category. Asterisks on the statistics for 'All IHS3 households' present the statistical significance of differences in the statistic between these households and those is the 'All IHS5 households' category. * = $p < 0.10$, ** = $p < 0.05$, ***= $p < 0.01$.
Tropical Livestock Units are based on the following conversion factors: poultry = 0.01 TLU; calf = 0.3; steer or heifer = 0.7; cow = 0.7; ox or bull = 0.8; donkey, mule, or horse = 0.6; goat = 0.1; sheep = 0.1; pig = 0.2.

Turning to non-agriculture income (Table 2.7), the share of households with members temporarily hiring out their labor (*ganyu*) for any task, whether agricultural or nonagricultural, became much more common between 2010/11 and 2019/20. However, doing so is less common among working members of commercial smallholder households than it is among members of other productive rural households. Engagement in *ganyu* labor is least common among workers in urban households.

Table 2.7: Non-agriculture income sources of households in the different economic categories, 2019/20

Characteristic	All IHS5 households	Commercially oriented smallholder farmers	Other productive rural households	Not economically productive	Urban households	All IHS3 households
Members engage in any hired-out temporary work (ganyu), either agriculture or non-agriculture, %	69.6	64.0 ***	73.0	90.4	40.5	43.7 ***
Amount of labor hired out over past year for those hiring out, hours per worker in household	62.5	52.1 **	58.5	77.5	69.6	40.7 ***
Any member with longer-term wage employment (excludes ganyu employment), % of households	19.8	13.3 *	15.7	8.0	49.1	23.0 ***
Any member engaged in household enterprise, %	37.9	40.5 *	35.9	24.8	55.9	19.6 ***
Of which at least one of household's enterprises is permanently operating (not seasonal), %	33.6	41.5 *	32.9	35.2	32.3	67.7 ***
Of which at least one requires skills to produce merchandise or services offered (not petty production or trading), %	16.2	16.3	14.4	12.3	22.3	18.6 **
Of which at least one has employed labor from outside the household in past year, %	9.6	10.1	8.0	14.0	16.5	8.6
Any member who receive regular income payments, e.g., remittances or gifts, pension, real estate or asset rentals or sales, %	62.4	67.1	63.8	57.3	59.5	43.0 ***
Observations	*11,434*	*816*	*7,211*	*1,358*	*2,049*	*12,271*

Source: Author's weighted analysis of the Malawi Integrated Household Surveys for 2010/11 (IHS3) and 2019/20 (IHS5).
Note: Asterisks on the statistics for 'Commercially oriented smallholder farmers' present the statistical significance of differences in the statistic between households in this category and those is the 'Other productive rural households' category. Asterisks on the statistics for 'All IHS3 households' present the statistical significance of differences in the statistic between these households and those is the 'All IHS5 households' category. * = $p < 0.10$, ** = $p < 0.05$, ***= $p < 0.01$.

A drop in the share of households that have members with wage employment occurred between 2010/11 and 2019/20. Wage employment, as one would expect, is most common for members of urban households. Members of rural households have especially low levels of participation in wage employment. However, the share of all households with enterprises almost doubled over this period. While enterprises are operated by more than half of urban households, close to half of households in both categories of productive rural households also reported having at least one enterprise. A significant increase between 2010/11 and 2019/20 is also seen in the share of households with a member who receives regular income payments.

Differences in participation in nonagricultural economic pursuits between categories of rural productive households are seen for both wage employment and household enterprises, but with opposite patterns. Members of other productive rural households are more likely than those in commercially oriented farming households to have wage employment. This may reflect such households having an added incentive to engage in wage employment to compensate for insufficient commercial returns on their agricultural activities to meet the basic needs of their household. In contrast, commercially oriented households are somewhat more likely than other productive rural households to have members engaged in household enterprises.

However, only about one-third of households with enterprises operate them permanently—most are seasonal enterprises. This suggests that few rural households are specializing in such enterprises as part of a transition out of agricultural production. Moreover, the household enterprises reported are not qualitatively different across the four categories of households. Most, regardless of what category of household operates them, primarily involve simple production or petty trading and do not require skilled labor. Of importance to the strategy for rural economic development highlighted earlier in this chapter, it appears that other productive rural households are not more likely than commercially oriented smallholder farming households to be working in nonfarm enterprises producing goods and services that are primarily for local consumption—construction and building repair; transport; education, health, and other social services; furniture and handicraft-making; food and beverage processing; and the like. One of the dynamic elements of the strategy is that increasingly these other productive rural households will seek their livelihoods in these economic activities, relying on the demand for these goods and services from commercially oriented farming households to supply the income they will use to obtain the food they require through the market, and reducing their dependence on subsistence farming to meet their food needs. However, that we are not seeing a larger share of other productive rural households exploiting non-agricultural income sources suggests that the desired rural economic transformation process has not yet started.

Food consumption patterns are examined in Table 2.8, particularly the consumption of maize. Almost all households reported consuming maize in the past week. However, we see a significant increase between 2010/11 and 2019/20 in reliance on the market for obtaining the maize consumed and a related fall in reliance on maize the household produced itself. Also, important differences are seen in the sources of maize consumed across household categories. Commercially oriented households are much less likely than other households to have bought the maize they consume and much more likely to have produced that maize themselves.

Table 2.8: Source of maize consumed, dietary diversity, and experience of recent food insecurity of households in the different economic categories, 2019/20

Characteristic	All IHS5 households	Commercially oriented smallholder farmers	Other productive rural households	Not economically productive	Urban households	All IHS3 households
Maize consumption in past week, % of households	97.6	98.8 ***	97.6	96.0	98.8	97.7
Maize consumed per capita past week, kg	2.7	2.9	3.0	1.8	2.4	3.5 ***
Purchased, share of maize consumed for those consuming	53.7	30.6 ***	49.4	59.5	76.1	36.3 ***
Own produced, share of maize consumed	40.2	65.9 ***	44.5	32.5	17.9	59.7 ***
Gift, share of maize consumed	6.1	3.5 ***	6.1	8.0	6.0	4.0 ***
Household Dietary Diversity Score (consumption in past 7 days of 12 food groups), mean	8.2	8.7 ***	8.1	6.1	10.1	8.0 **
Experienced food insecurity within household:						
In past 7 days	61.0	47.3 ***	62.8	84.3	40.4	30.8 ***
In past 12 months	68.2	59.7 ***	71.7	87.2	42.0	47.6 ***
Observations	*11,434*	*816*	*7,211*	*1,358*	*2,049*	*12,271*

Source: Author's weighted analysis of the Malawi Integrated Household Surveys for 2010/11 (IHS3) and 2019/20 (IHS5).
Note: Asterisks on the statistics for 'Commercially oriented smallholder farmers' present the statistical significance of differences in the statistic between households in this category and those is the 'Other productive rural households' category. Asterisks on the statistics for 'All IHS3 households' present the statistical significance of differences in the statistic between these households and those is the 'All IHS5 households' category. * = $p < 0.10$, ** = $p < 0.05$, ***= $p < 0.01$.

This pattern highlights the continued weakness of Malawi agricultural markets and the high risk that consumers continue to perceive in relying on those markets for their staple food. Although some farming households may be quite commercial in how they plan their production, this does not

mean that they are specialized producers who rely on the market to supply the food, goods, and other services which they do not produce. Such households continue to place a high value on meeting their own needs directly and insulating themselves from any market-related risks to their subsistence. However, for households that fall in the other categories, the maize they consume now is more likely to have been purchased at the market than grown on their own cropland—a pattern which reversed over the previous ten years.

The last rows of Table 2.8 examine dietary diversity and food insecurity. Commercially oriented households have more diverse diets and are significantly less likely than other rural households to have experienced food insecurity in the past week or past year. However, urban households perform better than commercially oriented smallholders on both sets of measures. Households were considerably more likely to report having experienced periods of food insecurity in 2019/20 than in 2010/11. This is further evidence of growing challenges for Malawian households, particularly in rural areas, to meet their basic needs.

Table 2.9: Households in different economic categories, 2004/05 (IHS2), 2010/11 (IHS3), 2015/16 (IHS4), and 2019/20 (IHS5), by rural regions and urban, weighted percentage share of households

	All households	Commercially oriented smallholder farmers	Other productive rural households	Not economically productive	Urban households
2004/05 (IHS2)	**100.0**	**6.3**	**71.8**	**10.3**	**11.7**
Rural North	9.4	7.5	81.7	10.8	0.0
Rural Central	36.2	8.2	83.8	7.9	0.0
Rural South	42.5	6.1	79.5	14.4	0.0
Urban	12.0	0.0	0.0	2.5	97.5
Observations	*11,280*	*687*	*8,029*	*1,165*	*1,399*
2010/11 (IHS3)	**100.0**	**5.3**	**62.2**	**17.3**	**15.2**
Rural North	11.2	5.5	74.4	20.1	0.0
Rural Central	36.0	10.0	73.7	16.3	0.0
Rural South	37.6	3.2	73.5	23.3	0.0
Urban	15.2	0.0	0.0	2.4	97.6
Observations	*12,271*	*655*	*7,428*	*2,016*	*2,172*
2015/16 (IHS4)	**100.0**	**5.5**	**66.6**	**9.2**	**18.7**
Rural North	6.8	6.0	83.8	10.1	0.0
Rural Central	36.2	10.7	80.5	8.8	0.0
Rural South	38.0	3.1	83.6	13.3	0.0
Urban	19.1	0.0	0.0	1.7	98.3
Observations	*12,447*	*636*	*8,412*	*1,161*	*2,238*
2019/20 (IHS5)	**100.0**	**7.0**	**63.6**	**13.4**	**15.9**
Rural North	10.7	10.6	82.9	6.5	0.0
Rural Central	34.9	11.8	68.2	20.0	0.0
Rural South	38.1	4.6	81.2	14.2	0.0
Urban	16.2	0.0	0.0	2.3	97.7
Observations	*11,434*	*816*	*7,211*	*1,358*	*2,049*

Source: Author's weighted analysis of the Malawi Integrated Household Surveys of 2004/05 (IHS2), 2010/11 (IHS3), 2015/16 (IHS4), and 2019/20 (IHS5).
Note: Statistics in the second column are column totals, while those in the third to sixth columns are row totals.

It was highlighted earlier that in the 2021 book published by the International Food Policy Research Institute the IHS4 household typology analysis was extended to earlier IHS rounds to examine how the relative sizes of the categories had evolved since the IHS2 of 2004/05. This panel analysis

showed that the share of commercially oriented farming households among all Malawian households has remained low but relatively steady over this period. Table 2.9 replicates and expands this analysis by including the IHS5 dataset. With the addition of IHS5, no significant changes are seen in the overall historical pattern of the share of households nationally falling into each of the four categories. More variability is seen at disaggregated levels of analysis. However, caution should be exercised in interpreting these patterns. Sub-samples at disaggregated levels are quite small, particularly in the Rural North and Urban disaggregations and for commercially oriented farming households.

In summarizing changes between 2010/11 (IHS3) and 2019/20 (IHS5) in the demographic, agricultural, and livelihood characteristics of Malawian households presented in this chapter, several merit closer and continuing attention.

Female-headed households continue to face important barriers to increasing the share of their agricultural production that they sell. Female-headed households are significantly under-represented in the commercially oriented farming household category. Sex-related differences in access to local agricultural resources and improved agricultural technologies almost certainly explain much of the handicap such households face in meeting their basic needs through agriculture.

In addition to the increased numbers of households producing irrigated crops noted earlier, other changes in agricultural patterns include a drop in livestock husbandry, particularly of cattle. Growing agricultural land constraints likely drive much of this change. Increased production and commercialization are seen in bean, cowpea, and soyabean. Increased production is seen for Irish potato, sweet potato, and, in particular, soyabean. Increased commercialization is seen among groundnut producers. The pattern with tobacco, the principal cash crop for Malawi for about 100 years now, shows a significant drop in households overall producing the crop, while it remains an important component of the crop mix for commercially oriented farming households.

All households seem to be expanding their livelihood portfolios beyond rainfed agricultural production. We noted the increase in farming households also engaging in irrigated farming. Similarly, over this period an increasing share of households had members engaging in various household income-earning enterprises. The share of households with members engaging in temporary *ganyu* employment grew by over 25 percentage points. The implication is that for a growing number of households every year, based on their current agricultural landholdings and crop productivity levels, they are unable to meet the basic needs of their members through rainfed farming alone. However, the share of households that have members with longer-term wage employment fell to under 20 percent. Growth in longer-term wage employment opportunities in any sector of the Malawian economy did not keep up with growth in the working population between 2010/11 and 2019/20. The fact that these wage-earning opportunities are declining reduces the incentives workers from farming households with low crop productivity levels and little commercial production have to move on from agriculture to employment off of their household farm.

In evaluating whether the model for rural economic development described early in this chapter can be applied to Malawi and can help us understand how rural economic development may be proceeding, an important element of that model was that other productive rural households would increasingly rely on off-farm employment for the livelihoods, while commercially oriented farming household would scale up and specialize in their farming. However, the IHS datasets show that other productive rural households are not any more likely than workers from commercially oriented farming households to be working in nonfarm enterprises or elsewhere off-farm. There is little evidence of any transformations in the livelihoods pursued by productive rural households to suggest that any restructuring of employment patterns by type of household is as yet occurring.

Finally, there is a growing reliance on markets for the maize that most Malawians consume as their staple. More of all maize consumed by Malawian households now comes from the market than from own production by the household, a pattern which switched between 2010/11 and 2019/20. Secure and sufficient income from any source is now as critical to household food security as is having access to land on which to grow food crops, particularly maize. However, subsistence production still dominates the cropping decisions of farming households of all sorts, including commercially oriented farming households. Although some farming households may be quite commercial in how they plan their production, this does not mean that they are specialized producers who rely on the market to supply the food, goods, and other services which they do not produce. Rather, most farming households continue to expect to meet most of their food needs through their own production.

Nonetheless, the increasing engagement with the market of particularly low-productivity farming households with limited cropland unable to produce enough maize to meet their annual needs may foster changes in the employment choices of workers in these households towards employment off-farm and a reliance on the market rather than their own cropland to meet household food needs. While such transitions in household economies will be difficult for many, the current trend of declining average agricultural landholdings, low crop productivity, and increasing prevalence of food insecurity from year to year likely make such changes necessary.

The model used to organize this chapter asserts that agricultural and rural economic development strategies in Malawi should focus on commercially oriented smallholder farming households. However, the strength of this argument is undermined by the small share of Malawian households that fall into this category—only 7 percent of households nationally with higher levels of about 12 percent of households in rural communities in the Northern and Central regions. It seems unlikely that significant improvements in household livelihoods and in the performance of the Malawian economy can emerge from efforts to increase the role that this small group of rural households play in their local economies. While it is encouraging to see in Table 2.9 that over time commercially oriented farming households as a share of all households in Malawi has risen slowly, the slowness of this growth suggests that much more must be done to build the capacity of these households to engage in higher-productivity commercial agricultural production and to improving the enabling environment that will foster such production, particularly through improved markets. There are no specific policy prescriptions for establishing and accelerating such a process of rural economic development beyond the centrality of locally-based commercially oriented farmers sharply increasing their agricultural productivity (Haggblade, Hazell and Dorosh 2007). These rural economic transformation processes are highly context specific.

However, with increased crop productivity, greater incomes for commercial farming households, and, crucially, increased demand for the goods and services produced locally by their neighbors, significant economic growth in rural communities across the country can be achieved over the medium term. While Malawi seems a difficult context in which such a model of rural economic development can take hold, commercially oriented smallholder farming households are not withering away. Consequently, we argue that a window of opportunity for this model of rural economic development to establish itself remains open.

CHAPTER 3. HOUSEHOLD FARMING TO KEEP OUT OF POVERTY—AN INCOME ANALYSIS

The results of the household typology analyses using the IHS3 and IHS5 datasets presented in the previous chapter suggest that an increasing share of households in Malawi are unable to meet their basic needs through rainfed agricultural production alone. We find a pattern of increased diversification of household economic activities between 2010/11 and 2019/20. More households are undertaking irrigated farming in the dry season, increasing their engagement in providing temporary *ganyu* labor, and establishing commercial enterprises out of their households. All are seeking to increase the income the household has at its disposal to meet its needs beyond the income that rainfed crop production alone provides.

In this chapter we examine the total income that farming households obtain, but with a particular focus on their agricultural income. Our focus here in Chapter 3 is to develop a better understanding of how central the returns from their farming, both through direct consumption and through cash income from the sale of their produce, are for farming households in Malawi to meet their basic needs. In the next chapter, the crop productivity levels of farming households are estimated in some detail using the IHS5 dataset. Having established what are their current yields in the first part of Chapter 4, we then consider whether raising those crop yields to levels much closer to the potential maximum yields for those crops in Malawi will result in a significant improvement in welfare for farming households. Our aim in both chapters is to determine how probable it is that farming households in Malawi will be able to rely on their agricultural production—under current levels in this chapter and under potentially higher levels in the next—to meet their basic needs and escape from or avoid falling into poverty.

If rainfed farming under current levels of productivity or under higher levels than most farming households now realize is unlikely to provide for the basic needs of their members, pursuing development policies that maintain the current structure of Malawi's agricultural sector is unacceptable. If most farming households cannot aspire to higher welfare through farming, realizing the first pillar of the Malawi 2063 development vision of an "optimally productive and commercialized agriculture sector" (National Planning Commission 2020) will require that many rural households be supported and motivated to pursue non-agricultural livelihoods. The optimal agricultural sector envisioned will be based on a smaller number of farming households operating at significantly higher levels of productivity and at larger scales of production.

The analysis of household income patterns of farming households in Malawi presented in this chapter draws on the IHS5 dataset. It is grounded in the quantitative consumption-based poverty analysis of IHS5 and the cost-of-basic-needs poverty line at the center of that analysis—real (Apr/May 2019) per capita annual consumption of MK 165,879, around USD 225 (National Statistical Office 2021; Caruso and Cardona Sosa 2022). However, our analysis will not be based on household consumption. Rather, we focus on household income. We seek to better understand how the various income streams that farming households can utilize might contribute to their being better able to meet the basic food and non-food consumption needs of all of their members. These income streams include net agricultural production (the value of the sum of own consumption and agricultural sales, less costs of production), wages from employment, net household enterprise income, casual *ganyu* labor wages, and other regular sources of income, including any cash or in-kind transfers received from other households or from government or other institutions, including under social safety net programs.

Most quantitative poverty analyses in lower-income countries are based on the value of household consumption rather than on income. This is for several reasons (Deaton and Zaidi 2002). First, particularly in an agricultural economy such as Malawi, income is often very lumpy. Farming households receive a large amount of cash income in the months following harvest and may receive little the rest of the year. On an income basis, a household that most would view as wealthy may be categorized as poor if economic information on that household was collected in a manner that missed most of the income it received. In contrast, households are constantly spending their income for consumption. As such, consumption is a smoother measure of welfare through time. Second, consumption can be viewed as realized welfare by the household, whereas income is more a measure of potential welfare. Third, from a survey standpoint, households are often more willing to truthfully report their consumption and expenditure than their income. Finally, in a subsistence-oriented economy such as Malawi, much income is derived from subsistence-oriented agricultural production or self-employment in household enterprises. Assigning income values to own crops consumed by the household or to the proceeds of these enterprises is often problematic.

Many of these challenges with using income to assess household welfare arise in the income-focused analysis of farming households in Malawi here. These issues will be discussed briefly as each type of income is presented. However, we expect that, setting aside outlier farming households with uncharacteristically high or low (losses) net income levels, using per capita annual net income as a welfare measure for these households should result in a similar distributional pattern of welfare as results from using the consumption-based welfare measure. That is, the cumulative distribution pattern for per capita annual household income should be similar to that for per capita annual household consumption, the measure of household welfare used in the quantitative consumption-based poverty analysis of IHS5. As a robustness check on our income analysis, household rankings based on the consumption measure of the welfare of IHS5 farming households, computed by NSO, and on our income-based measure should be reasonably well correlated.

Disaggregating households for analyzing income Malawian households obtain from their farming

The analysis presented in this chapter, in contrast to that of the previous chapter, is not comprehensive of all Malawian households. Rather, we limit the analysis to farming households in the IHS5 sample. Farming households are defined as those that engaged in any agricultural activities—those that reported in IHS5 having engaged in the production of any rainfed, irrigated (*dimba*), or permanent crops or raised any livestock, even at the smallest scales of production.

Table 3.1 examines some of the demographic, educational, and welfare differences between farming and non-farming households in Malawi, based on IHS5. For virtually all of the measures considered, there are significant differences in the average characteristics of the two groups. From a developmental perspective, farming households are generally worse off, having larger households, a greater share of members that are dependent non-workers, and lower educational attainment. Non-farming households are more likely than farming households to have a younger head and are less likely to be headed by women or to be resident in rural areas of Malawi.

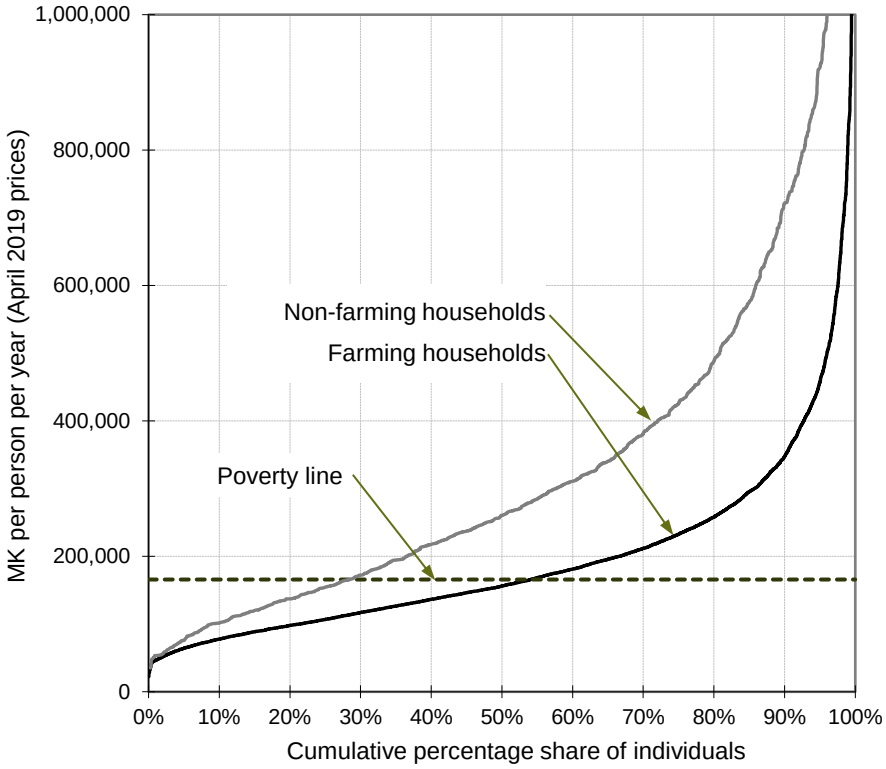
Table 3.1: Demographic, educational, and welfare characteristics of farming households compared to non-farming households, 2019/20

Characteristic	All Malawian households	Farming households	Non-farming households
Share of all households in Malawi, %	100.0	84.3	15.7
Household size, members	4.4	4.5	3.6 ***
Dependents (under 15 or over 64 years of age)	2.1	2.3	1.5 ***
Household head age, years	43.1	44.5	35.9 ***
Female-headed households, % of households	31.0	32.4	23.6 ***
Urban residents, % of households	16.3	8.3	59.2 ***
No members with formal education, % of households	3.1	3.3	2.2 **
Some primary	56.4	60.0	36.9 ***
Some secondary	36.0	33.9	47.5 ***
Beyond secondary	4.4	2.7	13.5 ***
Total annual per capita consumption and expenditure, mean, real MK	218,242	197,926	355,945 ***
Poverty headcount, basic-needs poverty line, % of individuals	50.7	54.1	28.2 ***
Percent of Malawi's poor individuals	100.0	92.8	7.2
Poverty prevalence, % of households	42.5	46.3	21.9***
Poverty gap index (depth of poverty), % of basic-needs poverty line	17.0	18.2	8.9 ***
Squared-poverty gap index (severity of poverty), %	7.6	8.2	3.9 ***
Observations	*11,434*	*9,570*	*1,864*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey. Poverty statistics are based on (National Statistical Office 2021).
Note: Asterisks on the statistics for 'Non-farming households' present the statistical significance of the difference in the statistic between these households and farming households. * = $p < 0.10$, ** = $p < 0.05$, ***= $p < 0.01$.
"Urban" residence is based on the classification of enumeration areas as urban or rural by the National Statistical Office.
The national poverty line (food and non-food), based on a cost-of-basic-needs approach applied to the IHS5 dataset, is MK 165,879.
The poverty gap index is the average extra consumption that would be required to bring all poor people up to the poverty line as a proportion of the poverty line. The squared poverty gap index considers both the consumption shortfall of the poor from the poverty line and inequality among the poor. This measure decreases if, for example, income is transferred from a poor individual to a poorer individual.
These poverty measures here are weighted by individuals in the population. Most statistics in this report are weighted by households in the population.

Farming households are more likely to be poor and unable to meet their basic needs. Figure 3.1 plots the cumulative distribution of total per capita daily consumption for farming and non-farming households, respectively. The two plots diverge quite quickly with rising consumption. The poverty headcount values for each group in Table 3.1 report where the respective plots in Figure 3.1 cross the poverty line—a 26 percentage point difference in the share of individuals that are members of poor households in each group.

Figure 3.1: Cumulative distributions of total per capita annual consumption for farming and non-farming households in Malawi, 2019/20



Source: Authors' weighted (individual) analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.

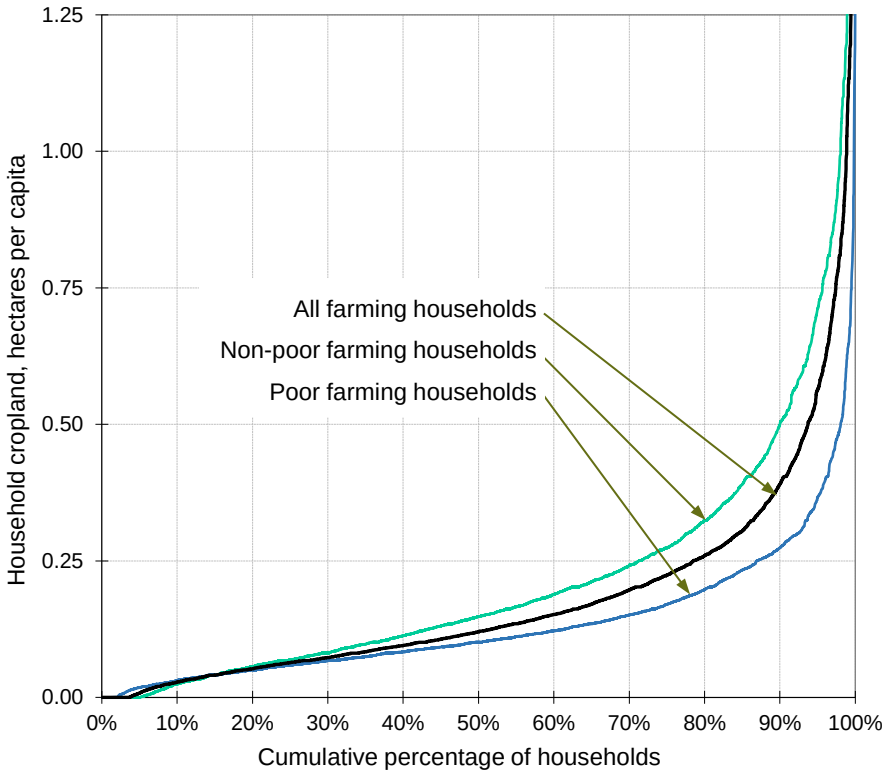
Although farming households are significantly poorer than non-farming households, even so, this simple definition of farming households places into the analytical dataset households that are vastly different in the scale of their agricultural production and the returns they realize from their farming. The category of farming households includes those that are strongly commercially oriented, having annual net income from sales or consumption of their crops or livestock of over MK 1.0 million per household member, with others that reported no income from their agricultural activities, such as those reporting owning one or two poultry or other small livestock but not consuming or selling any over the survey year. While all households that harvested a crop will have realized some form of income from their farming, whether in-kind or, through crop sales, in-cash, here too the agricultural income realized will vary from that generated from growing a few vegetables for own consumption from a small kitchen garden within the household compound to that from much larger plots extending over many hectares that are planted with improved seed and to which relatively high rates of inorganic fertilizer are applied to generate a large harvest, most of which is sold.

The significant variation in income levels that these households derive from their farming makes it difficult to identify patterns that relate agricultural production characteristics and non-farm economic activities to the total net per capita income households obtain. To gain insights into these issues, two analytical typologies are applied to the farming households in the IHS5 dataset to further disaggregate their characteristics. First, we categorize farming households by whether they are poor or non-poor based on the consumption-based poverty analysis of IHS5 (National Statistical Office 2021). This criterion divides farming households into roughly comparably sized groups—46.3 percent of farming households are poor.

While the threshold dividing the two groups in the poverty-based typology is tied to whether or not a household can meet its basic needs, the cumulative distribution plot of total per capita daily con-

sumption for farming households in Figure 3.1 shows that there is no sharp change near the poverty line in the cumulative distribution of welfare for farming households. The slope of the plot near the poverty line remains consistent with no discontinuities. Farming households with levels of consumption just below the poverty line are unlikely to have sharply lower economic prospects than those whose consumption level places them just above the poverty line. Over the years we can expect that most such households will repeatedly move into and out of poverty as they experience positive (e.g., good rainfall conditions for crop production) or negative (e.g., drought, flood, pests, serious illness within the household) economic shocks. In consequence, a typology that uses the poverty line to categorize farming households for the purpose of determining what types of farming households might best be able to continue to engage in agriculture to meet their basic needs and escape from or avoid falling into poverty likely will not clearly reveal differences in the economic potential of farming households across the two categories.

Figure 3.2: Cumulative distribution of per capita total cropland reported used by all, poor, and non-poor farming households in Malawi, 2019/20



Source: Authors' weighted analysis (household) of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Estimates of cropland area include both seasonal (rainfed and irrigated) and permanent cropland area and take into account the use of the same plot of land for both rainfed and irrigated production to avoid double-counting. Includes households that are exclusively involved in livestock husbandry and reported no cropland use.

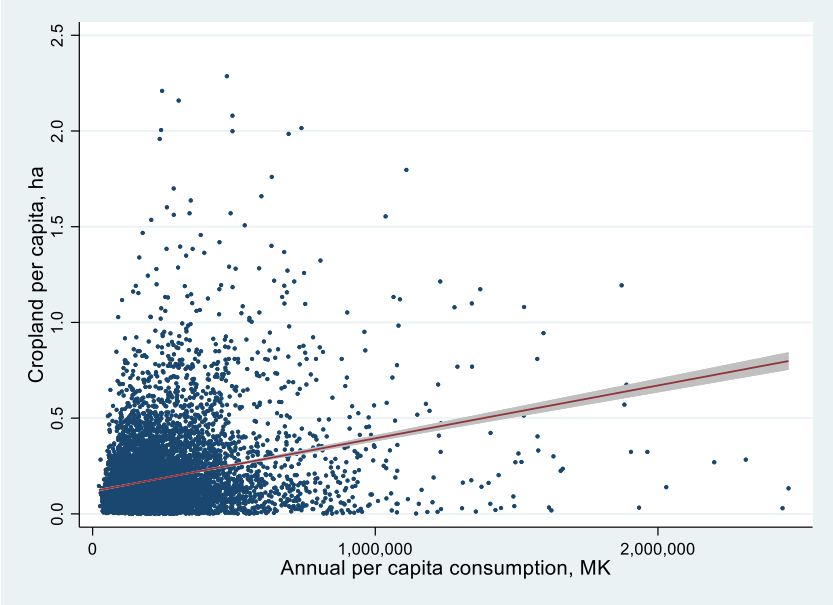
To gain insights that are unlikely to be seen using a poor/non-poor typology, we use per capita total cropland reported used by farming households as the criteria for a second farming household typology. We divided farming households into two categories using 0.25 ha cropland reported used per capita.[6] This threshold was identified visually from the cumulative distribution plot of per capita total cropland that farming households reported using (Figure 3.2). While the slope of the plot remains quite consistent up until about the 80th percentile of households, at that point in the plot—at about 0.25 ha per capita—the slope starts to rise sharply. We presume that farming households

[6] This measure is based on cropland use, not necessarily on ownership. Rented-in land is included in computing cropland use by the household, while rented-out or uncultivated land over which the household has use rights is not.

with more than 0.25 ha of land under crops per capita are likely to have a higher potential for meeting their basic needs through farming than the majority of farming households with landholdings smaller than this threshold.

The measures used in constructing the two typologies of farming households are correlated, if not strongly so. The secondary plots in Figure 3.2 for poor and non-poor households show that non-poor households are more likely to have larger cropland holdings—28.7 percent of non-poor households have cropland holdings above 0.25 ha per capita, while only 13.0 percent of poor households do. Figure 3.3 presents a scatterplot of the two measures. The adjusted R-squared for the ordinary least squares regression on the two measures is 0.1007. The rank correlation coefficient (Spearman's) for the two measures is 0.2428, which is significant at the $p < 0.01$ level.

Figure 3.3: Scatterplot with ordinary least squares regression line of per capita cropland and per capita annual household consumption and expenditure for farming households, outliers trimmed, 2019/20



Source: Authors' analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.

However, more important than the relative independence of the two measures for determining what types of farming households might best be able to continue to engage in agriculture and remain out of or escape poverty is where the threshold to divide farming households into two sub-groups lies along the distribution of the respective measures. The threshold used with the household consumption measure essentially divides farming households into two sub-groups of equal size, which likely will result in considerable overlap in economic potential across households in the two groups. In contrast, the more skewed cropland holding size threshold, which divides farming households 80:20, will more strongly emphasize differences in economic potential between the two sub-groups of that typology.

The two typologies of farming households used in this and the following chapters do not match the categories of the four-category typology of all Malawian households used in Chapter 2. The table in Text Box 3.1 shows how that typology of all households used earlier correlates with the two farming household typologies used here.

Text Box 3.1. How the two analytical typologies of farming households overlay the four-category typology of all Malawian households

The three typologies presented in the table here use different characteristics to categorize the IHS5 households. The share of maize produced by the household that was sold, rural or urban residence, and the dependency ratio of the household coupled with its poverty status are used as selection criteria for the four-category typology of all Malawian households used in Chapter 2. The other two typologies are used only with farming households. Such households are defined by whether they reported engaging in any agricultural activities. Then, the typologies of farming households are based on their consumption-based poverty status and on the area of cropland they used per capita, respectively. Given the variety of classification criteria used, the overlap of households categorized using the two farming household typologies is not so consistent as might be expected with the categories of the four-category typology of all households used in Chapter 2.

	All households			Farming households				
Four-category typology of all Malawian households	All Malawi house-holds	Not farming house-holds	Farming house-holds	Non-poor farming HHs	Poor farming HHs	Larger land-holding	Smaller land-holding	*Observa-tions*
Row totals, %								
All households	100.0	15.7	84.3	53.7	46.3	21.5	78.5	*11,434*
Commercially oriented smallholder farmers	100.0	0.0	100.0	72.9	27.1	44.1	55.9	*816*
Other productive rural households	100.0	8.8	91.2	59.3	40.7	23.1	76.9	*7,211*
Not economically productive	100.0	6.7	93.3	0.0	100.0	6.7	93.3	*1,358*
Urban households	100.0	57.7	42.3	85.5	14.5	11.7	88.3	*2,049*
Column totals, %								
Commercially oriented smallholder farmers	7.0	0.0	8.3	11.3	4.9	17.1	5.9	
Other productive rural households	63.6	35.8	68.8	76.0	60.5	73.9	67.4	
Not economically productive	13.4	5.8	14.9	0.0	32.1	4.7	17.7	
Urban households	15.9	58.4	8.0	12.7	2.5	4.3	9.0	
Observations	*11,434*	*1,864*	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*	

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.

We see that, while commercially oriented smallholder farming households are disproportionately likely to not be poor and to farm larger cropland holdings, there are poor farming households that sell a substantial share of the maize they produce, so fall into this commercially oriented smallholder category. Similarly, there are farming households with relatively small landholdings that do the same. Nonetheless, there is a relatively strong association between a farming household having a consumption level above the poverty line, farming a larger than average cropland holding, and being commercially oriented in its maize production.

Households in the other three categories for the four-category typology, if they farm, most, but not all, generally farm smaller plots. However, the association with poverty for these other categories of farming households is only strong, by definition, for the "Not economically productive" households. Most urban households engaged in farming are not poor, likely due to also engaging in remunerative nonfarm activities. Three-fifths of households in the "Other productive rural household" category are not poor, despite not being commercially oriented in their maize production.

Source: Authors' analysis.

General characteristics of farming households in Malawi

In the tables that follow on farming household characteristics, the sources of income of these households, and detailed crop-level characteristics of their agricultural production, a set of five statistics on each characteristic are presented—for all farming households; disaggregated between poor and non-poor farming households; and disaggregated between farming households with smaller and larger cropland holdings, using the 0.25 ha cropland holding per capita threshold. For statistics that are averages or ratios, mean tests are presented to highlight any statistically significant differences between farming households in the two categories under each of the two typologies.

Farming households that are not poor and those with larger landholdings tend to have smaller households (Table 3.2). However, as both measures used to categorize households are expressed on a per capita basis, there is some correlation between the value of these measures and household size. Farming households in these categories also have a significantly smaller share of household members that are dependents and are more likely to be headed by older and male individuals. The age of the head of the farming household is strongly associated with larger landholdings, in particular.

Table 3.2: Demographic and educational characteristics of categories of farming households, 2019/20

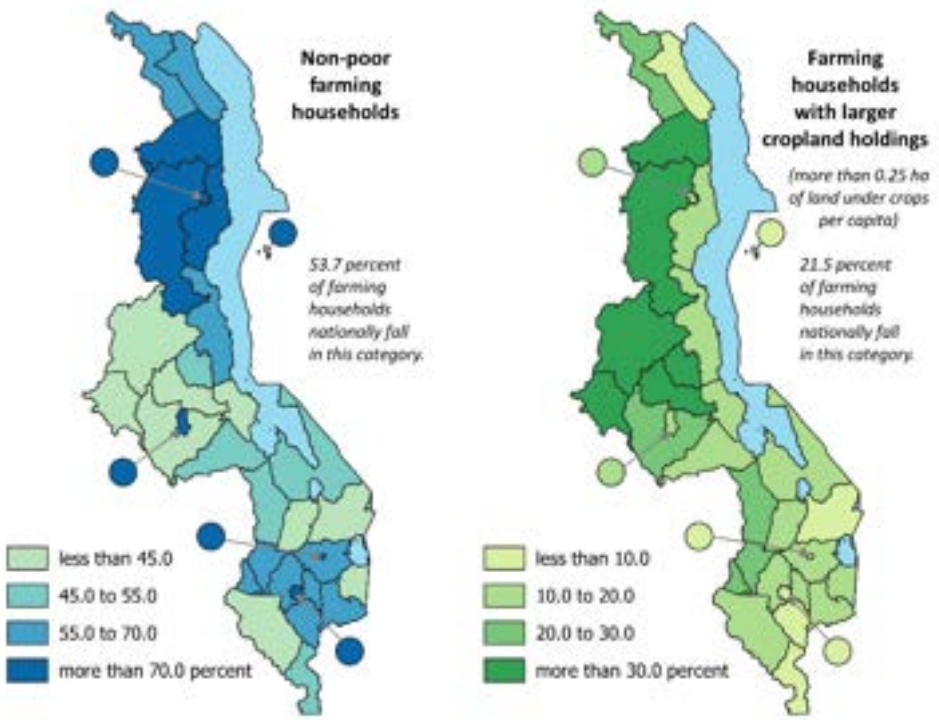
Characteristic	Farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Share of all farming households, %	100.0	53.7	46.3	21.5	78.5
Household size, members	4.5	3.9	5.3 ***	3.5	4.8 ***
Dependents (under 15 or over 64 years of age)	2.3	1.7	2.9 ***	1.6	2.4 ***
Dependents to household size ratio, mean	0.48	0.43	0.53 ***	0.43	0.49 ***
Household head age, years	44.5	44.9	43.9 **	50.6	42.8 ***
Under 35 years of age, % of households	32.2	33.0	31.2	23.3	34.6 ***
35 to 64 years of age	53.2	50.1	55.8 ***	51.6	53.7
Over 64 years of age	14.7	16.0	12.9 ***	25.1	11.7 ***
Female headed households, % of households	32.4	30.4	34.8 ***	29.4	33.2 **
Urban residents, % of all farming households	8.3	12.7	3.1 ***	4.3	9.3 ***
Northern region, % of all farming households	13.0	17.7	7.6 ***	18.1	11.6 ***
% share of farming households in region	100.0	73.1	26.9	29.8	70.2
Central region, % of all farming households	41.4	36.1	47.5 ***	51.0	38.8 ***
% share of farming households in region	100.0	46.9	53.1	26.5	73.5
Southern region, % of all farming households	45.6	46.2	44.9	30.9	49.6 ***
% share of farming households in region	100.0	54.4	45.6	14.6	85.4
No members with formal education, % of households	3.3	4.6	1.9 ***	7.7	2.1 ***
Some primary schooling as maximum education level among members	60.0	50.4	71.2 ***	56.5	61.0 ***
Some secondary	33.9	40.3	26.6 ***	33.2	34.1
Beyond secondary	2.7	4.8	0.4 ***	2.7	2.7
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. * = p < 0.10, ** = p < 0.05, ***= p < 0.01.
"Urban" residence is based on classification of enumeration areas as urban or rural by the National Statistical Office. HH = household(s).

With regards to place of residence, urban-based farming households are more commonly non-poor and have cropland holdings that place them in the smaller landholding group. Regionally, different patterns are seen in the farming household typologies. The Northern region has disproportionately

larger shares of non-poor and larger landholding households relative to the share of all farming households in Malawi that are in the region. The Central region also has a disproportionately larger share of households with larger landholdings, but, in contrast to the Northern region, has disproportionately more poor households. The Southern region, given greater rural population densities and, hence, higher agricultural land pressures in the region, has a disproportionately larger share of farming households with smaller cropping areas. However, poverty among farming households is slightly less than the share of Malawi's farming households that are found in the Southern region. Figure 3.4 maps out these patterns at the level of the districts and major urban centers making up the IHS5 strata, providing finer detail on the poverty status and size of cropland holdings of farming households in each than is seen in the table.

Figure 3.4: Maps by district and major urban centers of the share of farming households that are non-poor or have relatively large cropland holdings, 2019/20



Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Farming household poverty status is based on their reported consumption and expenditure (National Statistical Office 2021).

The pattern of educational attainment within these groups shown in Table 3.2 is somewhat puzzling. While non-poor households show consistently higher educational levels than poor households, this is not the case for the farming households groups defined by landholding size. Households with larger landholdings have slightly lower educational attainment than those with smaller landholdings. This may be associated with the heads of such households being somewhat older. Adults in them may not have had access to education to the degree that members of younger households have had, given the significant expansion in access to primary education in Malawi since the mid-1990s (Moussa and Omoeva 2020).

Table 3.3: Welfare measures for categories of farming households, 2019/20

Characteristic	Farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Total annual per capita consumption and expenditure, mean, real MK	197,926	301,196	110,192 ***	258,306	185,839 ***
Poverty headcount, basic-needs poverty line, % of individuals	54.1	0.0	100.0 ***	37.6	57.4 ***
Percent of Malawi's poor individuals	92.8	0.0	92.8	10.8	82.1
Poverty prevalence, % of households	46.3	0.0	100.0 ***	28.2	51.3 ***
Poverty gap index (depth of poverty), % of basic-needs poverty line	18.2	0.0	33.6 ***	10.5	19.7 ***
Squared-poverty gap index (severity), %	8.2	0.0	15.1 ***	4.0	9.0 ***
Poor housing quality, % of households	30.8	22.4	40.4 ***	25.6	32.2 ***
Food insecurity	71.9	61.4	84.0 ***	63.8	74.1 ***
Low asset ownership	75.4	64.7	87.9 ***	70.6	76.7 ***
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. * = p < 0.10, ** = p < 0.05, *** = p < 0.01.
Poor housing quality is defined as modern building materials, e.g., burnt brick, concrete, or iron sheets, not being used at all in the construction of a household's dwelling. Food insecurity is defined as a household reporting that there was a period in the past 12 months when members were hungry but did not eat and that the household went without eating for a whole day because there was not enough money or other resources for food. Low asset ownership is defined as a household not owning more than two of radio, television, telephone, computer, animal cart, bicycle, motorcycle, or refrigerator and not owning a car or truck.

Table 3.3 presents the characteristics of the different groups of farming households based on the results of the consumption-based poverty analysis (National Statistical Office 2021). As one of the two typologies, that for poor/non-poor, is based on those results, little new information is generated for those groups. However, for the groups defined by cropland holdings, we find that, while households in the larger landholding group have, on average, higher welfare levels, this does not exclude all such households from poverty—37.6 percent of individuals in such households are poor. While all of the poverty measures are higher for individuals in households with smaller landholdings, as are the three non-consumption-based measures of welfare reported, considerable numbers of farming households with larger landholdings are unable to meet their basic needs or see shortfalls in other dimensions of their welfare.

Value of regular income streams of farming households

Our analysis of income is focused on returns to employment for farming households. Consequently, our analytical variables are principally centered on production and income and not on consumption. The discussion first looks at income from agriculture in its various forms, before compiling income from non-agricultural sources to develop a total per capita net income value for all farming households.

Computing the annual per capita net income of farming households from the IHS5 dataset is not a wholly straightforward process. While an annual recall period can be generated for all income sources, different computations were required by source:

- Household income from agricultural production is based on the last completed growing season for both rainfed and irrigated crops. As Malawi has a unimodal annual rainfall regime, there is one rainfed and one irrigated season annually. Production of permanent crops in IHS5 is based on the previous 12 months. To value rainfed crop production, the rainfed production module for IHS5 included a question for the household respondent to estimate the value of the harvest obtained for each crop on each plot. The response to this question was used to value the rainfed

crops. However, this question was not asked in the modules for irrigated and permanent crops. For these crops, if they were sold, the value of the sale was used. If the crops were not sold, the quantity of the crops harvested was converted to kilograms and median producer prices per kilogram reported elsewhere in IHS5 for these crops for either the region or nation, depending on the size of the sample of prices, were used to value the crops that were not sold. For livestock and livestock products, the recall period on sales or own consumption and any livestock-related costs reported in IHS5 is the previous 12 months. If the livestock were not sold but consumed by the household, median prices per livestock type reported sold by other households were used to value those animals.

- Wage income is based on wage employment by individuals in the household over the previous 12 months. Detailed information is collected in IHS5 on the number of months the worker was employed, the intensity of work (hours of work per day, days of work per week) when employed, the wages received per pay period, and the value of any non-wage benefits received from the employer.

- Wage income from temporary work (*ganyu*) done on a piecework or daily wage basis is recorded for each worker in the household who engaged in any such labor over the previous twelve months. While all such work is done off of the household's own farm, no detail on the types of work an individual in the household did is collected for IHS5. Consequently, no assessment can be made of whether or how much of the *ganyu* work was agricultural. Such income is classified here as a component of the "off own-farm income" category.

- Net income from household enterprises is computed from the returns reported for the 12 months prior to the month the household was interviewed for IHS5. The respondent categorized each month that the enterprise was in operation into one of three levels of sales (low, average, high) and assigned a value of sales to each level. Costs for the enterprise are based on total costs for the last month the enterprise was in operation before the month of the interview. Those costs were then applied across all months the enterprise was in operation over the past 12 months to compute the annual total net income from the household enterprise.

- Other sources of income, including cash or in-kind transfers, pension payments, rental income, one-off windfall income, and that from social safety net programs are recorded in IHS5 based on a 12-month recall period.

For this analysis, the nominal income and cost amounts reported by respondents were not deflated to generate real values. Using real rather than nominal values is commonly done in poverty analyses that use a consumption-based household welfare indicator, as food consumption typically is recorded in household surveys on a weekly recall basis. The IHS5 dataset includes a spatial and temporal consumer price index to account for variations in the reference prices used by respondents interviewed in different regions of the country and in different months over the one-year IHS enumeration period relative to April/May 2019. However, because the primary recall period for various income sources in IHS5 was a full year, rather than one month or less, and the price index in the IHS5 dataset reflects both seasonal changes and longer-term sectoral changes in prices that cannot be disentangled, it was decided for this analysis of household income simply to use the nominal income and related cost values reported.

In the following sections, we present data on the net income of farming households in Malawi using two categories of income sources—net agriculture income derived from production on the household's own farm and net income from non-agricultural activities or from off own-farm. Later, the income from these two categories is combined to compute a total per capita net annual income value for each farming household.

Net agricultural income of farming households

Before considering the income farming households obtain from agriculture, we first describe the agricultural practices and assets of these households. The cropping practices of farming households in Malawi are described in Table 3.4. Rainfed cropping dominates agriculture in Malawi. Very few farmers do not farm in the rainy season. However, we see that only about one-quarter of farming households are only engaged in rainfed farming. The other households produce crops in the dry season on any land they have that can be irrigated or will grow permanent crops, such as fruit trees or cassava, on land suitable for the production of such crops. About half of all farming households raise some livestock, even if on a small scale.

Table 3.4: Agriculture production practices of farming households, 2019/20

% of households	Farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Rainfed cropping	92.5	90.0	95.5 ***	99.0	90.7 ***
Rainfed cropping only	27.1	22.8	32.1 ***	19.7	29.1 ***
Irrigated cropping	20.9	21.0	20.8	26.4	19.4 ***
Irrigated cropping only	0.7	0.8	0.7	0.0	0.9 ***
Permanent cropping (includes cassava)	38.0	40.6	34.9 ***	48.9	35.0 ***
Permanent cropping only	1.4	1.9	0.9 ***	0.3	1.7 ***
Livestock husbandry	51.4	57.8	43.8 ***	60.4	48.9 ***
Livestock husbandry only	3.6	5.1	1.9 ***	0.1	4.5 ***
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. * = p < 0.10, ** = p < 0.05, *** = p < 0.01.

Looking at the agricultural practices from a disaggregated perspective, farming households that are poor or which have smaller landholdings are more likely to only engage in rainfed cropping than households that are not poor or have larger holdings, respectively. While the poverty status of a household is not associated with engagement in irrigated farming, households with larger landholdings are more likely to grow irrigated crops than those with smaller amounts of land. Permanent cropping is associated with non-poor households and those with larger landholdings. A similar pattern is seen with livestock raising—it too is associated with better-off households and those with more agricultural land at their disposal.

The area of the cropland holdings of farming households is examined in Table 3.5 on both a household and per capita basis. (In Text Box 3.2, an assessment of the quality of the estimates of the total amount of arable land in Malawi is presented.) At 0.74 ha, the average amount of cropland farmed by farming households is small. There are differences between farming household groups. Non-poor households have on average 10 percent more cropland than poor households. As the household categories are defined by landholding size, the differences in cropland area used between farming households with relatively larger and smaller cropland holdings are much larger—a threefold difference.

Table 3.5: Cropland use of farming households, 2019/20

Characteristic	Farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Cropland area used in past season, ha					
Mean per household	0.740	0.780	0.696 ***	1.581	0.499 ***
Northern region	0.903	0.934	0.819 *	1.621	0.570 ***
Central region	0.871	0.937	0.815 ***	1.692	0.559 ***
Southern region	0.578	0.601	0.552	1.373	0.438 ***
Mean per household member	0.191	0.238	0.138 ***	0.485	0.107 ***
Northern region	0.238	0.272	0.149 ***	0.506	0.114 ***
Central region	0.218	0.283	0.163 ***	0.486	0.116 ***
Southern region	0.154	0.192	0.110 ***	0.469	0.099 ***
Seasonal (rainfed and irrigated) cropland area used in past season, average per household, mean, ha	0.677	0.711	0.638 ***	1.415	0.465 ***
Mean per household member, ha	0.175	0.217	0.127 ***	0.435	0.100 ***
Rainfed cropland, mean per household, ha	0.653	0.685	0.617 ***	1.375	0.447 ***
Rainfed cropland, mean per household engaged in any rainfed cropping, ha	0.679	0.722	0.633 ***	1.383	0.469 ***
Irrigated cropland, mean per household, ha	0.033	0.035	0.029 **	0.057	0.025 ***
Irrigated cropland, mean per household engaged in any irrigated cropping, ha	0.142	0.152	0.131 **	0.203	0.120 ***
Share of irrigated cropland also used for rainfed prod., %	27.8	29.3	26.0	23.8	29.2 *
Permanent cropland, mean per household, ha	0.183	0.198	0.167 ***	0.419	0.116 ***
Permanent cropland, mean per household engaged in any permanent cropping, ha	0.423	0.425	0.421	0.770	0.291 ***
Share permanent cropland also used seasonal prod., %	51.7	49.4	54.8 ***	45.9	53.9 ***
Rented in some land, % households	10.4	11.5	9.0 ***	12.8	9.7 ***
Rented in for rainfed production, % households engaged in any rainfed cropping	9.2	10.4	7.9 ***	12.2	8.4 ***
Cropland rented in for rainfed production, average for households renting in for rainfed production, ha	0.487	0.534	0.416 ***	0.880	0.331 ***
Rented in for irrigated production, % households engaged in any irrigated cropping	1.4	1.5	1.3	1.1	1.5
Cropland rented in for irrigated production, average for households renting in for irrigated production, ha	0.133	0.123	0.145	0.127	0.134
Rented out some land, % of households	1.0	0.9	1.7	1.3	0.9
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: The estimates of cropland area and seasonal (rainfed and irrigated) cropland area used in the past season take into account the use of the same plot of land for both rainfed and irrigated production to avoid double-counting. The estimates of rainfed, irrigated, and permanent cropland do not do so, so the sum of these estimates may for some households exceed the estimate of cropland and seasonal cropland area used by the household.
Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively.
* = p < 0.10, ** = p < 0.05, *** = p < 0.01.

Within Malawi, the average cropland areas used by farming households in the Northern and the Central regions are similar. However, cropland holdings for farming households in the Southern region are much smaller, being about two-thirds the size of those in the other two regions. This pattern of much smaller cropland holdings in the Southern region is seen at all disaggregated levels as well. However, it should be recognized that the concentration of larger cropland holdings in the Northern and Central region is more significant than these numbers suggest—recall from Table 3.2 that the Northern and Central regions both have disproportionately larger shares of larger landholding households relative to their share of all farming households in Malawi.

Text Box 3.2. An assessment of estimates of the total land area farmed in Malawi

For about 90 percent of all cropped farm plots, area measurements for IHS5 were determined using Global Positioning System (GPS) enabled devices, the preferred method to determine cropped areas (Carletto, Gourlay and Winter 2015). Respondents in the farming household guided the survey enumeration team along the boundaries of the plots they farmed. For plots on which GPS measurements could not be made, farmer estimates of the plot area were recorded. Taking into account the use of the same plot for both rainfed and irrigated production to avoid double-counting and applying sampling weights, the IHS5 data suggests that farming households farm in total an estimated 2,484,800 ha of cropland nationally—385,400 ha for the Northern region, 1,207,200 ha for Central region, and 892,200 ha for Southern region.

As a quality check on these estimates, we use the sum of the area planted by smallholders to specific crops from the final round of the annual agricultural production estimates conducted by the Ministry of Agriculture for the 2019/20 cropping year. The area under smallholder rainfed production was estimated by the Ministry to be 3,673,300 ha and that under irrigation to be 409,700 ha. While the 2019/20 estimates do not take into account the use of the same plot for both rainfed and irrigated production or adjust for intercropping, even if this double-counting was corrected for, these recent estimates by the Ministry of Agriculture of the national area cropped by smallholders likely would remain considerably higher than those estimated using IHS5.

The Food and Agriculture Organization of the United Nations, in its FAOStat database, reports that the total area estimated under temporary and permanent crops in Malawi in 2020 was 2,930,000 ha (FAO 2022). In contrast, a study of land cover in Malawi based on the interpretation of satellite imagery from 2010 and 2011 estimated the area of land under agriculture to be 4,775,200 ha (FAO 2013). However, these estimates include estate land, in addition to that used by farming households. An assessment of estate land use in Malawi conducted under the World Bank using both satellite image interpretation and administrative records on lease holdings estimated that the land under estates in Malawi was 1.35 million ha (Deininger and Xia 2017). The sum of the IHS5 estimate of land under smallholder farming production and the World Bank estimate of estate land—3,835,000 ha—falls midway between the FAOStat estimate of the total area under crops in Malawi and that of the FAO 2013 satellite imagery-based analysis of land use, but about one million ha from either of those two very different FAO estimates.

Given its focus on land that is in use, the IHS5 estimate of the average cropland holding for farming households in Malawi of 0.74 ha likely underestimates somewhat the size of these holdings, since uncultivated land within the total land holding of a household is not included. However, as most plot areas recorded for IHS5 were measured using GPS, the IHS5 estimates likely more accurately reflect the area of cropland farming households in Malawi use relative to estimates drawn from the annual agricultural production estimates or remote sensing analyses.

Source: Authors' analysis.

The second panel in Table 3.5 described how cropland is used under the three different farming regimes. For all farming households, just under 90 percent of their cropland is used for rainfed farming. Irrigated cropland holdings are much smaller than rainfed holdings, being about one-fifth the rainfed area used, on average. Just over a quarter of irrigated cropland is also used for rainfed farming—much of the traditionally irrigated land in Malawi is found in *dambo*s, seasonally flooded areas in the landscape, so is too waterlogged to be used for rainfed farming. For the 38 percent of farming households with permanent crops, the share of the household's total cropland holding that is allocated to these crops is quite large at just over half of the area. However, note that just over half of the area that is planted with permanent crops is also used for rainfed or irrigated (seasonal) crops. Many farming households with permanent crops do not cultivate those permanent crops very intensively, thereby allowing seasonal field crops to be planted together with the permanent crops.

The final panel in Table 3.5 describes patterns of renting-in or renting-out cropland. The IHS5 dataset suggests that these practices are not common among farming households. However, the share of farming households that reported renting-in land is significantly higher than the share that reported renting-out some of their land. For policy purposes, it would be valuable to better understand who is renting out their cropland and why. In Chapter 2 in describing the model of rural economic growth that provides a conceptual foundation for this report, it was highlighted that it is through renting-out their land that rural households that are increasingly seeking their livelihoods outside of agriculture can make the land over which they maintain use-rights available for use by more productive and commercially oriented farming households, further accelerating agricultural and rural economic growth. Are households that reported renting-out all or some of their land those that are primarily focused on work outside of agriculture? Alternatively and less conducive to rural economic transformation, are they simply those that, due to age or illness, no longer can dedicate sufficient household labor to farming all their land? Finally, might they be poor households that rent out the land over which they have rights to wealthier tenants to meet short-term consumption needs? There is some evidence from other Malawi studies that such distress renting-out of land is common and may be an initial stage in permanent transfers of rights to land from poorer to wealthier households (Ricker-Gilbert, Jayne and Chamberlin 2022).

While agriculture in Malawi is dominated by crop production, many farming households own livestock and derive income from the consumption and sale of livestock or livestock products. Small landholdings and often locally limited communal areas available for open grazing mean that most focus on raising smaller livestock types, which have lower pasture requirements than cattle. Table 3.6 presents livestock ownership disaggregated by farming household sub-groups. Non-poor households and those with larger landholdings are both more likely than other farming households to own larger numbers of livestock and are more likely to own any cattle. However, less than 15 percent of households in these more favored groups own any cattle, reflecting challenges in the production of large livestock in the context of generally small landholdings. About half of all farming households own goats, sheep, or pigs and more than two-thirds own poultry.

Table 3.6: Livestock ownership, 2019/20

Characteristic	All farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Own livestock, % of households	47.7	53.9	40.6 ***	57.9	44.9 ***
Tropical Livestock Units (TLU) owned, of those owning	0.594	0.704	0.425 ***	0.915	0.481 ***
Own cattle, % of households owning livestock	9.1	10.8	6.5 ***	13.5	7.5 ***
Own goats, sheep, or pigs, % of households owning livestock	48.0	47.7	48.3	56.7	44.9 ***
Own poultry, % of households owning livestock	71.0	72.9	68.0 ***	70.2	71.3
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. * = p < 0.10, ** = p < 0.05, *** = p < 0.01.
Tropical Livestock Units based on following conversion factors: poultry = 0.01 TLU; calf = 0.3; steer or heifer = 0.7; cow = 0.7; ox or bull = 0.8; donkey, mule, or horse = 0.6; goat = 0.1; sheep = 0.1; pig = 0.2.

Based on the production from their cropland and livestock, the annual net agricultural income of all farming households computed from the IHS5 dataset is presented in Table 3.7. The average net total per capita agricultural income is just under MK 35,000, far below the basic-needs poverty line value of per capita annual consumption of MK 165,879. Only 3.5 percent of farming households reported annual per capita net income from agriculture above this poverty line. A larger share of

households in the larger landholding category, but still a small minority, were able through their farming to generate per capita net income above the poverty line.

Table 3.7: Net agricultural income of farming households, 2019/20

	Farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Total annual net agricultural income per capita, all farming households, mean, MK	34,710	46,860	20,640 ***	76,070	23,390 ***
Exceeds consumption-based basic-needs poverty line of MK 165,879 per capita per year, % of farming households	3.5	5.6	1.0 ***	11.3	1.4 ***
Reported net loss, % of farming households	6.0	7.4	4.4 ***	6.3	5.9
Rainfed cropping net income per capita, all farming households, mean, MK	18,680	23,740	12,820 ***	44,840	11,520 ***
For those engaged in any rainfed cropping, mean, MK	20,100	26,220	13,400 ***	45,160	12,630 ***
Rainfed cropping net income per ha of rainfed cropland, mean, MK	140,800	147,810	133,140 **	111,490	149,550 ***
Reported net loss from rainfed cropping, % engaged in any rainfed cropping	9.9	13.2	6.4 ***	10.2	9.9
Irrigated cropping net income per capita, all farming households, mean, MK	1,020	1,210	790	1,700	830
For those engaged in any irrigated cropping, mean, MK	4,690	5,570	3,660	6,270	4,110
Irrigated cropping net income per ha of irrigated cropland, mean, MK	203,570	169,730	242,990	63,570	255,170 **
Reported net loss from irrigated cropping, % engaged in any irrigated cropping	37.3	42.7	30.9 ***	41.0	35.9 *
Permanent cropping gross income per capita, all farming households, mean, MK	4,300	6,050	2,260 ***	8,420	3,170 ***
For those engaged in any permanent cropping, mean, MK	10,220	13,600	5,800 ***	15,280	8,280 ***
Permanent cropping gross income per ha of permanent cropland, mean, MK	239,420	287,610	176,310 ***	179,880	262,310 *
Livestock husbandry net income per capita, all farming households, mean, MK	10,720	15,860	4,760 ***	21,120	7,870 ***
For those engaged in any livestock husbandry, mean, MK	20,860	27,410	10,850 ***	34,940	16,100 ***
Reported net loss from livestock husbandry, % engaged in any livestock husbandry	0.8	1.1	0.4 **	0.4	0.9
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: No costs related to permanent crop production are specifically recorded in IHS5. Gross income is presented for permanent crops. Total agricultural income is the sum of net income for rainfed, irrigated, and livestock production and gross income from permanent crops.
Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively.
* = p < 0.10, ** = p < 0.05, *** = p < 0.01.

This discrepancy to a large degree reflects how agricultural production was valued for the analysis here—rainfed crops being valued by the household respondent, presumably based on local market prices, while median prices reported for crops and livestock sold were used to value all production of irrigated and permanent crops and livestock. However, the value to the household of the agricultural produce from its own production that it consumed, its shadow price, may be considerably higher than the price that produce would have received if sold by the household in the months immediately following harvest. Rather the household may ascribe a value to that produce closer to the price the household would have paid for it if purchased later when seasonal prices were at their highest and also the risks for the household not finding the produce available in the market were highest. If the produce were valued at this higher price, per capita net agricultural income for a

greater share of farming households would exceed the poverty line. Determining what value is ascribed to all of the types of agricultural products farming households produce is a critical methodological challenge for the analysis here.

Nonetheless, that the average net total agricultural income of most farming households is so far below the basic-needs poverty suggests most farming households in Malawi will be unable to rely on their farming activities alone to meet the basic needs of all of their household members. A combination of higher prices and significantly increased productivity will be required for even half of all farming households to be able to rely on their farming alone to avoid living in poverty.

Across the four production regimes, rainfed production provides the greatest share of agricultural income for farming households—54 percent of the agricultural income for all farming households comes from rainfed farming. This share is higher for farming households that are poor, at 62 percent, and for those with larger landholdings, at 59 percent. Irrigated production provides the smallest share of agricultural income overall at less than 3 percent, but only about one-fifth of farming households reported that they engaged in any irrigated farming (Table 3.4). The second most important source of agricultural income is livestock, providing 31 percent of the agricultural income for all farming households.

Farming households that are in the non-poor category and in the larger landholding category consistently have higher per capita agricultural income than those in the poor and in the smaller landholding categories, respectively. This pattern is maintained when income from the four production regimes is examined both for all farming households and for only households that engaged in a particular type of production, although the differences are not statistically significant for irrigated production.

However, when the agricultural income of farming households is considered on a cropped area basis, rather than per capita, households with smaller landholdings generate more income per unit area of cropland than do those with larger landholdings. The differences are particularly sharp for income from irrigated production. This pattern suggests that households with smaller amounts of cropland use that land more intensively than do households that have larger land endowments. However, the same pattern is not consistently seen with poor farming households—the agricultural income such households generate on a per unit area basis from rainfed and from permanent cropping is significantly less than that generated by non-poor farming households. For irrigated farming, while the mean per hectare net income is higher for poor households, the difference with non-poor households is not statistically significant.

Table 3.7 also presents the share of households that experienced net losses in the farming activities for the three production regimes for which costs of production are recorded in IHS5. Overall, only 6 percent of farming households reported net losses on their total agricultural production in the previous year. However, households that engaged in irrigated farming were most likely to report net losses—37 percent of households that produced irrigated crops reported net losses. In contrast, only 10 percent of rainfed producers reported losses and almost no livestock producers reported losses—over 70 percent of livestock producers reported no out-of-pocket input costs for their animals.

For crop production, the costs considered in computing net income include those for renting-in land, hired-in labor from outside the household, organic fertilizer, inorganic fertilizer, pesticides, herbicide, and seed. At least one of these inputs was reported to be used by 78 percent of rainfed farming households and by 76 percent of irrigated farming households. The patterns of input use are quite similar between rainfed and irrigated cropping—for both production regimes, inorganic fertilizer costs account for about three-quarters of all costs, being used by 47 percent of rainfed

farming households and 43 percent of irrigated farming households. Small differences between the regimes are seen for use of hired-in labor, which is a higher share of input costs for rainfed cropping, and for use of pesticides, which is used by about one-quarter of households engaged in irrigated farming, but only by about 5 percent of those engaged in rainfed.

Household income from non-agricultural or off own-farm sources

We now turn to the income received by farming households in Malawi from non-agricultural or off own-farm sources. Some of this income may be directly related to farming, such as casual temporary employment (*ganyu*) on the farms of other households, or to value-added processing or petty trading of some of the agricultural produce of the farming household as part of the activities of a household enterprise. However, for the most part, such income is not closely linked to agricultural production on the household's own farm. Information is presented in Table 3.8 organized by five sources of such income—payments from engaging in *ganyu* labor; longer-term wage employment; proceeds from household enterprises; regular income payments; and social safety net or similar income transfers. In Chapter 5, a closer examination is presented of the characteristics of casual short-term (*ganyu*) employment, longer-term wage employment, and employment in household enterprises specifically, including variation in the income farming households derive from such employment.

The top panel of Table 3.8 shows the share of farming households obtaining income from these sources. Almost no farming households report only relying on their agricultural production for income. Due both to the seasonality of farming with significant underemployment in agriculture during the dry season of the year and the challenges of obtaining sufficient income from farming alone, almost all farming households in Malawi pursue non-agricultural livelihoods as well. Here we examine some of the patterns in the sources and flows of non-agricultural or off own-farm income to farming households in Malawi.

As shown in the top panel of Table 3.8, casual temporary (*ganyu*) labor is the most commonly reported source of such income—almost three-quarters of farming households report a member obtaining some income through such work. The dominance of casual temporary employment as a source of off-farm income reflects the relatively low barriers to engaging in such work for most workers. The IHS5 does not record the type of work done by those engaged in *ganyu*, so no insights can be obtained on the skill level or tools and other assets required to obtain such work. However, we assume that in rural communities where most farming households reside most such work is to support the agricultural production of neighboring households or to provide traditional services, such as assisting with basic construction tasks. Consequently, much of this work will not require specialized skills or equipment, but simply the ability to provide relatively minimally-skilled manual labor. The principal barriers to engaging in such work are linked to seasonal demand—there will be times during the cropping season when time-sensitive farming operations need to be completed. At these times, there will be strong demand for *ganyu* workers, but perhaps much less demand at other times of the year. However, these periods of high demand during the cropping season are also when potential *ganyu* workers need to work on the plots of their own household to ensure a good harvest. The opportunity costs can be high for a farming household if its workers engage in *ganyu* labor.

Table 3.8: Non-agricultural or off own-farm sources of income of farming households, 2019/20

	Farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Received any non-agricultural or off own-farm sources of income, % of households	98.5	98.4	98.7	97.0	99.0 ***
Have members who engaged in casual temporary employment (*ganyu*)	73.3	62.1	86.3 ***	62.7	76.3 ***
Have members with longer-term wage employment	15.3	20.1	9.8 ***	11.0	16.5 ***
Have a household enterprise	36.5	41.5	30.7 ***	32.3	37.7 ***
Have members who receive regular income payment, e.g., pension, remittances, rental or regular sales of real estate or other assets	63.6	67.4	59.1 ***	68.2	62.3 ***
Have members who received social safety net or similar income transfers, incl. agric. input subsidies	35.5	34.7	36.5	37.4	35.0 *
Total net income per capita from non-agricultural or off own-farm sources, all households, mean, MK	133,510	187,420	71,020 ***	165,570	124,730
For those who obtained any off own-farm income only	135,480	190,380	71,990 ***	170,670	126,040
Median, MK	53,000	74,530	39,700	62,930	50,720
Casual temporary employment (*ganyu*) income per capita, all households, mean, MK	46,770	46,870	46,660	44,970	47,270
As share of total net income from non-agricultural or off own-farm sources, %	35.0	25.0	65.7	27.2	37.9
For those with members engaged in any casual temporary employment only, MK	63,770	75,410	54,060 ***	71,710	61,990
Median, MK	24,000	24,010	22,800	24,000	24,000
Longer-term wage employment income per capita, all HHs, mean, MK	29,860	50,980	5,390 ***	33,120	28,970
As share of total net income from non-agricultural or off own-farm sources, %	22.4	27.2	7.6	20.0	23.2
For those with members engaged in any longer-term wage employment only, MK	194,860	253,370	55,180 ***	301,030	175,500 **
Median, MK	76,670	120,000	36,000	80,000	76,000
Household enterprise net income per capita, all households (net computation excludes household labor), mean, MK	25,330	40,680	7,540	30,570	23,900
As share of total net income from non-agricultural or off own-farm sources, %	19.0	21.7	10.6	18.5	19.2
For those operating household enterprises only, MK	69,390	97,970	24,570	94,650	63,460
Median, MK	12,400	16,670	9,000	19,460	11,430
Other regular income payments income per capita, all households, mean, MK	25,770	41,970	6,990 ***	48,150	19,640 ***
As share of total net income from non-agricultural or off own-farm sources, %	19.3	22.4	9.8	29.1	15.7
For those receiving any other regular income payments only, MK	40,540	62,250	11,830 ***	70,560	31,540 ***
Median, MK	6,670	11,500	3,370	13,500	5,170
Social safety net or similar income transfers, incl. agric. input subsidies, all households, mean, MK	5,770	6,920	4,440 ***	8,750	4,960 ***
Value agric. input subsidies, all HHs, mean, MK	3,708	4,017	3,349 **	4,744	3,424 ***
Input subsidies as share of all income transfers, %	64.3	58.0	75.4	54.2	69.0
All such income transfers as share of total net income from non-agricultural or off own-farm sources, %	4.3	3.7	6.3	5.3	4.0
For those who received any social safety net or similar income transfers only, MK	16,250	19,940	12,180 ***	23,380	14,160 ***
Median, MK	9,620	10,930	8,040	13,660	8,800
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. This is not done for medians or the statistics on the share of total net income from non-agricultural or off own-farm sources.
* = p < 0.10, ** = p < 0.05, *** = p < 0.01.

Thirty-five percent of all non-agricultural or off own-farm income reported in IHS5 was derived from casual temporary employment—the source contributing the largest share of such income, as presented in the bottom panel of Table 3.8. While all farming households reported similar levels of income per capita derived from *ganyu* employment, there is considerable variation across farming household types in the share of the household's total off-farm income derived from *ganyu*. Poor households relied on *ganyu* employment for almost two-thirds of their off own-farm income. Households with smaller landholdings are also considerably more likely than those with larger landholdings to obtain a large share of their off own-farm income from such employment—possibly because they are better able to complete time-sensitive farming operations on their own cropland during the period when they need to be done and still be able to provide *ganyu* labor for neighboring farming households with larger cropland holdings within the period such operations need to be completed.

However, for households with members engaged in *ganyu* labor, the income they receive from such employment is less than that received by households with members having more formal wage employment. A significantly smaller share of households has members with wage employment—only 15 percent of households. However, the income households received from wage employment on average and at the median is about three times larger than that earned from the *ganyu* labor employment of households with members doing *ganyu*. There are strong income advantages to obtaining formal wage employment, rather than relying on casual temporary employment. This pattern is replicated also at the disaggregated farming household levels. An important exception to this pattern is seen with poor farming households, who on average receive almost as much from engaging in casual temporary employment as they do from engaging in formal wage employment. However, only about 10 percent of poor farming households have members with formal wage employment, while 86 percent have members who have had some casual temporary employment. That a household has a member with formal wage employment is correlated relatively strongly with the household being non-poor. Overall, 22 percent of all non-agricultural or off own-farm income reported in IHS5 was derived from formal wage employment—the second most important source of such income.

Household enterprises provided 19 percent of non-agricultural or off own-farm income to IHS5 farming households. However, as evidenced by the significant difference between the mean and the median levels of income from household enterprises obtained by households operating such enterprises, there is considerable variation in the income households obtain from these enterprises. The significant difference in average incomes from enterprises earned by non-poor farming households relative to poor households also points to this variability in returns. Household enterprises range from specialized construction, carpentry, or repair services and highly capitalized wholesale trade enterprises at one end of the spectrum to, at the other, household members preparing small batches of *mandazi* (deep-fried buns) or selling roasted groundnut in small units outside of their homestead, or regularly selling a small portion of the crops they harvested at the local market. A few households obtain significant income flows from the enterprises they operate, while most obtain relatively small returns. Moreover, over 60 percent of farming households reported not operating any such enterprises.

The remaining two sources of non-agricultural or off own-farm income are the receipt of regular income payments, such as private remittances from other individuals, including adult children of the household head or the household head's spouse residing elsewhere, pension payments, and real estate or asset rentals or sales; and, secondly, receiving benefits in cash or in-kind from social safety net or similar income transfer programs, including coupons for agricultural input subsidies. These sources of income are not as tightly associated with employment and engagement in the labor market as the other three sources considered, so are not considered in detail in this report.

Receipt of regular income payments was reported by almost two-thirds of farming households, with the share of all non-agricultural or off own-farm income made up by such payments being just over 19 percent, slightly more than the share of off-farm income farming households receive from operating household enterprises. Farming households that are not poor or that have larger landholdings receive a larger share of income from these regular income payments than do households that are poor or that have smaller landholdings. Among the different categories of regular income payments farming households, the largest share of such income comes from remittances from biological children of the head of household or the household head's spouse who were 15 years old and over and did not live in the household residing elsewhere—just over half of regular income payments by value are of this sort, with little difference in the share of regular income payments made up by such remittances between the different categories of farming households. The share of regular income payments that poor farming households receive that is made up of remittances or gifts from non-household members is 29 percent, somewhat higher than the share received from this source by households in the other categories, for which this share is between 16 and 22 percent.

The share of all non-agricultural or off own-farm income made up by transfers from social safety net or similar programs is about 5 percent—poor farming households receive a slightly larger share of such income for these programs. Overall, about 35 percent of all farming households received such transfers, with little difference between disaggregated groups of farming households in their level of participation in such programs. However, farming households that are non-poor or with larger cropland holdings receive greater benefits from the social safety net or similar income transfer programs to which they have access than do farming households that are poor or have smaller cropland holdings.

Transfers under the agricultural input subsidy program are the major source of farming household income from social safety net or similar income transfers for all farming households. The value of the input subsidy made up almost two-thirds of the value of all income transfers reported received by all farming households and made up an even larger share of the value of such income transfers for poor farming households and for those with smaller cropland holdings. However, note in Table 3.8 that non-poor households received a significantly higher benefit from the input subsidy program than did poor farming households. Similarly, households with larger cropland holdings received significantly higher benefits from the program than did farming households with smaller holdings.

During the 2019/20 IHS5 survey year and in the previous year, the Farm Input Subsidy Programme, the input subsidy program then in place, targeted about 900,000 farming households nationally. The scale of the input subsidy program in these years was significantly smaller than both in previous and in following years. The average number of farming households benefiting from the Farm Input Subsidy Programme between 2005/06 to 2011/12 was 1.6 million (Chirwa and Dorward 2013), while the current program, the Affordable Inputs Programme, in its first year of operation in 2020/21 targeted 3.8 million (Nyondo, et al. 2021). In recent years, almost certainly the share of all income transfers received by farming households that is made up by input subsidy benefits will have been considerably higher than what is reported in IHS5.

Total net income for farming households in Malawi

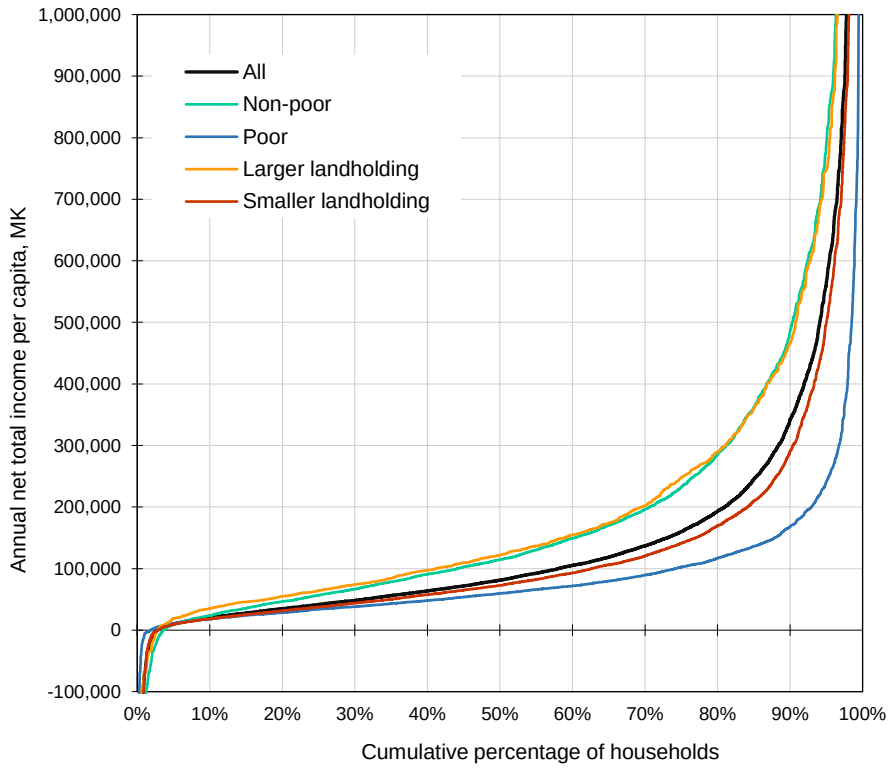
Having reviewed the various sources of on-farm agricultural income and of non-agricultural or off own-farm income in the previous sections, here we combine these income streams to compute total income for farming households. It bears repeating that combining income from agricultural produce, much of which is not formally valued in cash terms, with income from other sources, which typically is transferred in cash, is not straightforward. This challenge was highlighted earlier in the

discussion of how to value agricultural produce most accurately. Our estimates of total household income reflect this uncertainty.

The cumulative distribution of annual net total income per capita for farming households in Malawi as reported in IHS5 is presented in Figure 3.5. Given that both agricultural income and the returns from household enterprises are computed net of the costs of agricultural production or enterprise operation, about 5 percent of households reported losses, or negative net income, over the previous year. About 80 percent of households obtained income up to MK 200,000 per capita, with the remaining 15 percent receiving considerably more.

Figure 3.5 also presents secondary plots of the cumulative distribution of annual net total income per capita by the four categories of farming households. The plots for non-poor households and households with larger landholdings almost duplicate each other and, except at the lowest levels of income, over most of the distribution of income for these two categories is above the plot for all farming households. The plot of the distribution of income for poor households is below or, at the right side of the plot, significantly below the plot for all farming households. As households with smaller landholding make up 80 percent of farming households, the cumulative distribution plot for such households is only slightly below that for all farming households over much of the distribution.

Figure 3.5: Cumulative distribution of annual net total income per capita for all farming households and by farming household category in Malawi, 2019/20



Source: Authors' weighted analysis (household) of 2019/20 (IHS5) Malawi Integrated Household Survey.

Table 3.9 provides more detail on the income obtained by all farming households and by households in the categories of the two typologies of households, both for Malawi as a whole and by region. Information is also provided on the share of total household income from agricultural (on own-farm) sources. As shown in the top panel of the table, farming households in the Northern region generally receive more income per capita than do those in the other two regions. Except for poor farming households, both the mean and median total income of farming households in the Northern region are the highest of the three regions.

Table 3.9: Income sources of farming households, 2019/20

Characteristic	Farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Total annual net income per capita, mean, MK	168,210	234,280	91,660 ***	241,630	148,130 ***
Median	81,140	114,370	59,690	121,880	72,670
Total annual net income exceeds consumption-based poverty line, % of farming households	24.0	35.9	10.2 ***	36.7	20.6 ***
Northern region, mean	318,670	404,510	85,670 **	273,380	337,890
Median	108,470	140,260	63,020	139,400	100,420
Total income exceeds basic-needs poverty line, %	34.6	43.1	11.6 ***	41.5	31.7 **
Central region, mean	125,340	171,670	84,500	220,760	90,940 ***
Median	81,370	121,870	62,190	116,830	71,070
Total income exceeds basic-needs poverty line, %	23.5	38.0	10.6 ***	35.0	19.3 ***
Southern region, mean	164,200	217,930	100,240 ***	257,550	148,290 ***
Median	74,800	102,650	56,340	123,600	69,110
Total income exceeds basic-needs poverty line, %	21.5	31.4	9.6 ***	36.5	18.9 ***
Total net ann. agricultural income per capita, mean, MK	34,710	46,860	20,640 ***	76,070	23,400 ***
Median	16,190	22,600	11,740	40,950	12,560
Northern region, mean	53,140	63,110	26,150 ***	101,350	32,680 ***
Median	24,650	30,000	15,830	43,500	19,040
Central region, mean	36,000	50,500	23,230 ***	69,900	23,790 ***
Median	17,600	25,290	13,400	41,750	12,830
Southern region, mean	28,270	37,770	16,970 ***	71,480	20,920 ***
Median	13,360	18,670	10,250	39,010	11,500
Total annual net agricultural income as a share of total annual net income, %	20.6	20.0	22.5	31.5	15.8
Northern region	16.7	15.6	30.5	37.1	9.7
Central region	28.7	29.4	27.5	31.7	26.2
Southern region	17.2	17.3	16.9	27.8	14.1
Total annual net income made up by agricultural income, mean percentage share †	30.3	30.6	29.9	43.8	26.6 ***
Median of percentage share	23.2	23.3	23.1	41.6	19.4
Northern region , mean percentage share	34.9	34.6	35.9	43.0	31.5 ***
Central region, mean percentage share	32.8	33.4	32.4	47.1	27.7***
Southern region, mean percentage share	26.6	26.9	26.2	38.6	24.5 ***
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. This is not done for medians and percentiles. * = $p < 0.10$, ** = $p < 0.05$, *** = $p < 0.01$.
"Total annual net agricultural income as a share of total annual net income" is computed by summing up for all households in each category the annual net agricultural income they received and dividing it by the sum of the total annual net income the households reported.
"Total annual net income made up by agricultural income, mean percentage share" is calculated by first computing for each household the share of their net income obtained from agricultural sources and then computing the average share for all households in a category.
† In computing the mean percentage share of total annual net income made up by agricultural income, 54 households with outlier values of either less than -500 percent (12) or more than +500 percent (42) were excluded from the analysis.

With regards to the share of farming households that reported total net income above the consumption-based basic-needs poverty line, less than one-quarter of farming households reported income above this level (MK 165,879 per capita per year). Just over one-third of non-poor farming households and an equal share of those with larger landholdings had incomes that exceeded the consumption poverty line. A greater share of farming households in the Northern region had incomes above the poverty line than did households in the other two regions. This pattern is seen at the disaggregated farming household category level as well. That a significantly larger share of farming households, 76.0 percent, has total income below the consumption poverty line than the 46.3 percent of farming households estimated to be poor based on their reported consumption (Table 3.2) suggests that the correlation between the levels of household consumption and household income for these farming households is not close. This correlation will be examined later.

The pattern of higher incomes among farming households in the Northern region is also seen in the second panel of the table for annual net agricultural income per capita, including for poor households. Across all farming households, those with larger landholdings have both the highest average level of total income and the highest average level of agricultural income. However, when households are disaggregated by region, this pattern does not hold for the Northern region, where non-poor farming households have higher total incomes on average than do farming households with larger landholdings, while still having lower net agricultural incomes. Further analysis is required of the specific sources of non-agricultural income of non-poor farming households with smaller landholdings in the Northern region to better understand why there the relationship between landholding area and total income seen in the other two regions does not hold in the Northern region.[7]

The information in the bottom two panels of Table 3.9 concerns the importance of agricultural income in total income. The first of these panels shows the ratio of the sum of all agricultural income earned by farming households to the sum of their total income. Overall, 21.6 percent of the total income obtained from farming households comes from agricultural sources—75.7 percent of farming households reported earning less than half of their total net income from agriculture. The challenges associated with valuing the agricultural produce of farming households that is not sold is part of what accounts for these low percentage shares of agricultural income in total income. By farming household category, those with larger landholdings obtained more than 31 percent of their income from agricultural sources, while those with smaller landholdings reported only obtaining 16 percent.

The bottom panel of the table is based on the mean percentage ratio of net agricultural income to total net income for individual farming households, rather than the sum of all such income streams. Here we see that there is considerably more variability in the contribution their own farming makes to the total income of individual farming households. The average farming household in Malawi obtains about 30 percent of its income from its agricultural production. This rises to just under 44 percent for farming households with larger landholdings. However, this distribution is somewhat skewed to a lower share of income coming from agriculture for most households—the median share of income from agriculture is just 23.2 percent for all farming households.

Regionally, we see that agriculture makes a more important contribution to the total income of farming households in the Central and the Northern regions than in the Southern region. However, the relative patterns of the importance of agriculture income across farming groups is not consistent in the Central and the Northern regions—larger landholders in the Central region report obtaining on average over 80 percent of their total income from farming, while farming households in this category in the Northern region obtained less than 30 percent of their income from farming. As more than 50 percent of all farming households with larger landholdings are in the Central region

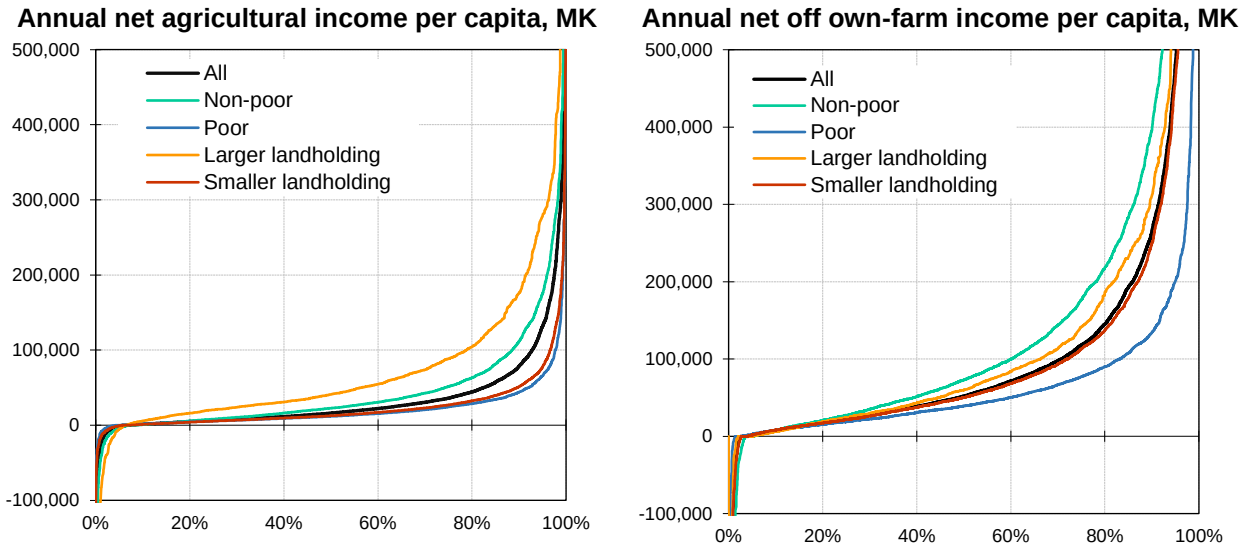
[7] An examination of the sources of income for farming households by region shows that the considerably higher mean total annual net income per capita for farming households in the Northern region results principally from much higher non-agricultural income for farming households there, particularly for those farming households that are both non-poor and have smaller cropland holdings. The statistics on total annual net agricultural income as a percentage share of total annual net income in Table 3.9 point to this being the case.

The particular non-farm income source providing much higher income for farming households in the Northern region than is seen for farming households in the other two regions is household enterprises. The mean net income farming households in the Northern region receive from household enterprises is five times higher than the average for all farming households in Malawi. Non-agricultural trading enterprises are the most remunerative household enterprises for farming households in the Northern region, although such enterprises also are common among farming households there reporting substantial net annual losses on their enterprise. One-third of farming households in the Northern region operate a household enterprise (Table 5.5). While this share is substantial, it would be wrong to assert that engaging in such enterprises is a common and effective way for all farming households in the Northern region of Malawi to diversify and raise their total household income.

Farming households in the Northern region also receive higher levels of wage income from long-term employment and income from other sources, e.g., pension, remittances, real estate or asset rentals or sales, than do farming households in the other two regions—this is particularly so for non-poor farming households.

and less than 20 percent in the Northern region, a smaller sample size in the Northern region may contribute to this inconsistency.

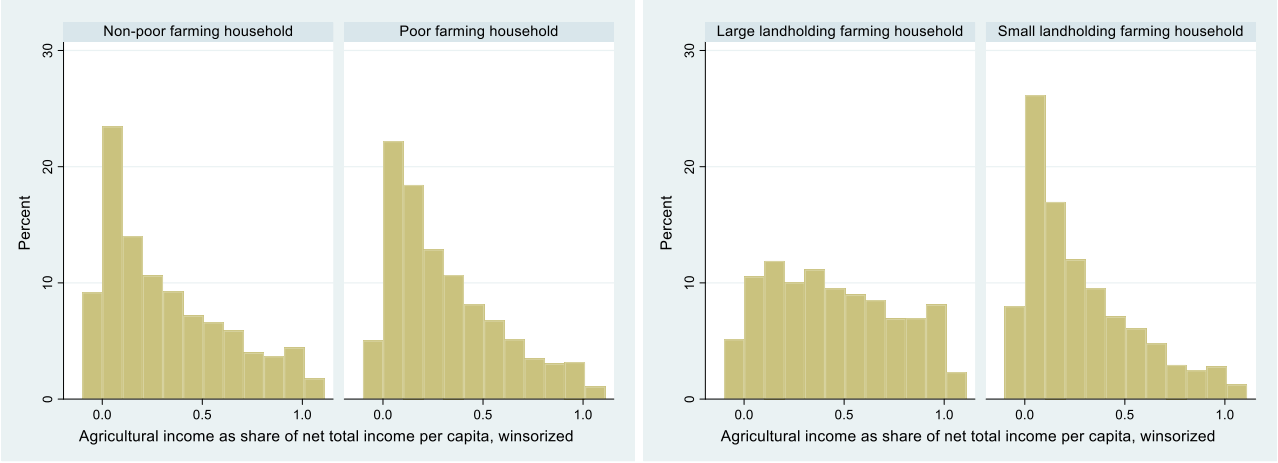
Figure 3.6: Cumulative distribution of annual net agricultural income and net off own-farm income per capita for all and categories of farming households in Malawi, 2019/20



Source: Authors' weighted analysis (household) of 2019/20 (IHS5) Malawi Integrated Household Survey.

To examine the respective contributions of on-farm agricultural income and of off own-farm non-agricultural income to the total income of farming households, some insights are gained from the side-by-side plots of the cumulative distribution functions of these two sources of income shown in Figure 3.6. Agricultural income levels are quite low over much of the distribution of all farming households, only rising sharply at about the 80th percentile. In contrast, income from non-agricultural or off own-farm sources, while still quite unequally distributed across all farming households, rises faster with an increasing share of the population of farming households.

Figure 3.7: Histogram of ratio of household net agricultural income to household net total income, by farming household category



Source: Authors' unweighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: The leftmost and rightmost bars in each histogram represent the share of all households with a ratio of agricultural income to total household income ratio that is less than zero or greater than 1.0, respectively. Extremely low or extremely high ratio values were winsorized to fall within the bins of these bars. Such values are possible because the ratios are based on net income values. Particularly in farming or in the operation of household enterprises, households may realize losses that resulted in overall negative net income, resulting in a negative ratio. Similarly, a household's net agricultural income could be higher than its total net income if losses were realized in its non-agricultural income-earning activities, resulting in a ratio above 1.0.

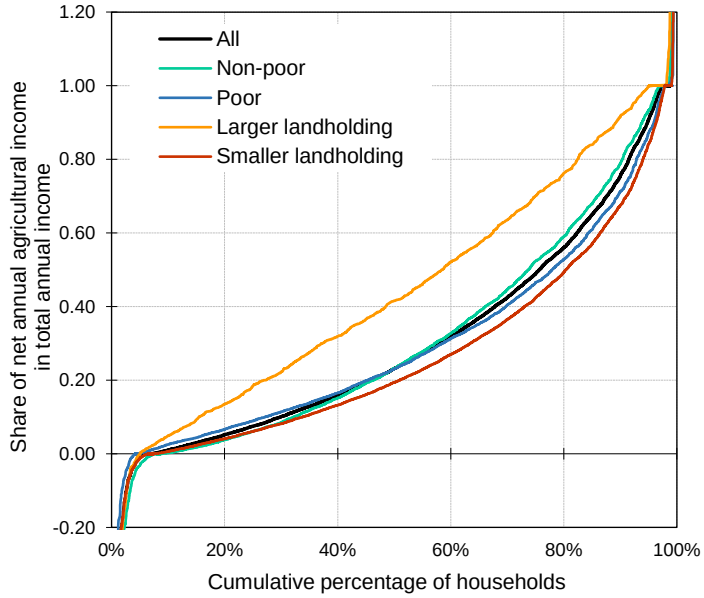
Figure 3.6 provides no insights on the distribution across farming households of the relative contribution of their agricultural production to household total income. The histograms of the ratio of net agricultural income to total household income by farming households categories presented in Figure 3.7 provide better insights on this. The second to 11th bars of each histogram correspond to ranges of 0.10 ratio points running from 0.0 to 1.0. The leftmost bar of each histogram presents the share of all farming households with a negative ratio—those reporting a net loss in either agricultural production or in total income. The rightmost bin of each histogram presents the share of all farming households with a ratio above 1.0, as would be possible if the household's net agricultural income was higher than its total net income if significant losses were realized in its non-agricultural income-earning activities. Higher histogram bars to the right side of the histogram indicate a larger share of households earning much of their income from agricultural production.

The low value given to the net agricultural production of farming households and the higher net income levels reported from non-agricultural or off own-farm sources would suggest that a high proportion of farming households would have low ratios of net agricultural income to net total income. The histograms of these ratios by farming household category in Figure 3.7 confirm this. Over 20 percent of farming households have a ratio between 0.00 and 0.10, drawing far more of their income from other activities than their farming. Only in the histogram for farming households with larger landholdings do we see a sharply different pattern with an almost even distribution of households in the ten ratio ranges between 0.00 and 1.00. However, for the 80 percent of farming households in the smaller landholding category, non-agricultural or off own-farm sources of income contribute much more than does net agricultural production to their total income.

An alternative graphical presentation of the share of the total annual income obtained by farming households in Malawi that is made up of agricultural income is presented in Figure 3.8, which shows the cumulative distribution of this ratio. These plots demonstrate somewhat more clearly than in Figure 3.7 the reliance of farming households with relatively small cropland holdings on non-farm sources of income. The plot for households in this category falls below the plots for the other farming household groups except at the very ends of the distribution. The quite linear plot for farming households with larger cropland holding confirms the almost even distribution of households in the ten ratio ranges between 0.00 and 1.00 seen in Figure 3.7 for this category of farming households. When farming households are grouped by poverty status, there is not as sharp a divergence in the plots, particularly at the lower end of their distributions. However, overall, non-poor farming households are more likely than poor households to have a larger share of their total income coming from agriculture.

The discussion in this section has primarily focused on the contribution that farming makes to the total incomes of farming households by contrasting the incomes obtained from the two overall categories of income sources—annual net agricultural income and annual net off own-farm income. However, each income source category is made up of several income sources. Figure 3.9 presents for all farming households and by farming household category the average net income contributed by the nine income sources examined—four agricultural sources and five non-agricultural off own-farm sources and the share of total average household income that is made up by income from each source. The data presented compiles information presented in Table 3.7 and Table 3.8.

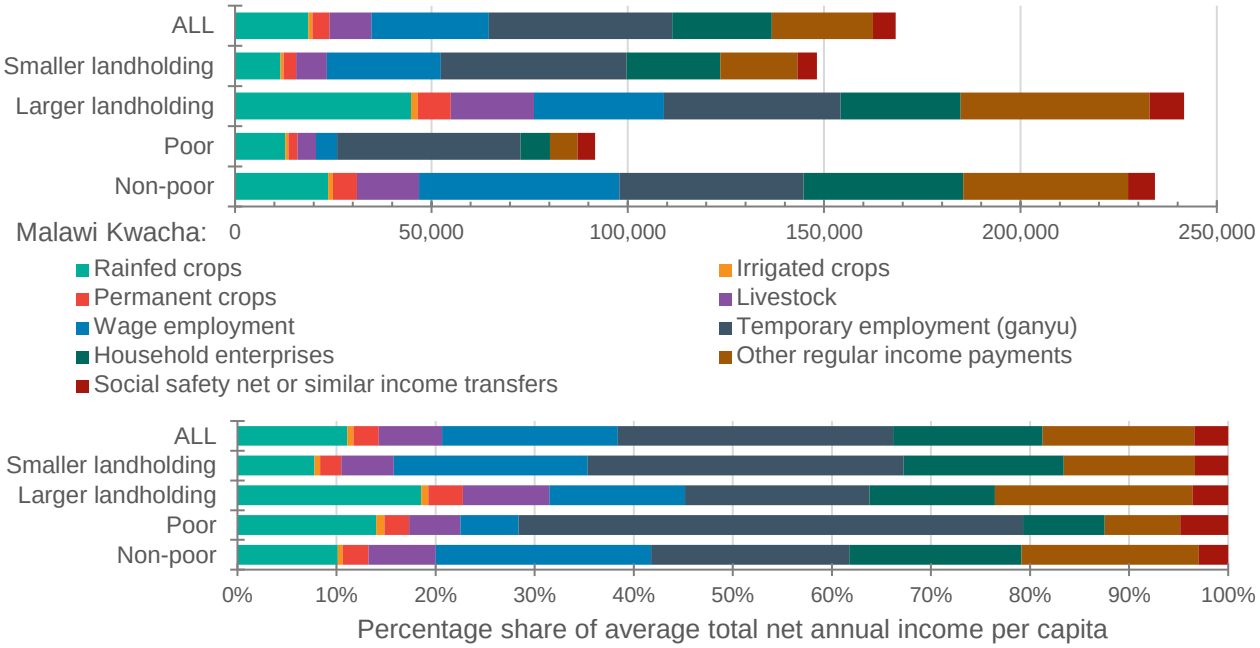
Figure 3.8: Cumulative distribution of annual net agricultural income as a share of total annual income for all farming households and by farming household category in Malawi, 2019/20



Source: Authors' weighted analysis (household) of 2019/20 (IHS5) Malawi Integrated Household Survey.

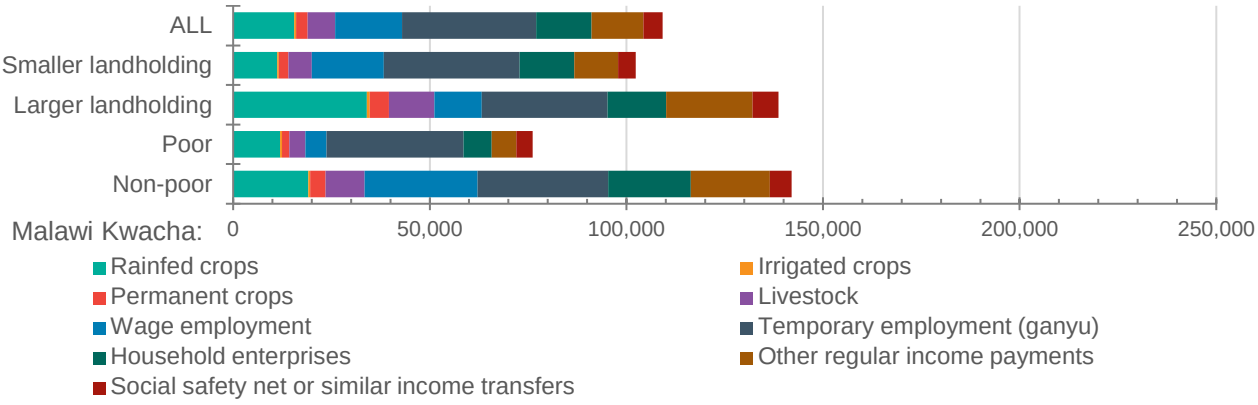
However, households with very large incomes (or very low, negative net incomes) skew the average income levels reported in Figure 3.9 significantly. Figure 3.10 presents the same information as in Figure 3.9, but using a trimmed IHS5 dataset which was created by dropping all IHS5 sample households that reported receiving a level of income from any source that was above the 99th percentile level or, for net income sources, below the first percentile level for a particular income source. The analysis of this trimmed dataset generates average levels of income received from each source that is more typical for most farming households. The analysis of the trimmed dataset shows average levels of income from most sources that are substantially lower than the averages seen with the full dataset of farming households. However, the share of total household income obtained from each source does not change appreciably between the analysis of the full and the trimmed IHS5 datasets.

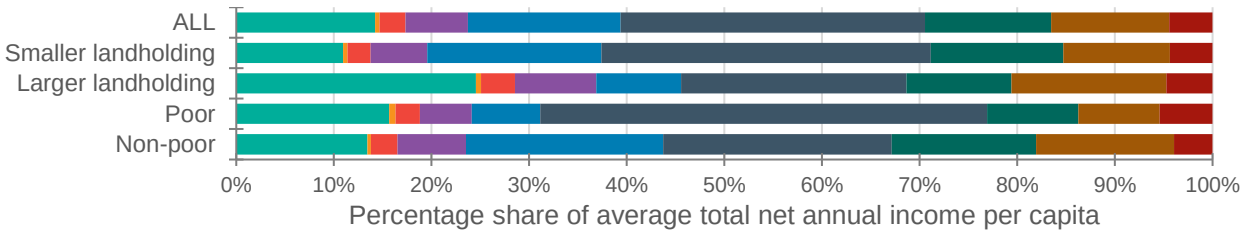
Figure 3.9: All farming households, average net annual income per capita and share of total income obtained from a portfolio of farm and off own-farm income sources, by farming household category, 2019/20



Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey. Total farming households: 9,570.

Figure 3.10: Typical farming households, average net annual income per capita and share of total income obtained from a portfolio of farm and off own-farm income sources, by farming household category, 2019/20





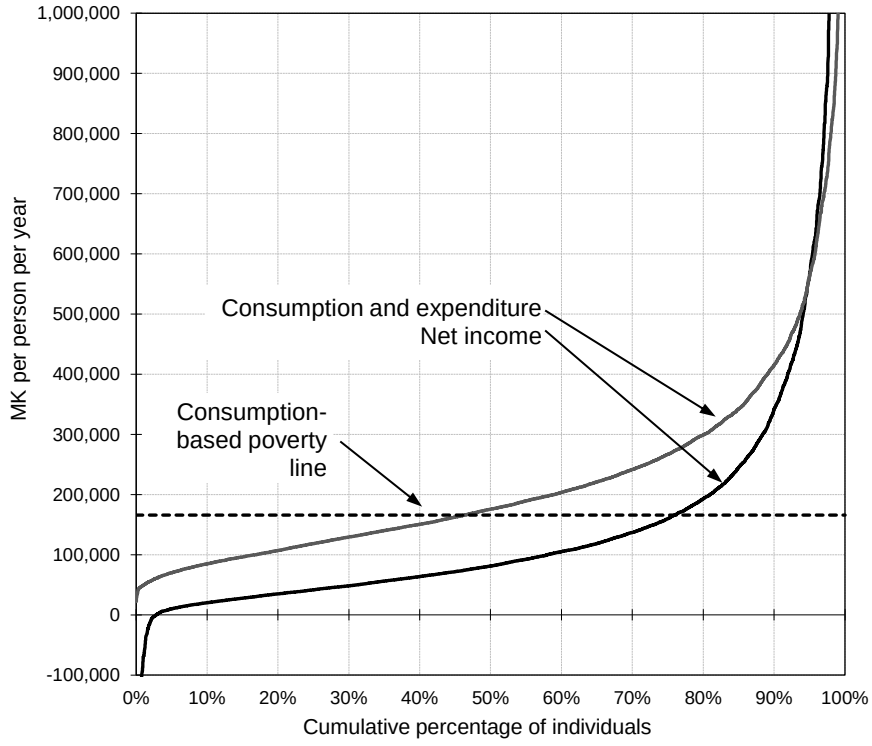
Source: Authors' weighted analysis of trimmed 2019/20 (IHS5) Malawi Integrated Household Survey. Total farming households in the trimmed dataset: 8,566.
Note: To trim the IHS5 dataset for the analysis of "typical" farming households, outlier households were dropped from the dataset if they reported income for any source that was above the 99th percentile for that source. In addition, for the four sources for which net income was reported—rainfed crops, irrigated crops, livestock, and household enterprises—any households that reported net incomes below the first percentile for these sources—those reporting a large annual net loss in income from the source—were also dropped.

Assessing the correlation between the levels of household consumption and household income

The aim of the research here is to determine whether farming households in Malawi will be able to rely on income from higher productivity farming using the agricultural resources to which they have access to meet their basic needs and escape from or avoid falling into poverty. Our analysis in this chapter has been centered on the income these households obtain. We use the consumption based-poverty line established using the IHS5 dataset to determine whether households can meet their basic needs. Conceptually, household income and consumption are two sides of the same coin, with their levels serving as reasonable proxy measures of the welfare level of the household. However, we also highlighted earlier that household income is generally a more problematic measure of household welfare than is household consumption in contexts such as rural Malawi. Nonetheless, setting aside outlier households with uncharacteristically high or low net income levels, using per capita annual net income as a welfare measure for farming households should result in a similar distributional pattern of welfare as results from using the consumption-based welfare measure. Here we evaluate our income measure of household welfare against the consumption-based measure graphically and statistically.

The cumulative distributions of both measures for all farming households are plotted in Figure 3.11. Over most of the distribution, net income is lower than consumption. Given the problems noted earlier with accurately estimating income in farming households, we assume that much of the difference is due to incomplete or inaccurate information reported by farming households on their income.

Figure 3.11: Cumulative distribution of per capita annual total consumption and total net income for farming households in Malawi, 2019/20

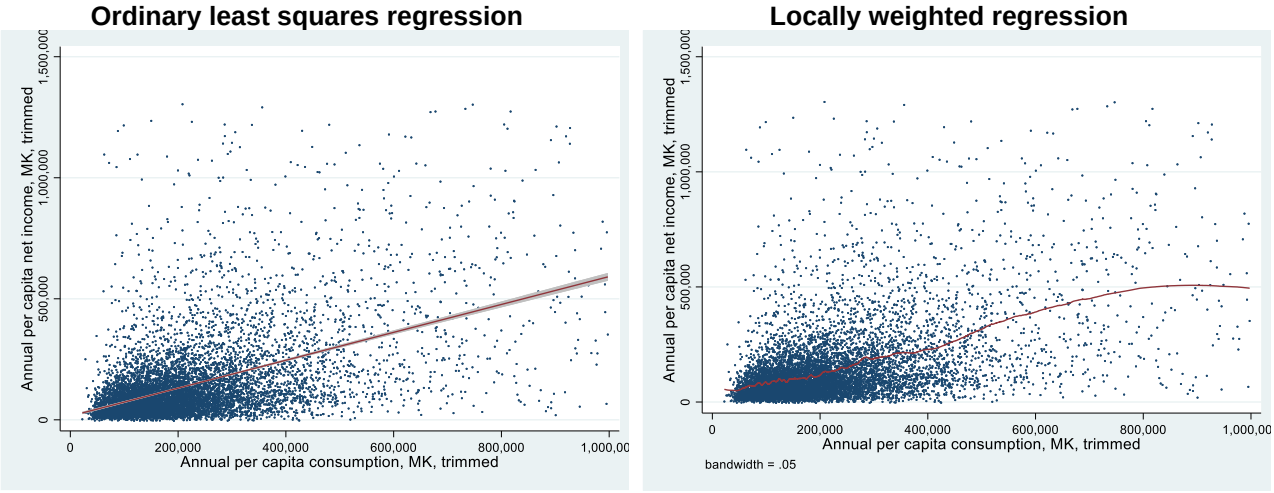


Source: Authors' weighted (household) analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.

The cumulative distribution plots in Figure 3.11 reflect two different rankings of households, so offer no information on the relationship between income and consumption for specific farming households. To obtain more insights on this, Figure 3.12 presents scatterplots of the income and consumption for each farming household in the IHS5 dataset. In the left graph, an ordinary least squares linear regression line for income on consumption is plotted on the scatter plot, while in the right graph, a locally weighted regression line is plotted.[8] Details on the ordinary least squares linear regression for all farming households and for disaggregated categories of households are presented in Table 3.10. The ranked and pairwise correlation coefficients for the two measures are also presented.

The regression using all farming households (except outlier cases) has an adjusted R-squared of 0.25, suggesting that, while there is considerable correlation between the two measures, much of the variability in household net income cannot be adequately predicted solely by household consumption. That the two measures are correlated is confirmed by the two measures of correlation. Their highly significant p-levels indicate that the levels of the two variables are not independent of each other.

Figure 3.12: Scatterplots with ordinary least squares and locally weighted regression lines of per capita annual household net income and per capita annual household consumption and expenditure for farming households in Malawi, outliers trimmed, 2019/20



Source: Authors' unweighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Sample households with the lowest or highest 2.5 percent of net income values and those with the highest 2.5 percent of consumption values were excluded in creating the scatterplot and running the regressions.

The ordinary least squares and locally weighted regression plots in Figure 3.12 are quite similar when computed on the trimmed dataset of all farming households. There are no large changes in slope along the plot of the locally weighted regression, suggesting a relatively consistent relationship between per capita annual net income and per capita annual consumption and expenditure for farming households over their distributions.

[8] For the regressions, we use income as our dependent variable, even though logically household consumption is dependent upon the income of the household. We do so in order to directly use the results from the consumption-based IHS5 poverty analysis (National Statistical Office 2021), particularly the basic need poverty line, for the analysis that follows.

We also include a constant (y-intercept) in the regressions, although logically zero income should result in zero consumption. While our household consumption measure is always greater than zero, our household income measure is based on annual net income. Net losses are possible for household income from agriculture and from household enterprises, so our total household income measure can be negative – 52 IHS5 farming households in the trimmed dataset had net annual incomes less than or equal to zero. Because households with negative annual net incomes nonetheless will have positive consumption, we include a constant in the regressions.

Table 3.10: Correlation of per capita household income with per capita household consumption and expenditure for farming households, outliers trimmed, 2019/20

	Farming households	Non-poor farming HHs	Poor farming HHs
Ordinary least squares regression	net_income_pc_tr = 15562 + 0.5763 net_cnsmptn_pc_tr *Adj. R-squared: 0.2507*	net_income_pc_tr = –2201+ 0.6202 net_cnsmptn_pc_tr *Adj. R-squared: 0. 2126*	net_income_pc_tr = 41715 + 0.3931 net_cnsmptn_pc_tr *Adj. R-squared: 0.0155*
Rank correlation coef. (Spearman's)	0.4494 ***	0.3998 ***	0.1815 ***
Pairwise correlation	0.5008 ***	0.4612 ***	0.1254 ***
Observations	*9,148*	*5,092*	*4,056*
	Larger landholding	**Smaller landholding**	
Ordinary least squares regression	net_income_pc_tr = 44921 + 0.5311 net_cnsmptn_pc_tr *Adj. R-squared: 0.2139*	net_income_pc_tr = 11097 + 0.5775 net_cnsmptn_pc_tr *Adj. R-squared: 0.2432*	
Rank correlation coef. (Spearman's)	0.4394 ***	0.4163 ***	
Pairwise correlation	0.4630 ***	0.4933 ***	
Observations	*1,863*	*7,285*	

Source: Authors' unweighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: To reduce the effect on these correlation statistics of outlier cases, extremely low net income values or extremely high net income or consumption values were not included in these analyses. Sample households with the lowest or highest 2.5 percent of net income values were excluded, as were households with the highest 2.5 percent of consumption values. (As the distribution of consumption measures is left-bounded at zero, households with the lowest consumption values were not excluded.) * = p < 0.10, ** = p < 0.05, *** = p < 0.01.

However, at lower values, the relationship between the two variables is much more random than is indicated by these regressions on the full sample of farming households. For poor farming households—those with per capita annual household consumption and expenditure below the basic-needs poverty line of MK 165,879—the adjusted R-squared for the ordinary least squares linear regression for income on consumption is 0.0155 (Table 3.10). In contrast, the regressions for the other categories of farming households have adjusted R-squared values between 0.21 and 0.25. Similarly, the correlation coefficients for the consumption and income variables for this sub-set of poor farming households, while statistically significant, are the lowest of all farming household categories. In sum, particularly for poor farming households, the relationship between consumption and income, at least as computed from variables in the IHS5 dataset, is quite weak. Much of the weakness in this relationship is methodological in origin with the measurement of net household income using the household survey data being especially challenging.

The coefficient for the regression on all farming households indicates that MK 1.00 of consumption is associated with MK 0.58 of income. If we use the regression equation from the full farming household sample with the consumption-based basic-needs poverty line of MK 165,879 from the poverty analysis of IHS5 (National Statistical Office 2021), we compute an income-based poverty line of MK 111,158 per capita per year. Using this income-based poverty line, the share of farming households with total income below this level is 62.5 percent (Table 3.11), or a poverty prevalence rate among households 16.2 percentage points above the 46.3 percent computed by NSO for farming households using a consumption-based approach (Table 3.3).

Table 3.11: Welfare measures drawn from income-based poverty analysis for categories of farming households, 2019/20

Characteristic	Farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Total annual net income per capita, mean, MK	168,210	234,280	91,660 ***	241,620	148,130 ***
Median	81,140	114,370	59,690	121,880	72,670
Poverty headcount, income-based poverty line developed from basic-needs consumption-based poverty line, % of individuals	66.4	50.9	79.5 ***	51.0	69.4 ***
Poverty prevalence, % of households	62.5	48.7	78.5 ***	45.9	67.1 ***
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: The income-based poverty line used here is MK 104,644 per capita per year.
Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively.
* = p < 0.10, ** = p < 0.05, *** = p < 0.01.
The assignment of households to the 'Non-poor' and 'Poor farming households' categories is based on the results of the consumption-based poverty analysis of the IHS5. Consequently, households in the 'Non-poor farming households' category may be found to be poor on the income basis used here.

We use the computed income-based poverty line of MK 111,158 per capita per year to create three categories of farming households—those that have both a net total per capita annual income and a net total per capita annual agricultural income above the income-based poverty line; those that have a net total annual income above the income-based poverty line, but a net annual agricultural income below it; and those that have net total annual income below it. The first category is made up of those households that are successfully meeting their basic needs through farming; the second consists of those who are more reliant on off-farm income sources to successfully meet their basic needs; while farming households in the third category are unable to generate sufficient income to cover the costs of the basic needs of their members whether through farming, off-farm employment, or a combination of the two. Profiles of the farming households in each category are presented in Table 3.12.

Table 3.12: Characteristics of farming households that do and do not obtain annual per capita net agricultural income above the computed income poverty line

Characteristic	Farming households	Total income & net agricultural income are both ABOVE income poverty line	Total income ABOVE, but net agric. income BELOW income poverty line	Total income BELOW income poverty line
Share of all farming households, %	100.0	6.2	31.3	62.5
Household size, members	4.5	3.7	4.2 ***	4.8
Dependents (under 15 or over 64 years of age)	2.3	1.6	1.8 ***	2.5
Household head age, years	44.5	51.5	45.2 ***	43.4
Under 35 years of age, % of households	32.2	20.7	31.6 ***	33.6
35 to 64 years of age, % of households	53.2	52.9	53.2	53.3
Over 64 years of age, % of households	14.7	26.3	15.2 ***	13.1
Female-headed households, % of households	32.4	22.1	26.6 **	36.3
Urban residents, % of households	8.3	6.2	15.8 ***	4.7
Northern region, % of households	13.0	24.5	15.5 ***	10.6
% share of farming households in region	100.0	11.6	37.3	51.1
Central region, % of households	41.4	47.6	40.9 **	41.0
% share of farming households in region	100.0	7.1	31.0	61.9
Southern region, % of households	45.6	27.8	43.6 ***	48.3
% share of farming households in region	100.0	3.8	30.0	66.3

Characteristic	Farming households	Total income & net agricultural income are both ABOVE income poverty line	Total income ABOVE, but net agric. income BELOW income poverty line	Total income BELOW income poverty line
No members with formal education, % of households	3.3	5.2	3.7	2.9
Some primary as maximum educ. level among members, %	60.0	50.3	50.6	65.7
Some secondary education, % of households	33.9	40.9	39.0	30.7
Beyond secondary education, % of households	2.7	3.6	6.7 ***	0.6
Rainfed cropping, % of households	92.5	95.5	88.2 ***	94.4
Irrigated cropping, % of households	20.9	30.8	18.0 ***	21.4
Permanent cropping (includes cassava), % of households	38.0	53.3	37.8 ***	36.6
Livestock husbandry in past year, % of households	51.4	84.0	53.6 ***	47.0
Mean cropland area used by household in past season, ha	0.740	1.511	0.741 ***	0.664
Mean per household member	0.191	0.497	0.205 ***	0.155
Northern region	0.238	0.499	0.232 ***	0.184
Central region	0.218	0.545	0.222 ***	0.178
Southern region	0.154	0.411	0.179 ***	0.129
Rented in some land, % households	10.4	13.9	11.6	9.5
Own livestock, % of households	47.7	78.9	50.0 ***	43.6
Tropical Livestock Units (TLU) owned, of those owning	0.594	1.879	0.513 ***	0.411
Rainfed crop production, % of households that produce				
Maize, all	87.0	90.9	82.4 ***	88.9
Local maize	49.7	41.9	44.5	53.1
Improved maize	42.9	55.2	43.1 ***	41.6
Rice	5.8	9.4	4.9 ***	5.9
Sorghum	8.9	5.3	7.4 **	10.0
Cassava (permanent crop production)	11.6	17.5	10.8 ***	11.5
Sweet potato	5.8	10.1	5.3 ***	5.6
Groundnut	25.4	40.7	25.2 ***	24.0
Bean	16.2	26.6	16.0 ***	15.3
Cowpea	4.8	4.7	4.2	5.1
Soyabean	14.8	23.5	14.5 ***	14.0
Pigeonpea	27.6	20.2	24.7 **	29.8
Tobacco	5.1	19.4	4.3 ***	4.0
Total annual net income for household made up by agricultural income, mean percentage share	30.3	65.8	15.8 ***	34.0
Median of percentage share	23.2	70.3	9.1	29.6
Received any non-agricultural income, % of households	98.4	95.7	100.0 ***	97.9
Have members engaged in temporary employ. (*ganyu*) , %	73.3	49.1	68.2 ***	78.3
Have members with longer-term wage employment, %	15.3	13.0	29.4 ***	8.5
Have a household enterprise, %	35.7	33.0	43.4 ***	32.0
Have members who receive regular income payments, %	63.6	70.2	68.4	60.5
Have memb. received social safety net or similar income, %	35.5	39.7	35.4 *	35.2
Observations	*9,570*	*640*	*3,154*	*5,776*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: The income-based poverty line used here MK 111,158 per capita per year. Asterisks on the statistics for 'Total income ABOVE, but net agric. income BELOW income poverty line' present the statistical significance of differences in the statistic between these households and households in the 'Total income & net agricultural income both ABOVE income poverty line' category. * = $p < 0.10$, ** = $p < 0.05$, *** = $p < 0.01$. Tropical Livestock Units based on following conversion factors: poultry = 0.01 TLU; calf = 0.3; steer or heifer = 0.7; cow = 0.7; ox or bull = 0.8; donkey, mule, or horse = 0.6; goat = 0.1; sheep = 0.1; pig = 0.2.

We find that just over 6 percent of households are able to generate enough income from their farming to meet their basic needs, when defined by the computed income-based poverty line. Recall that the four-category typology of all Malawian households presented in Chapter 2 showed that only 7.0 percent of households were categorized as commercially oriented smallholder farmers. While the criteria used in that typology and that used for Table 3.12 are very different, the low

share of households falling into the most productive farming categories in the two typologies confirms that it is very challenging for households in Malawi to meet their basic needs through farming. Obtaining sufficient off-farm employment is now critical to the welfare of most farming households.

In general, the characteristics of the households in each income-based category shown in Table 3.12 reflect what was seen in other tabulations in this report based on consumption-based poverty and on cropland holding size. Here we highlight several:

- Farming households with relatively more members, particularly more dependents, are unlikely to obtain net total per capita annual income above the income-based poverty line. Female-headed households similarly are disadvantaged.
- Farming households with older heads of household—particularly those 65 years of age and older—are more likely to obtain sufficient income from their farming alone to meet their basic needs. We presume that this reflects their greater accumulation of cropland, productive assets, farming and agricultural marketing knowledge, and social capital relative to farming households with younger heads. Farming households with heads aged under 35 years that have total incomes above the poverty line are considerably more likely to rely on off-farm income than households with older heads and total incomes above the income-based poverty line.
- Farming households in the Northern region are relatively more likely than farming households in the Central and Southern regions to be able to generate annual net income from farming above the income-based poverty line. However, the largest concentration of farming households able to do so is in the Central region. Farming households in the Northern region are also more likely than farming households in the other two regions to combine agricultural and off-farm income to successfully meet their basic needs. Farming households in the Southern region are disproportionately overrepresented in the category with total annual income below the income-based poverty line.
- Farming households that do not obtain incomes above the poverty line tend not to have any members whose education extended beyond some primary school. Households that rely on off-farm income sources to successfully meet their basic needs are more likely than other farming households to have members that received some post-secondary education.
- Cropland holding size is strongly associated with farming households that obtain agricultural incomes above the income-based poverty line. Average per capita cropland holdings for such households are more than double those of other farming households across all three regions of Malawi. Livestock husbandry is also strongly associated with such farming households.
- Farming households that obtain agricultural incomes above the income-based poverty line are more likely than other households to produce improved maize, groundnut, soyabean, and tobacco.
- Over three-quarters of farming households that do not obtain incomes above the poverty line reported having members that engaged in *ganyu* temporary employment.
- Farming households that combine agricultural and off-farm income to successfully meet their basic needs are relatively more likely than others to have members with long-term wage employment or to operate a household enterprise.

Although these poverty results based on household income should be viewed as considerably less accurate than the IHS5 consumption-based poverty analysis results, in the next chapter we use the income-based poverty line as a component of assessing whether many poor farming households in Malawi will be able to escape poverty through higher crop productivity on the land they farm. While

our results should be viewed as indicative rather than exact, the analysis will provide additional guidance on whether higher levels of production can be expected to provide sufficient income to poor farming households so that they can meet all of their basic needs. For most, even substantially higher crop productivity on their generally small cropland holdings will not enable them to escape poverty.

The key insight obtained from this chapter is that most farming households in Malawi now are unable to rely solely or even primarily on their own farming to meet their basic needs. The average share of total household income coming from agriculture is less than one-third for all farming households. At a 43.8 percent share, only for those farming households with larger cropland holdings does the share of total income coming from agriculture approach half. Crop production remains a critical component of the livelihoods of the many Malawian households that engage in farming, but increasingly these households must also pursue other sources of income. For most, under current productivity levels on their relatively small cropland holdings, their farming generates too little income to enable them to meet their basic needs. Non-agricultural or off own-farm income sources are more important for them in meeting those needs than the returns from their own farm production.

CHAPTER 4. HOUSEHOLD FARMING TO KEEP OUT OF POVERTY—A CROP PRODUCTIVITY ANALYSIS

This chapter continues to examine the issue that motivated the previous chapter—how probable it is that farming households in Malawi will be able to rely on their agricultural production to generate the income they require to meet their basic needs and escape from or avoid falling into poverty. In Chapter 3 we examined the sources of income for farming households with a specific focus on determining how significant a share of their total income was made up by their agricultural production. In this chapter, we focus on the crop productivity levels of these farming households to assess whether with increased productivity above current levels many more farming households will be able to meet their basic needs.

Our assumption at the start of the analysis of the IHS5 dataset, and likely that of most observers, was that the agricultural activities of farming households in Malawi are likely the dominant livelihood strategies that they pursue to meet their basic needs. However, as reported in the previous chapter, we found that this is not now the case. Income from other sources than their own farming makes up the majority of the income of most farming households. For most, their current levels of production on relatively small cropland holdings, using relatively limited amounts of commercial inputs, and primarily producing crops under rainfed conditions means that they are unable under their current productivity levels to meet their basic needs solely through their own farming.

However, might more farming households in Malawi be better able to meet their basic needs with their current cropland holdings by raising their productivity levels so that they realize more income from their farming? If such productivity improvements significantly increase the agricultural income they obtain, many of these households might see their consumption levels rise above the basic-needs poverty line, allowing poor farming households to escape poverty. (However, we recognize that whether increased production will result in increased agricultural income also will be determined to a significant extent by market performance factors—an issue not examined here.) In this chapter, the crop productivity levels of farming households are estimated in some detail using the IHS5 dataset.[9] Having established what are their current yields, we then consider whether raising yields to levels much closer to the potential maximum yields for those crops in Malawi will result in significant improvements in welfare for farming households.

Crop productivity and sales of farming households

This section of the analysis focuses on current crop-specific productivity levels of farming households in Malawi as reported in IHS5. We focus on the twelve most commonly produced field crops—local maize, improved maize, rice, sorghum, cassava, sweet potato, groundnut, bean, cowpea, soyabean, pigeonpea, and tobacco.[10] For these crops, IHS5 records production of each on at least 500 plots across the IHS5 sample of 9,570 farming households. Detailed tables on each of these crops are presented in this section.

[9] Income from livestock is not considered in this chapter, even though it provides 31 percent of the agricultural income for all farming households and 23 percent of that for poor farming households (Table 3.7). The determinants of higher livestock productivity are significantly different than those for improving crop productivity. A separate chapter involving a different set of analyses would be required to adequately consider whether and how livestock productivity levels for farming households in Malawi could be significantly improved.

[10] Other crops that are relatively commonly cultivated include tomato, *tanaposi* (green leafy brassicas), *nkhwani* (green leafy non-brassicas), mango, and banana. However, they were not considered here. The first two are primarily grown under irrigation in small horticultural plots, while the other three tend to be grown in combination with other crops under relatively low intensities. All merit closer study to explore the potential for increasing their productivity and commercialization by farming households.

Table 4.1: Crops produced by farming households under different farming regimes, 2019/20, percent of farming households

Farming regime:	Rainfed					Irrigated					Permanent				
Crop	All	Non-poor	Poor	Larger landholdg.	Smaller landholdg.	All	Non-poor	Poor	Larger landholdg.	Smaller landholdg.	All	Non-poor	Poor	Larger landholdg.	Smaller landholdg.
Maize, all	87.0	84.9	89.4 ***	94.6	84.9 ***	8.5	7.7	9.5 **	11.6	7.7 ***	-	-	-	-	-
Local maize	49.7	47.0	52.8 ***	51.3	49.3	2.7	2.3	3.2 **	3.6	2.4 **	-	-	-	-	-
Improved maize	42.9	43.9	41.8 *	51.0	40.7 ***	5.9	5.5	6.4	8.1	5.3 ***	-	-	-	-	-
Rice	5.8	5.9	5.7	4.8	6.1 **	0.5	0.6	0.4	0.6	0.4	-	-	-	-	-
Sorghum	8.9	7.7	10.2 ***	9.5	8.7	-	-	-	-	-	-	-	-	-	-
Cassava	0.2	0.3	0.2	0.3	0.2	0.0	0.0	0.0	-	0.0	11.6	13.2	9.8 ***	9.9	12.1 **
Sweet potato	5.8	6.0	5.5	9.3	4.8 ***	2.3	2.3	2.4	2.6	2.2	-	-	-	-	-
Groundnut	25.4	25.7	25.0	44.5	20.1 ***	0.0	0.0	0.0	-	0.0	-	-	-	-	-
Bean	16.2	18.3	13.8 ***	19.5	15.3 ***	1.9	2.0	1.8	2.7	1.7 **	-	-	-	-	-
Cowpea	4.8	4.5	5.0	4.4	4.9	0.2	0.3	0.2	0.4	0.2	-	-	-	-	-
Soyabean	14.8	14.1	15.5	28.7	11.0 ***	0.0	0.0	0.0	-	0.0	-	-	-	-	-
Pigeonpea	27.6	27.5	27.7	20.8	29.4 ***	0.0	0.0	0.0	-	0.0	-	-	-	-	-
Tobacco	5.1	5.5	4.5 **	13.2	2.8 ***	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Finger millet	1.3	1.3	1.2	2.6	0.9 ***	-	-	-	-	-	-	-	-	-	-
Pearl millet	1.4	0.9	1.9 ***	1.4	1.3	-	-	-	-	-	-	-	-	-	-
Groundbean	1.1	1.1	1.1	2.0	0.9 **	-	-	-	-	-	-	-	-	-	-
Irish potato	1.3	1.6	0.9 **	1.9	1.1 **	2.6	3.5	1.6 ***	3.7	2.3 **	-	-	-	-	-
Cotton	0.9	0.9	0.9	1.8	0.7 ***	-	-	-	-	-	-	-	-	-	-
Sunflower	1.2	1.2	1.1	2.5	0.8 ***	-	-	-	-	-	-	-	-	-	-
Sugar cane	0.6	0.7	0.4	0.8	0.5	0.5	0.6	0.4	0.7	0.5	1.1	1.2	0.9	2.3	0.7 ***
Cabbage	0.1	0.1	0.0	0.1	0.1	0.5	0.6	0.4	0.7	0.4	-	-	-	-	-
Tanaposi (green leafy brassicas)	0.2	0.3	0.1 *	0.2	0.2	4.8	4.8	4.8	6.1	4.5 *	-	-	-	-	-
Nkhwani (leafy non-brassicas)	47.0	44.5	49.9 ***	50.1	46.1 **	3.0	2.5	3.5 **	3.2	2.9	-	-	-	-	-
Okra	1.3	1.2	1.3	1.1	1.3	0.3	0.3	0.3	3.7	2.6	-	-	-	-	-
Tomato	1.1	1.0	1.2	1.1	1.1	4.6	4.9	4.3	6.6	4.1***	-	-	-	-	-
Onion	0.0	0.1	0.0	0.0	0.0	0.7	0.9	0.6	0.8	0.7	-	-	-	-	-
Pea	2.8	2.9	2.8	2.8	2.9	0.6	0.7	0.6	0.6	0.6	-	-	-	-	-
Mango	-	-	-	-	-	-	-	-	-	-	23.6	24.7	22.4 **	30.3	21.8 ***
Citrus	-	-	-	-	-	-	-	-	-	-	2.8	3.8	1.7 ***	5.2	2.2 ***
Papaya	-	-	-	-	-	-	-	-	-	-	3.8	4.4	3.1 **	3.7	3.9
Banana	-	-	-	-	-	-	-	-	-	-	8.2	9.1	7.3 ***	15.1	6.4 ***
Avocado	-	-	-	-	-	-	-	-	-	-	2.9	3.7	1.9 ***	3.2	2.8
Guava	-	-	-	-	-	-	-	-	-	-	3.5	4.2	2.6 ***	4.3	3.2
Masuku (*Uapaca kirkiana*)	-	-	-	-	-	-	-	-	-	-	2.0	2.8	1.2 ***	1.8	3.1 **
Masau (*Ziziphus mauritiana*)	-	-	-	-	-	-	-	-	-	-	0.9	0.7	1.0	1.1	0.8
Other crops	2.6	2.9	2.3	2.4	2.7	0.4	0.5	0.3 **	0.4	0.4	4.5	5.4	3.4 ***	0.7	0.4 ***

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Observations: all farming households: 9,570; non-poor: 5,457; poor: 4,113; larger landholdings: 1,985; smaller landholdings: 7,585. Of all farming households, 92.5 percent engage in rainfed cropping, 20.9 percent in irrigated cropping; and 38.0 percent have permanent crops (Table 3.4). "Other crops" include cucumber, sesame, velvet bean (*Mucuna pruriens*), and hyacinth bean (*Lablab purpureus*), among others. Dash ("-") indicates no crop production reported. Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. * = p < 0.10, ** = p < 0.05, *** = p < 0.01.

Table 4.1 provides a relatively detailed profile of the crops produced by farming households in Malawi under the three different farming regimes—rainfed, irrigated, and permanent cropping. The preeminence of maize in the mix of crops grown by farming households is clear. The other ten crops considered in detail in this section constitute a second tier of crops in terms of importance in the cropping systems of farming households, while all other crops fall into a third tier.

The average number of crops produced by farming households in each category under the three different farming regimes is presented in Table 4.2. Simpson's Index of Diversity, which is weighted by the relative area planted to each crop listed in Table 4.1, is computed for the cropping pattern of all farming households and for each category of farming household (Simpson 1949).[11] In computing both the simple average of crops produced and the diversity index, no consideration is paid to whether a crop was intercropped or planted at a very low density.

Table 4.2: Average number of crops produced and Simpson's Index of Diversity for cropping patterns under different cropping regimes, for farming households that produced crops under a given regime, 2019/20

	Cropping regime	All farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Crops grown, mean number	Rainfed	2.85	2.90	2.80 ***	3.24	2.74 ***
	Irrigated	1.52	1.53	1.50	1.56	1.50
	Permanent	1.71	1.80	1.59 ***	1.75	1.70
Simpson's Index of Diversity	Rainfed	0.799	0.804	0.793	0.811	0.787
	Irrigated	0.848	0.858	0.827	0.842	0.849
	Permanent	0.743	0.775	0.683	0.729	0.745
Observations	*Rainfed*	*8,697*	*4,824*	*3,873*	*1,960*	*6,737*
	Irrigated	*1,879*	*1,040*	*839*	*494*	*1,385*
	Permanent	*3,789*	*2,283*	*1,506*	*990*	*2,799*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: The total number of crops considered under each regime was 26 for rainfed, 20 for irrigated, and 11 for permanent. Local and improved maize was considered a single crop.
The value of Simpson's Index of Diversity ranges between 0 and 1, with greater values indicating greater crop diversity. In computing the index, double-counting of the planted area occurred for crops planted in the same plot as intercrops.
Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. Such comparisons of differences were not done for Simpson's Index of Diversity.

Landholding size appears as an important determinant of whether households grow other crops than maize under rainfed production. Examining Table 4.1, between the larger and smaller landholding categories of farming households, there are statistically significant differences in the share of farming households that grow a rainfed crop for most of the crops considered in some detail in this section. This pattern is confirmed in the statistics presented in Table 4.2. Households with larger landholdings are more likely to produce hybrid maize, sweet potato, groundnut, bean, soyabean, and tobacco. Those with smaller landholdings are more likely to grow any maize, rice, cassava (under permanent cropping), and pigeonpea. Only for local maize, sorghum, and cowpea is there no statistically significant difference in the share of households that grow the crop between the larger and smaller landholding categories. In contrast, poverty status is a considerably less salient driver of the cropping choices of farming households. Statistically significant differences in the share of households growing a particular crop between

[11] Simpson's Index of Diversity is the mathematical complement of Simpson's Index (D)—that is, (1-D). $D = \sum_{i=1}^{S} \left(\frac{n_i}{N}\right)^2$, where S is the number of crops, n_i is the total area devoted to the i^{th} crop, and N, the sum of n_i, is the total area under all crops. The value of Simpson's Index of Diversity ranges between 0 and 1, with greater values indicating greater crop diversity.

the poor and non-poor categories are seen for a smaller number of crops than is the case for farming households categorized by landholding size. However, non-poor farming households grow significantly more crops on average under rainfed and permanent cropping than do poor farming households.

There are no significant differences in the number of crops produced under irrigation between farming household categories. This is the case despite the trend analysis for the period 2010/11 to 2019/20 presented in Chapter 2 showing that there was almost a doubling to over 20 percent in the share of farming households that engaged in at least some irrigated production over this period (Table 2.4). However, despite this expansion, the income analysis in Chapter 3 showed that irrigated production, relative to rainfed farming, permanent cropping, and livestock and livestock products, provided the smallest share of agricultural income overall at less than 3 percent of total agricultural income (Table 3.7). Moreover, more than a third of households producing irrigated crops reported a net loss from their irrigated cropping.

Table 4.1 shows that the types of crops that are irrigated are quite different from those grown under rainfed production. There are four general categories of crops grown under irrigation by farming households in Malawi—maize,[12] sweet potato and Irish potato, vegetables, and other crops, which includes smaller numbers of irrigated plots of rice, grain legumes (bean, pea, and cowpea), sugarcane, and a few other crops. To obtain a better understanding of patterns of irrigated crop production, in Text Box 4.1 we use the three categories of specific irrigated crops to examine in a more disaggregated manner irrigated crop production by farming households across Malawi and the net returns they obtain from that production. The highest net returns from irrigated production reported in IHS5 generally were obtained by households producing Irish potato and sweet potato. The net returns from the production of other irrigated crops were considerably smaller.

Table 4.3 presents statistics demonstrating the importance of maize in the cropping patterns of farming households in Malawi. Almost 9 out of 10 farming households produce maize, whether unimproved local varieties or improved commercial varieties. Over 70 percent of the seasonal cropland (rainfed and irrigated) used by all farming households is planted to maize, while farming households that produce any maize devote 80 percent of their land to the crop. Farming households with smaller landholdings devote more of their cropland to maize than do households with relatively larger amounts of land. This suggests that there is a maize-first element in the crop mix choices of farming households—adding other crops to the mix of crops a farming household plans to produce in the upcoming season appears to be considered only after the household's maize requirements are catered for in the cropping plan.

[12] While maize is an important irrigated crop, observation suggests that an important share of maize grown in the dry season is harvested while green and is sold or consumed on the cob. However, the IHS5 dataset does not distinguish maize produced or sold on the cob from maize produced or sold as grain.

Text Box 4.1. Returns to irrigated farming by farming households in Malawi, 2019/20—a crop-specific analysis

The finding of the income-focused analysis of irrigated farming in Chapter 3 of limited income for households out of their irrigated production is confirmed in the crop-specific analysis of irrigated crop production. The exception is for some producers of irrigated sweet potato and Irish potato. The highest net returns from irrigated production reported in IHS5 generally were obtained by households producing these crops.

	Any irrigated crops	Irrigated maize	Irrigated sweet potato and Irish potato	Irrigated vegetables
Grow crop under irrigation, % of HH engaged in irrigation	100.0	40.9	23.4	52.6
Female-headed, % of households engaged in irrigation	23.8	25.6	26.3	19.7
Age of head of HH engaged in irrigation, mean, years	43.9	44.9	43.0	43.3
Distance of farming households engaged in irrigation to nearest urban center, mean, km	22.3	24.5	21.3	21.8
Districts with largest share of producers, top four in order	Lilongwe (rural), Mchinji, Mzimba, Dedza	Lilongwe (rural), Mchinji, Chikwawa, Dowa	Dedza, Mchinji, Lilongwe (rural), Ntcheu	Lilongwe (rural), Mzimba, Thyolo, Zomba (rural)
Grow other irrigated crops than those in category, % of those engaged in irrigated cropping crops in category	na	57.3	36.2	40.6
Stream or other gravity-fed source of irrigation water,%	6.8	8.2	9.4	4.9
Well as source of irrigation water,%	67.6	66.2	56.8	75.3
No irrigation, rely on residual soil moisture, %	25.6	25.6	33.8	19.8
Irrigated cropland area under crops in category, mean per household engaged in irrigation of crop, ha †	0.199	0.151	0.154	0.133
Irrigated crop net income per capita, for those engaged in irrigated cropping of crops in category, mean, MK	4,690	3,030	6,660	1,120
Irrigated cropping net income per ha of irrigated crops in category, mean, MK	203,690	88,150	379,630	38,370
Reported net loss from irrigated crops in category, % engaged in irrigated cropping of crops in category	37.3	21.0	21.7	63.5
Observations, irrigated farming households	*1,879*	*785*	*451*	*975*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: † In computing the mean total area under any irrigated crops, unlike Table 3.5, intercropping on a plot is not taken into account. This results in some double-counting of the same crop plot in computing the mean area under irrigation per household.
Distance to urban center is based on travel distance to nearest center with a population of 20,000 or larger.
'Irrigated vegetables' include cabbage, *tanaposi*, *nkhwani*, okra, tomato, onion, carrot, cucumber, eggplant, and lettuce. 'na' = not applicable.

Households producing maize and vegetables under irrigation realize much lower returns. Many irrigated vegetable producers, in particular, realized net losses, although these losses are not substantial—the median loss for all irrigated vegetable producers that realized a net loss was MK 19,630. The major costs for irrigated vegetable production are for commercial seed, pesticide, and inorganic fertilizer, with inorganic fertilizer being the largest cost, on average, by far. If poor yield response to the application of inorganic fertilizer on irrigated vegetables accounts for why many irrigated vegetable farmers did not realize any benefit from their farming, this points to the need for more investment in agronomic research on irrigated farming in Malawi—particularly for vegetables.

Figures in the table suggest that access to markets is one of the drivers of production patterns for irrigated sweet potato and Irish potato and for irrigated vegetables. Households producing these crops are situated somewhat closer to urban centers than are households producing other crops under irrigation. We also see that for vegetables, three of the four districts with the largest share of producers are peri-urban districts. Agro-ecological conditions also are important in determining production patterns. Irish potato production in Malawi is best suited for production at higher elevations, as in Dedza and Ntcheu.

Source: Authors' analysis.

Table 4.3: Total maize production and sales, 2019/20

Characteristic	All farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Maize (any) production, % of households	88.4	86.2	91.1 ***	95.1	86.6 ***
Cropped area planted to any maize, all farming households, percentage share of total seasonally cropped area	70.6	68.3	73.2 ***	63.6	72.5 ***
Cropped area planted to any maize, maize producing households, percentage share of total seasonally cropped area	79.8	79.3	80.3	66.9	83.7 ***
Total area planted by household to any maize, sum of rainfed and irrigated, maize producing households, average, ha	0.489	0.503	0.473 **	0.842	0.383 ***
Total area per capita planted by household to any maize, sum of rainfed and irrigated, maize producing households, average, ha	0.129	0.160	0.095 ***	0.280	0.084 ***
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively.
* = p < 0.10, ** = p < 0.05, *** = p < 0.01.

Households with smaller landholdings that produce maize devote only one-sixth of their cropland to other crops than maize, while those with larger landholdings devote one-third. However, on both a household basis and a per capita basis, non-poor farming households and those with larger landholdings plant larger areas of maize than do households that are poor or with smaller landholdings, respectively.

Maize production by farming households is disaggregated in Table 4.4 and Table 4.5 by whether the seed used was a traditional local variety or an improved commercial variety, respectively. Few IHS5 farming households reported growing both types of maize—Table 4.1 shows that, while 87.0 percent of all farming households grew some sort of maize, 49.7 percent reported growing local maize and 42.9 percent reported growing improved maize. Less than 10 percent of farming households reported growing both types of maize.

Table 4.4: Local maize production and sales, rainfed, 2019/20

Characteristic	All farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Local maize production, rainfed, % of households	49.7	47.0	52.8 ***	51.3	49.3
Irrigated local maize production, % of households	2.7	2.3	3.2 **	3.6	2.4 **
Rainfed cropped area planted to local maize, all farming households, percentage share	39.4	37.2	42.0 ***	34.7	40.7 ***
Rainfed cropped area planted to local maize, local maize producing households, percentage share	79.3	79.0	79.6	67.6	82.7 ***
Total area planted by household to rainfed local maize, local maize producing households, average, ha	0.431	0.434	0.428	0.717	0.350 ***
Total area per capita planted by household to rainfed local maize, local maize producing households, average, ha	0.122	0.154	0.089 ***	0.269	0.080 ***
Monocropping of local maize, households for which all rainfed local maize plots did not have intercrops, %	19.7	19.8	19.5	23.7	18.5 ***
Inorganic fertilizer use on rainfed local maize, share of households that grew local maize that applied fertilizer to at least one plot, %	65.2	71.3	58.8 ***	70.3	63.7 ***
Nitrogen application, for those using fertilizer, mean, kgN/ha	81.0	93.5	65.2 **	70.8	84.1
Phosphorus application, for those using fertilizer, mean, kgP_2O_5/ha	23.7	30.8	14.9 ***	22.7	24.1
Sulfur application, for those using fertilizer, mean, kgS/ha	4.5	5.8	2.8 ***	4.3	4.5
Rainfed local maize yield, average, kg/ha	1,050	1,200	894 ***	886	1,096 ***
Northern region	1,161	1,279	913 ***	946	1,271 **
Central region	1,075	1,290	911 ***	972	1,114 *
Southern region	1,012	1,131	878 ***	760	1,060 ***
Median, national	720	832	630	589	756
90^{th} percentile, national	2,100	2,520	1,726	1,890	2,169
Gross value of rainfed local maize produced, MK/ha					
Valued at median of regional producer prices reported, average	155,690	178,610	132,030 ***	128,800	163,360 ***
Median	106,770	123,550	92,440	86,200	111,900
Valued at 90^{th} percentile of real national consumer prices reported, average	573,410	655,680	488,440 ***	484,300	598,810 ***
Median	393,440	454,690	344,260	321,630	413,120
Costs of rainfed local maize production reported (excludes household labor), average, MK/ha	47,940	66,580	28,680 ***	66,500	42,650 **
Median	11,340	18,410	7,520	14,960	10,710
Sold any local maize, % of rainfed local maize producing households	14.9	17.9	11.7 ***	24.1	12.3 ***
Share of rainfed local maize harvest sold, for households that sold any	29.1	30.4	27.2	33.0	27.0 ***
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. This is not done for medians or percentiles. * = $p < 0.10$, ** = $p < 0.05$, *** = $p < 0.01$. High outliers for cost of production were winsorized to a maximum of three times the producer price value of production for the household.

Table 4.5: Improved maize production and sales, rainfed, 2019/20

Characteristic	All farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Improved maize production, rainfed, % of households	42.9	43.9	41.8 *	51.0	40.7 ***
Irrigated improved maize production, % of households	5.9	5.5	6.4	8.1	5.3 ***
Cropped area planted to rainfed improved maize, all farming households, percentage share	31.5	31.7	31.4	29.6	32.1 **
Cropped area planted to rainfed improved maize, improved maize producing households, percentage share	73.5	72.1	75.1 ***	58.0	78.8 ***
Total area planted by household to rainfed improved maize, improved maize producing households, average, ha	0.478	0.493	0.459 **	0.803	0.366 ***
Total area per capita planted by household to rainfed improved maize, improved maize producing households, average, ha	0.117	0.141	0.088 ***	0.238	0.076 ***
Monocropping of rainfed improved maize, households for which all rainfed improved maize plots did not have intercrops, %	28.0	29.3	26.4	33.6	26.0 ***
Inorganic fertilizer use on rainfed improved maize, households that grew improved maize that applied fertilizer to at least one plot, %	75.0	81.3	67.4 ***	82.4	72.5 ***
Nitrogen application, for those using fertilizer, mean, kgN/ha	101.8	113.5	84.7 **	71.1	113.8 ***
Phosphorus application, for those using fertilizer, mean, kgP_2O_5/ha	32.1	35.9	26.4	21.2	36.3 ***
Sulfur application, for those using fertilizer, mean, kgS/ha	6.1	6.8	5.0	4.0	6.8 **
Rainfed improved maize yield, average, kg/ha	1,381	1,693	1,000 ***	1,328	1,398
Northern region	1,619	1,735	1,253 ***	1,519	1,681
Central region	1,482	1,910	1,098 ***	1,454	1,494
Southern region	1,169	1,449	802 ***	874	1,226 ***
Median, national	934	1,186	754	929	945
90th percentile, national	2,801	3,437	1,980	2,821	2,801
Gross value of rainfed improved maize produced, MK/ha					
Valued at median of regional producer prices reported, average	203,120	250,000	145,990 ***	191,560	207,120
Median	139,060	175,030	111,380	135,380	140,030
Valued at 90th percentile of real national consumer prices reported, average	754,310	924,730	546,610 ***	725,770	764,190
Median	510,020	648,030	411,940	507,340	516,400
Costs of rainfed improved maize production reported (excludes household labor), average, MK/ha	86,420	120,850	44,460 ***	114,590	76,750
Median	29,370	50,180	15,390	39,710	26,930
Sold any improved maize, % of rainfed improved maize producing households	23.5	28.2	17.8 ***	36.8	18.9 ***
Share of rainfed improved maize harvest sold, for households that sold any	34.8	36.2	32.3 *	37.9	32.8 **
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. This is not done for medians or percentiles. * = $p < 0.10$, ** = $p < 0.05$, *** = $p < 0.01$. High outliers for cost of production were winsorized to a maximum of three times the producer price value of production for the household.

We do not provide detailed discussions on any of the tables for the crops considered in this section. However, we summarize some salient differences between local and improved maize production:

- Households producing improved maize devote a smaller share of their cropland to the crop than do those producing local maize. However, as improved maize producing households have larger landholdings, the average area planted to improved maize by a household growing the crop is greater than the average area planted to local maize by households growing that crop.
- Both types of maize are commonly grown together with other crops. However, improved maize is more commonly grown in a pure stand (28 percent of households) than is local maize (20 percent).
- Inorganic fertilizer is used on both types of maize—three-quarters of households growing improved maize applied inorganic fertilizer to the crop, while two-thirds of those growing local maize did so. However, higher rates of nutrients are applied to improved maize—25 percent higher rates in the case of nitrogen. Non-poor households apply significantly higher rates of all nutrients to local maize and significantly higher rates of nitrogen to improved maize than do poor households. However, while there is no significant difference in the rates of nutrients applied to local maize between farming households with larger cropland holdings and those with smaller holdings, those with smaller landholdings apply significantly higher rates of nutrients to improved maize than do households with larger landholdings.
- Average yields and values of production for improved maize are about 30 percent higher than those for local maize. These differences are smaller in the Southern region at only 15 percent higher.
- The costs of production per hectare at the mean are 80 percent higher for improved maize relative to local maize. However, there is considerable variation in the level of these costs—the costs of production per hectare at the median are 160 percent higher for improved maize.
- Across all farming households growing maize, the major cost of production is inorganic fertilizer. When adjusted for plot size, the average cost of inorganic fertilizer per hectare of maize planted for non-poor farming households is between 100 percent (for local maize) and 150 percent (for improved maize) higher than for poor farming households. This difference is driven in part by the initial decision by the household whether or not to use any inorganic fertilizer—which non-poor farming households are more likely to do. However, considering the inorganic fertilizer costs only of those that decide to use inorganic fertilizer on their maize, non-poor farming households bear costs for inorganic fertilizer on a per hectare basis that are almost 100 percent higher than those of poor farming households. Further analysis will be required to better understand these cost differences, including exploring whether there is differential access to subsidized fertilizer across farming households in the two groups and any differences in fertilizer use efficiency—kg maize per kg fertilizer applied on a per hectare basis relative to the yield of unfertilized maize.

  The other costs of production considered are for renting-in land, hiring-in labor, organic fertilizer, herbicides, pesticides, and seed. Significant differences are seen between poor and non-poor farming households for use of hired-in labor on their maize crop, which non-poor households are more likely to employ. For improved maize seed, non-poor household bear costs per hectare about double those poor households incur. However, average per hectare costs for all farming households producing maize for hiring-in labor (MK 4,600) and improved seed (MK 14,700) are considerably lower than those incurred for inorganic fertilizer (MK 47,900).

  While farming households with larger landholdings generally have higher maize production costs per hectare than households with smaller landholdings, there is considerable variance in the

types and levels of production costs within the two categories. The contrasts in production costs for farming households grouped by cropland holding size are not as well defined as when the households are grouped by poverty status.

- Most households retain the maize they produce, whether it is local or improved. Fifteen percent of local maize producers sold a portion of their maize harvest, while just under one-quarter of improved maize producers did so.

The production of rice by farming households is described in Table 4.6. Rice production is concentrated in lowland areas along the lakeshore, which is ecologically well-suited for the crop. Rice producers tend to specialize in the crop, growing it intensively without intercrops. The small share of farming households that grow the crop devote almost half of their cropland to it. Relative to maize, rice producers obtain considerably higher yields. This is the case even though few rice producers use inorganic fertilizer. Much of the rice produced is sold.

Table 4.6: Rice production and sales, rainfed, 2019/20

Characteristic	All farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Rice production, rainfed, % of households	5.8	5.9	5.7	4.8	6.1 **
Cropped area planted to rice, rainfed rice producing households, percentage share	46.3	49.8	42.0 **	37.4	48.3 ***
Total area planted by household to rice, rainfed rice producing households, average, ha	0.241	0.278	0.196 ***	0.395	0.207 ***
Monocropping of rice, households for which all rice plots during rainy season did not have intercrops, %	95.5	95.2	95.8	95.2	95.5
Inorganic fertilizer use on rice, share of households that grew rainfed rice that applied fertilizer to at least one plot, %	19.1	24.9	12.0 ***	14.8	20.0
Rice yield, average, kg/ha	2,199	2,280	2,101	1,551	2,341 ***
Median, national	1,564	1,564	1,589	1,159	1,655
90th percentile, national	4,420	4,785	4,066	3,414	4,769
Gross value of rice produced, MK/ha					
Valued at median of regional producer prices reported, average	539,040	560,350	513,070	379,610	573,930 ***
Valued at 90th percentile of real regional consumer prices reported, average	2,068,290	2,161,980	1,954,090	1,452,270	2,203,030 ***
Costs of rice production reported (excludes household labor), MK/ha	75,600	109,730	34,000 ***	46,140	82,030 **
Sold any rice, % of rainfed rice producing households	63.4	63.7	63.1	59.6	64.3
Share of rainfed rice harvest sold, for households that sold any	62.3	62.1	62.5	66.8	61.4
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. This is not done for medians or percentiles. * = p < 0.10, ** = p < 0.05, *** = p < 0.01. High outliers for cost of production were winsorized to a maximum of three times the producer price value of production for the household.

Although sorghum is much less commonly grown than maize, it is the second most commonly produced cereal in Malawi, grown by about 9 percent of farming households (Table 4.7). However, most sorghum is grown as an intercrop, rather than in pure stand. In consequence, overall yields are low—at about 300 kg/ha, the average yield reported is less than one-third that for local maize. Few farming households producing sorghum sell any of their harvest.

Table 4.7: Sorghum production and sales, rainfed, 2019/20

Characteristic	All farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Sorghum production, rainfed, % of households	8.9	7.7	10.2 ***	9.5	8.7
Cropped area planted to sorghum, rainfed sorghum producing households, percentage share	73.6	72.0	75.0	64.4	76.4 ***
Total area planted by household to sorghum, rainfed sorghum producing households, average, ha	0.406	0.413	0.399	0.661	0.329 ***
Monocropping of sorghum, households for which all rainfed sorghum plots did not have intercrops, %	13.7	11.7	15.4	17.9	12.4 **
Inorganic fertilizer use on sorghum, share of households that grew rainfed sorghum that applied fertilizer to at least one plot, %	50.4	51.8	49.3	46.3	51.7
Sorghum yield, average, kg/ha	305	310	301	244	324
Median, national	163	161	167	143	171
90th percentile, national	714	668	771	482	791
Gross value of sorghum produced, MK/ha					
Valued at median of national producer prices reported, average	29,370	29,840	28,960	23,450	31,150
Valued at 90th percentile of real national consumer prices reported, average	180,120	182,980	177,600	143,800	190,990
Costs of sorghum production reported (excludes household labor), MK/ha	12,730	16,070	9,780 **	11,730	13,030
Sold any sorghum, % of rainfed sorghum producing households	9.9	12.2	7.9 *	11.4	9.5
Share of rainfed sorghum harvest sold, for households that sold any	47.0	44.7	50.0	43.9	48.1
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. This is not done for medians or percentiles. * = $p < 0.10$, ** = $p < 0.05$, *** = $p < 0.01$. High outliers for cost of production were winsorized to a maximum of three times the producer price value of production for the household.

Among the staple food crops, cassava is the second most important after maize in terms of the share of farming households producing the crop (Table 4.8). As the period between planting and harvest for cassava can extend beyond 18 months, IHS5 categorizes cassava as a permanent crop. IHS5 collected less information on permanent crops than on rainfed or irrigated crops, including collecting no information on costs of production. While few cassava-producing households reported that they planted cassava in plots with other permanent crops in them, in areas where cassava is common in Malawi it is commonly seen to be planted as an intercrop with seasonal crops. About one-quarter of cassava producers sell some of their harvest.

Table 4.8: Cassava production and sales, 2019/20

Characteristic	All farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Cassava production, % of households	11.6	13.1	9.8 ***	9.8	12.1 **
Permanent cropped area planted to cassava, cassava producing households, percentage share	86.9	86.2	88.0	78.8	88.5 ***
Total area planted by household to cassava, cassava producing households, average, ha	0.319	0.332	0.299 *	0.557	0.266 ***
Monocropping of cassava, households for which all cassava plots did not have intercrops of other permanent crops, %	80.7	81.9	78.9	77.8	81.3
Cassava (fresh) yield, average, kg/ha	3,054	3,257	2,739 *	2,219	3,239 ***
Median, national	1,354	1,394	1,282	927	1,444
90th percentile, national	7,735	8,190	6,188	6,155	7,812
Gross value of cassava produced, MK/ha					
Valued at median of regional producer prices reported, average	253,950	280,710	212,720 ***	190,510	268,090 **
Valued at 90th percentile of real regional consumer prices reported, average	1,146,270	1,217,980	1,035,970	829,120	1,216,921 ***
Sold any cassava, % of cassava producing households	24.1	25.9	21.3	41.6	20.2 ***
Share of cassava harvest sold, for households that sold any	45.2	45.7	44.2	55.9	40.3 **
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. This is not done for medians or percentiles. * = p < 0.10, ** = p < 0.05, *** = p < 0.01. No costs related to production of cassava or any other permanent crops are recorded in IHS5.

The cassava yields presented in Table 4.8 are for tubers in fresh form and, depending on the farming household group, fall between 2,200 and 3,300 kg/ha. However, median yields are between 900 and 1,500 kg/ha, indicating considerable variability in productivity levels. These yield values are significantly lower than those estimated for cassava in the annual agricultural production estimates exercise that the Ministry of Agriculture implements annually—over the past decade, those estimates for cassava have been between 20 and 25 mt/ha and consistently show that more cassava than maize is produced annually in Malawi. However, analysis of IHS shows that less than 5 percent of calories consumed by the average Malawian come from roots and tubers, including cassava (Gilbert, Benson and Ecker 2020), which validates the much lower cassava yield estimates in IHS5.

Sweet potato, a tuber like cassava, also is an important source of carbohydrates for Malawians (Table 4.9). Unlike cassava, its growth pattern is seasonal, being grown both under rainfed conditions and with irrigation. Average sweet potato yields reported by farming households are similar to those reported for cassava at between 3,000 and 4,000 kg/ha as fresh tubers. However, as was the case with cassava, median yields are about half those levels, again indicating considerable variability in productivity levels among households. Compared to cassava, a somewhat larger share of farming households producing sweet potato sell some of their harvest, and those that do so sell a larger share of what they produced.

Table 4.9: Sweet potato production and sales, both rainfed and irrigated, 2019/20

Characteristic	All farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Sweet potato production, total, % of households	7.9	8.1	7.8	11.5	7.0 ***
Irrigated sweet potato production, % of households	2.3	2.3	2.4	2.6	2.2
Seasonally cropped area (sum of rainfed and irrigated) planted to sweet potato, sweet potato producing households, percentage share	29.6	29.3	30.0	20.7	33.6 ***
Total area planted by household to sweet potato, sweet potato producing households, average, ha	0.210	0.209	0.212	0.302	0.169 ***
Monocropping of sweet potato, households for which all sweet potato plots did not have intercrops, %	70.9	71.8	69.7	73.0	69.9
Sweet potato yield, average, kg/ha	3,670	4,390	2,805 ***	3,850	3,590
Median, national	1,887	2,084	1,688	1,661	1,977
90th percentile, national	7,983	9,225	6,065	8,086	7,907
Gross value of sweet potato produced, MK/ha					
Valued at median of regional producer prices reported, average	275,610	330,340	209,930 ***	284,750	271,500
Valued at 90th percentile of real regional consumer prices reported, average	779,870	934,160	594,670 ***	823,760	760,070
Costs of sweet potato production reported (excludes household labor), MK/ha	39,960	58,310	17,940 *	29,270	44,780
Sold any sweet potato, % of sweet potato producing households	32.0	36.0	27.2 **	40.4	28.2 ***
Share of sweet potato harvest sold, for households that sold any	65.8	64.6	67.8	61.5	68.6
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. This is not done for medians or percentiles. * = p < 0.10, ** = p < 0.05, *** = p < 0.01. High outliers for cost of production were winsorized to a maximum of three times the producer price value of production for the household.

Groundnut (Table 4.10) is among the most common non-maize crops produced by farming households, grown by about one-quarter. Larger landholding households are significantly more likely to grow the crop than farming households in other categories. About two-thirds of households plant groundnuts in sole stands without intercrops. Average yields are about 750 kg/ha, although median yields are considerably less. More than half of groundnut producing farming households sell some of their harvest. Those that do so sell more than half of what they produce.

Table 4.10: Groundnut production and sales, rainfed, 2019/20

Characteristic	All farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Rainfed groundnut production, % of households	25.4	25.7	25.0	44.5	20.1 ***
Cropped area planted to rainfed groundnut, rainfed groundnut producing households, percentage share	44.7	44.1	45.3	34.7	50.7 ***
Total area planted by household to rainfed groundnut, rainfed groundnut producing households, average, ha	0.342	0.349	0.333	0.455	0.273 ***
Monocropping of groundnut, households for which all rainfed groundnut plots did not have intercrops, %	65.4	66.3	64.3	75.3	59.4 ***
Rainfed groundnut yield, average, kg/ha	763	791	729	761	763
Median, national	441	452	433	450	441
90th percentile, national	1,419	1,568	1,236	1,357	1,447
Gross value of rainfed groundnut produced, MK/ha					
Valued at median of regional producer prices reported, average	185,110	195,720	172,630	187,420	183,720
Valued at 90th percentile of real regional consumer prices reported, average	888,210	897,310	877,790	910,670	874,620
Costs of rainfed groundnut production reported (excludes household labor), MK/ha	25,400	32,740	16,650 ***	23,440	26,590
Sold any groundnut, % of rainfed groundnut producing households	57.6	55.0	60.6 **	62.9	54.4 ***
Share of rainfed groundnut harvest sold, for households that sold any	60.9	59.0	62.8 *	60.2	61.3
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. This is not done for medians or percentiles. * = p < 0.10, ** = p < 0.05, *** = p < 0.01. High outliers for cost of production were winsorized to a maximum of three times the producer price value of production for the household.

Bean (Table 4.11) and cowpea (Table 4.12) have quite similar production profiles among farming households, although bean is more commonly cultivated. Both are predominantly grown as intercrops—less than 5 percent of farming households reported growing either bean or cowpea in pure stands. The low yields reported for each likely reflect that they are planted at a low density as secondary crops within intercropped plots. Most of the harvest for both crops is used within the household, although bean is more commonly sold, with about 30 percent of producers selling some of their harvest. Only about 15 percent of cowpea producers reported selling any of what they produced.

Table 4.11: Bean production and sales, rainfed, 2019/20

Characteristic	All farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Rainfed bean production, % of households	16.2	18.3	13.8 ***	19.5	15.3 ***
Cropped area planted to rainfed bean, rainfed bean producing households, percentage share	69.1	68.5	70.0	54.5	74.1 ***
Total area planted by household to rainfed bean, rainfed bean producing households, average, ha	0.424	0.431	0.414	0.681	0.335 ***
Monocropping of bean, households for which all rainfed bean plots did not have intercrops, %	4.6	5.5	3.1 *	8.6	3.2 **
Bean yield, average, kg/ha	238	250	219	198	252
Median, national	82	92	73	58	89
90th percentile, national	412	445	309	386	412
Gross value of rainfed bean produced, MK/ha					
Valued at median of regional producer prices reported, average	95,080	100,130	87,300	79,550	100,480
Valued at 90th percentile of real regional consumer prices reported, average	261,310	275,680	239,140	221,600	275,110
Costs of rainfed bean production reported (excludes household labor), MK/ha	58,600	73,040	36,320 ***	57,770	58,890
Sold any bean, % of rainfed bean producing households	31.3	31.6	30.8	34.4	30.2
Share of rainfed bean harvest sold, for households that sold any	57.3	58.9	54.8	60.7	56.0
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. This is not done for medians or percentiles. * = p < 0.10, ** = p < 0.05, *** = p < 0.01. High outliers for cost of production were winsorized to a maximum of three times the producer price value of production for the household.

Table 4.12: Cowpea production and sales, rainfed, 2019/20

Characteristic	All farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Rainfed cowpea production, % of households	4.8	4.5	5.0	4.4	4.9
Cropped area planted to rainfed cowpea, rainfed cowpea producing households, percentage share	69.5	62.3	77.0 ***	51.5	74.0 ***
Total area planted by household to rainfed cowpea, rainfed cowpea producing households, average, ha	0.359	0.351	0.367	0.598	0.300 ***
Monocropping of cowpea, households for which all rainfed cowpea plots did not have intercrops, %	2.8	3.1	2.4	4.3	2.4
Rainfed cowpea yield, average, kg/ha	160	188	131	115	171
Median, national	62	84	42	48	70
90th percentile, national	383	482	312	318	408
Gross value of rainfed cowpea produced, MK/ha					
Valued at median of national producer prices reported, average	38,440	45,170	31,430	27,530	41,110
Valued at 90th percentile of real national consumer prices reported, average	127,380	149,680	104,160	91,240	136,240
Costs of rainfed cowpea production reported (excludes household labor), MK/ha	20,850	31,690	9,570 ***	23,200	20,280
Sold any cowpea, % of rainfed cowpea producing households	14.9	14.7	15.0	16.9	14.4
Share of rainfed cowpea harvest sold, for households that sold any	57.1	53.9	60.3	34.7	63.5 ***
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. This is not done for medians or percentiles. * = p < 0.10, ** = p < 0.05, *** = p < 0.01. High outliers for cost of production were winsorized to a maximum of three times the producer price value of production for the household.

Soyabean (Table 4.13) is a relatively recent crop in Malawi—production estimates for soyabean were first produced by the Ministry of Agriculture in the late-1980s well after the agricultural production estimates system was initiated. The crop is growing in importance in Malawi with rising demand for soyabean from both livestock feed producers and from industry. Recent estimates are that the crop is planted annually on over 200,000 ha. According to the estimates of the Ministry of Agriculture, the most intensive production of soyabean is in the mid-altitude plateau farming zones in the Central and Northern regions. Soyabean is not commonly processed by Malawian households for home consumption.[13] About 15 percent of all farming households produce soyabean. This share exceeds the share that produce tobacco, which historically has been the most important cash crop grown by farming households. Farming households with larger cropland holdings are significantly more likely to produce soyabean than other categories of households. More than half of soyabean producers plant the crop in pure stands. Nonetheless, considerable variation is seen in the yields reported—median reported yields are about 50 percent lower than average yields.

[13] That the estimates in Table 4.13 on the share of soyabean harvested that was sold are less than 100 percent likely primarily reflects producers at the time they were interviewed for IHS5 storing the crop before sale, rather than any use of soyabean for own consumption by the household.

In the food consumption module of the IHS5 household questionnaire, 13 percent of farming households in the IHS5 sample reported consuming soyabean flour in the previous seven days. The market was reported as the source of the soyabean flour consumed for 52 percent of these households; gifts, including social safety net programs, for 27 percent; and own production for 20 percent.

Table 4.13: Soyabean production and sales, rainfed, 2019/20

Characteristic	All farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Rainfed soyabean production, % of households	14.8	14.1	15.5	28.7	11.0 ***
Cropped area planted to rainfed soyabean, rainfed soyabean producing households, percentage share	45.9	44.3	47.5	38.5	51.1 ***
Total area planted by household to rainfed soyabean, rainfed soyabean producing households, average, ha	0.407	0.433	0.380 *	0.564	0.295 ***
Monocropping of soyabean, households for which all rainfed soyabean plots did not have intercrops, %	60.1	59.0	61.3	68.3	54.2 ***
Rainfed soyabean yield, average, kg/ha	707	731	683	684	724
Median, national	477	483	463	483	466
90th percentile, national	1,594	1,800	1,588	1,488	1,800
Gross value of rainfed soyabean valued at median of regional producer prices reported, average, MK/ha	141,490	146,120	136,600	136,870	144,810
Costs of rainfed soyabean production reported (excludes household labor), MK/ha	27,550	40,180	14,200 ***	26,550	28,270
Sold any soyabean, % of rainfed soyabean producing households	83.0	77.2	89.1 ***	84.6	81.8
Share of rainfed soyabean harvest sold, for households that sold any	79.9	77.6	82.0 **	79.5	80.3
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. This is not done for medians or percentiles. * = p < 0.10, ** = p < 0.05, *** = p < 0.01. High outliers for cost of production were winsorized to a maximum of three times the producer price value of production for the household.

Pigeonpea (Table 4.14) is an important crop for farming households in the Southern region, in particular. These households plant long-duration varieties of pigeonpea as an intercrop, typically with maize, groundnut, or soyabean (Ngwira, et al. 2019). The pigeonpea matures in the months after the main crop in the plot is harvested. Pigeonpea has reasonably good market demand, being exported to India by Blantyre-based exporters. In addition, both pigeonpea grain and leaves are commonly consumed within households. Given the concentration of production in the Southern region where average cropland holdings are the smallest, farming households in the smaller landholding category are significantly more likely to produce the crop than farming households with larger landholdings. Yields are quite low overall, at less than 350 kg/ha on average. Pigeonpea yields approaching 500 kg/ha are all that were reported attained by the most productive households.

Table 4.14: Pigeonpea production and sales, rainfed, 2019/20

Characteristic	All farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Rainfed pigeonpea production, % of households	27.6	27.5	27.7	20.8	29.4 ***
Cropped area planted to rainfed pigeonpea, rainfed pigeonpea producing households, percentage share	81.2	80.3	82.3 *	70.8	83.2 ***
Total area planted by household to rainfed pigeonpea, pigeonpea producing households, average, ha	0.385	0.386	0.383	0.686	0.326 ***
Monocropping of pigeonpea, households for which all rainfed pigeonpea plots did not have intercrops, %	1.3	1.4	1.1	2.5	1.1
Rainfed pigeonpea yield, average, kg/ha	287	329	238 *	263	291
Median, national	132	147	118	112	137
90th percentile, national	449	499	391	359	458
Gross value of pigeonpea produced, MK/ha					
Rainfed pigeonpea valued at median of national producer prices reported, average	68,780	78,840	57,190 *	63,130	69,880
Rainfed pigeonpea valued at 90th percentile of real regional consumer prices reported, average	199,190	228,040	165,930 *	184,070	202,120
Costs of rainfed pigeonpea production reported (excludes household labor), MK/ha	29,460	39,630	17,730 ***	23,720	30,570 *
Sold any pigeonpea, % of rainfed pigeonpea producing households	39.4	40.8	37.9	47.7	37.8***
Share of rainfed pigeonpea harvest sold, for households that sold any	57.1	57.3	56.8	57.7	56.9
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. This is not done for medians or percentiles. * = p < 0.10, ** = p < 0.05, *** = p < 0.01. High outliers for cost of production were winsorized to a maximum of three times the producer price value of production for the household.

Although more households reported producing soyabean than tobacco in IHS5, tobacco has been the dominant cash crop for farming households in Malawi since the colonial period. Particularly air-cured burley tobacco is produced by small-scale farmers, although flue-cured tobacco, the production of which requires greater capital investments than burley, also is increasingly produced by farming households. Only about 5 percent of farming households reported in IHS5 producing any tobacco (Table 4.15). Particularly farming households with larger cropland holdings are more likely to produce tobacco. Most producers grow their tobacco in a pure stand with no other crops as intercrops and also apply inorganic fertilizer to the crop. Average yields of dry leaf are about 1,200 kg/ha, with non-poor producers achieving higher average yields than poor producers. The costs of tobacco production as a share of the gross value of tobacco produced averaged about 40 percent, being slightly higher than that for non-poor and larger landholding farming households and slightly lower for poor and smaller landholding households.

Table 4.15: Tobacco production and sales, 2019/20

Characteristic	All farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Tobacco production, % of households	5.1	5.5	4.5 *	13.2	2.8 ***
Cropped area planted to tobacco, tobacco producing households, percentage share	39.2	41.3	36.2 **	36.8	42.1 *
Total area planted by household to tobacco, tobacco producing households, average, ha	0.612	0.707	0.479 ***	0.815	0.351 ***
Non-burley tobacco, share of tobacco producing households producing other types, %	10.8	10.9	10.6	13.2	7.7
Monocropping of tobacco, households for which all rainfed tobacco plots did not have intercrops, %	76.1	75.6	76.7	75.1	77.3
Inorganic fertilizer use on tobacco, share of tobacco producing households that applied fertilizer to plot in which tobacco was grown, %	92.8	96.6	87.5 ***	95.0	89.9
Tobacco yield, average, kg/ha	1,184	1,386	900 ***	1,259	1,087
Median, national	962	1,093	792	999	915
90th percentile, national	2,149	2,471	1,647	2,160	2,092
Gross value of tobacco produced, MK/ha	670,850	785,510	510,080 ***	713,620	615,890
Costs of tobacco production reported (excludes household labor), MK/ha	269,180	348,230	158,340 ***	305,970	221,910 ***
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'Poor farming households' and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-poor farming households' and 'Larger landholding' households, respectively. This is not done for medians or percentiles. * = p < 0.10, ** = p < 0.05, *** = p < 0.01. High outliers for cost of production were winsorized to a maximum of three times the producer price value of production for the household.

The gross returns per hectare to tobacco production are the highest of any of the crops considered. Only rice approaches the returns that tobacco provides at about 80 percent of those of tobacco, while the returns from maize are only about 30 percent of those of tobacco.

However, the costs of production for tobacco on a per hectare basis are considerably higher than for any of the other major rainfed crops considered. The average costs of production reported for improved maize and rice, the two other crops with the highest reported costs of production, are only about 30 percent of those of tobacco. These high costs suggest that, given the poor access most farming households have to credit, most will not be able to engage in tobacco production simply due to the up-front costs that they must bear before harvesting and marketing the crop. However, having sufficient cash resources or access to capital are not the sole factors determining whether a farming household engages in tobacco production—note in Table 4.15 that those with larger cropland holdings are more likely than the non-poor to produce tobacco.

Given the much lower costs of production for rice, the net returns for rice on a per hectare basis are 15 percent higher than those reported for tobacco. However, rice production is limited primarily to lakeshore areas of Malawi, so prospects for increasing the share of farming households across Malawi that produce rice are not large. Moreover, similar to tobacco, rice production is labor intensive. Consequently, while the returns for both crops are high on a per hectare basis, computing returns on the two crops based on labor inputs may suggest that many labor-constrained farming households would find the two crops unattractive to produce.

Based on IHS5 production and sales data, sweet potato and groundnut rank third and fourth in terms of net returns per hectare, followed by improved maize and soyabean. Arguably soyabean is the most in-

triguing of the crops generating reasonably high net returns. The share of farming households producing soyabean rose almost three-fold between 2010/11 and 2019/20 (Table 2.5). Relative to tobacco and rice, several factors may account for this recent surge in soyabean production among farming households in Malawi. It is a less labor-intensive crop than either tobacco or rice. As primarily a cash crop that can be traded in regional markets, like tobacco, it has a reasonably secure market. It can be produced everywhere that tobacco is produced in Malawi and does not have the limitations rice has in this regard (Benson, Mabiso and Nankhuni 2016). It requires less up-front cash outlay to produce than tobacco. In consequence, a significantly larger share of farming households is likely to find that they can more profitably produce soyabean than either tobacco or rice, resulting in greater numbers of farming households producing the crop now than was previously the case. However, closer crop-specific economic analysis than can be done here would better explain these shifts in the share of farming households producing soyabean and the other crops that generate reasonable net financial returns.

Will raising crop productivity enable poor farming households to meet their basic needs from increased crop income?

Having provided an overview of the levels of production of the major crops produced by farming households in Malawi, we now turn to determining whether achieving higher productivity levels for these crops might significantly increase the incomes obtained by these households. The objective of this analysis is to determine whether poor farming households in Malawi will be able to escape poverty if they were to increase the productivity levels of the crops they produce closer to their potential maximum under smallholder farming conditions. Our concern is that the declining average cropped areas exploited by farming households may now for most be too small to provide sufficient returns to enable those households to meet their basic needs, even if they raise their crop yields close to the maximum levels possible.

Table 4.16: Potential maximum crop productivity levels for smallholder farmers in Malawi from the agricultural research and extension literature, various sources, kg/ha

Crop	IHS5 average, pure stand only	IHS5 90th percentile, pure stand only	GAP, Malawi, 2012	Other sources
Improved maize, hybrid	1,598	3,151	7,000 to 9,000	8,000(1); 7,100(2); 6,000(3)
Rice	2,245	4,420	4,000 to 6,000	6,000(1); 7,600(3)
Sorghum	567	1,285	3,000	4,000(1); 4,500(2); 3,200(3)
Cassava	3,233	7,966	30,000	25,000(1); >20,000(2)
Sweet potato	4,380	9,225	30,000	38,000(1)
Groundnut	905	1,655	2,000 to 2,500	2,200(1); 2,300(3)
Bean	835	1,779	2,000 to 2,500	2,200(1); 3,000(3)
Cowpea	617	1,116	2,000	2,200(1); 3,200(3)
Soyabean	933	1,925	4,500	3,500(2)
Pigeonpea	802	1,598	2,500	1,100(1); 2,500(3)
Tobacco, burley	1,235	2,160	3,000 to 4,000	2,000(1)

Source: Authors' compilation
Note: GAP = *Guide to Agricultural Production and Natural Resources Management in Malawi* (Ministry of Agriculture and Food Security 2012).
Other sources: (1) (Acland 1971); (2) (Fischer, Byerlee and Edmeades 2014); (3) (University of Nebraska-Lincoln & Wageningen University & Research 2022)—values for Tanzania.
Cereals and grain legumes are dried and shelled yields. Cassava and sweet potato are fresh weight yields. Tobacco is cured leaf yield.
For several crops, ranges of potential yields are provided in GAP. These reflect different potential maximum yields for the varieties of the crop best suited to particular agricultural ecologies of the country.

For this analysis, we primarily use the 90th percentile yields for the major crops grown in pure stand (monocropping) by farming households as reported in IHS5. However, we also use in our analysis for selected scenarios the maximum crop yield estimates from Malawian crop scientists reported in the last edition of the *Guide to Agricultural Production and Natural Resources Management in Malawi* (GAP) published by the Ministry of Agriculture (2012).[14] These yield levels are presented in Table 4.16. To validate the Malawi-specific estimates, also presented in the table are likely maximum potential crop yields under small-scale farming conditions in eastern and southern Africa as reported by regional and international researchers.

Using the 90th percentile of yields reported in IHS5 for crops grown in pure stand as an indicator of current superior levels of crop productivity for farming households in Malawi, we find that these yields are significantly lower than the maximum potential yields for these crops noted in both the GAP and in regional publications. The relative size of this yield gap varies by crop. Looking at average maximum potential yields from all sources consulted, the 90th percentile yields from IHS5 are only 10 to 20 percent below the maximum potential yields for rice, pigeonpea, and tobacco. Yields for groundnut and bean are 25 percent below, and yields for maize, sorghum, cowpea, and soyabean are about half of what they might potentially be. The largest differences between the 90th percentile yields from IHS5 and the average maximum potential yields from all of the sources consulted are seen for cassava and sweet potato, with the 90th percentile yields only at about one-third of their maximum potential as reported by other sources.

To assess the likely impact of raising crop productivity on the prevalence of poverty among farming households, counterfactuals of household income obtained from two higher crop productivity levels for each farming household in the IHS5 dataset growing selected crops were constructed. The first productivity level is the 90th percentile yield level for producers growing a crop in pure stand reported in IHS5, while the second is the potential maximum productivity level reported for the crop in the 2012 edition of the GAP. If the GAP reports a yield range, the upper bound was used. However, we only present the income and poverty reduction effects of both potential productivity levels for maize, since for most crops the GAP yield levels are significantly above the 90th percentile yield level and will be considerably more challenging for most farming households to achieve in the medium-term. For the other crops considered in these analyses, we only examine the income and poverty reduction effects of farming households attaining the lower 90th percentile yield levels.

While earlier we presented production and sales information from IHS5 for local and improved maize separately and for ten other crops, we will not examine all these crops. That analysis showed that several, although grown by quite a large share of farming households, are not dominant elements in the crop mixes of those households. Rather they tend to be grown as secondary intercrops planted at low densities. These include sorghum, bean, cowpea, and pigeonpea. It is unlikely that intensive production of these crops as monocrops and using commercial inputs will be profitable for very many farming households. So, we will not consider these four crops in the assessment of the impact of higher productivity for major crops on poverty among farming households.

Additionally, while local and improved maize cultivars were examined separately earlier in this chapter, for the analysis here, we will use the potential productivity of improved maize only to assess the likely impact on household welfare of higher productivity on all of the cropland of a farming household that was reported planted to maize, whether it was planted to local or improved varieties. Using improved

[14] The GAP is updated every decade or so to provide farmers and agricultural extension staff with, among other information, guidance on best farming practices and on the improved varieties available for a wide range of crops produced in Malawi.

maize seed is the best farming practice for raising maize productivity. In sum, our analysis of the impact of higher crop productivity on poverty among farming households will consider seven crops—maize (improved), rice, cassava, sweet potato, groundnut, soyabean, and tobacco.

We focus only on rainfed production, except for cassava, which is defined in IHS5 as a permanent crop. Based on the share of production of the seven crops that is irrigated (Table 4.1), only for maize would consideration of irrigated production possibly offer additional insights on the scope for reducing poverty through increased productivity on irrigated plots. However, for simplicity, we leave such an analysis of the income effects of higher production of irrigated maize to others.

Crop production is reported in IHS5 at plot level. We apply the two higher productivity levels—the 90th percentile of productivity reported in the IHS5 and the GAP estimate of potential productivity—to each plot in which one of the seven crops was grown and compute the production of the crop that would result on those plots. The gross value of this higher level of crop production is valued using either the regional or the national median producer prices for the crop reported in IHS5.

Additionally, for the food crops of maize, rice, cassava, sweet potato, and groundnut, we extend the analysis of the value of the production of these crops by computing a gross value of their production using the 90th percentile of real regional consumer prices reported in IHS5. We contend that this price is a reasonable shadow price for the value of the crop if it were used by the farming household for own consumption. However, the consumer prices for the food crops are several times higher than their producer prices, leading in the scenarios here to enormous changes in household income. This makes it difficult to use the results of the consumer price scenarios to inform current policy questions. Consequently, our discussion primarily focuses on the income and poverty reduction effects of higher yields when the crops are valued at their producer prices. As with the GAP maximum productivity estimates, we present our results using the regional consumer prices only for maize.

To compute the change in household income based on higher production, we first compute the net agricultural income that each plot planted with the crop will generate at the higher productivity levels. As we have no information on the costs associated with the production of these crops at higher productivity levels, we use the information from IHS5 on the average gross value and the average costs of rainfed crop production reported on a per hectare basis for each crop to compute the net income for each crop at the higher productivity levels.[15] While this is a reasonable solution, it assumes that all costs of crop production for farming households are variable costs, which almost certainly is not correct. We also subtract from the total net agricultural income of each farming household growing the crop of interest on a specific plot the net agricultural income computed for the crop of interest, as well as for any intercrops reported grown on the same plot to reflect growing the crop of interest in pure stand.[16]

We then determine whether the net income generated by this increased production on plots on which households reported growing the crop—primarily when valued at the median of national producer

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[15] To compute the net value of the crop, we deflate the gross income computed at the higher productivity levels and valued using the median producer price or 90th percentile consumer price using information derived from IHS5 for all farming households. This information was presented in Table 4.4 for maize and for the other crops in subsequent crop-specific tables:

Net value of crop at higher productivity = (Gross value of crop at higher productivity)
x (1 – ((IHS5 costs of production of crop, avg.) ÷ (IHS5 gross value of crop, avg.)))

IHS5 did not collect production cost information for permanent crops. Consequently, the values for cassava production used in these scenarios are gross values.

[16] *Adjusted net household income under higher crop productivity = Total net household income (computed from IHS5)*
– Sum of net income (computed from IHS5) from all crops in household plots in which crop of interest was planted
+ Net income generated by crop of interest alone (monocrop) at higher productivity level.

prices for the crop, but also for food crops at the 90th percentile of real regional consumer prices—will enable a significant share of poor farming households to raise their income above the income-based poverty line of MK 111,158 per capita per year. This income poverty line was computed in Chapter 3 using the results of the regression of total annual net income per capita on total annual consumption per capita for farming households and the consumption-based basic-needs poverty line of MK 165,879 per capita per year computed in the quantitative poverty analysis of IHS5 (Table 3.10). The share of farming households with total income below this income-based poverty line is 62.5 percent.

As maize is the dominant crop produced by farming households across Malawi, in Table 4.17 we present the results for maize from all four scenarios based on two levels of productivity—the 90th percentile yields from IHS5 and the GAP yields—and on two prices to value the crop—the median crop producer price and the 90th percentile of crop consumer prices. Maize is produced by 88 percent of farming households and over 70 percent of the cropland of farming households is devoted to maize. Consequently, the impact of significantly higher maize productivity on the income and welfare of farming households could be large.

Table 4.17: Higher maize productivity scenarios —total annual net income per capita and income-based poverty prevalence, two productivity level scenarios and two crop values, 2019/20

Characteristic	Farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Productivity level: 90th percentile of productivity reported in IHS5 (3,151 kg/ha in pure stand)					
Scenario 1) Crop valued at median regional producer price					
Change in mean tot. net ann. income per capita, %	12.2	10.8	16.4	22.2	7.7
Change in poverty prevalence, income-based poverty line, percentage points	-7.4	-8.5	-6.1	-18.6	-4.4
Scenario 2) Crop valued at 90th percentile of real national consumer prices					
Change in mean tot. net ann. income per capita, %	95.1	82.7	131.6	157.5	67.2
Change in poverty prevalence, percentage points	-42.4	-34.2	-51.8	-42.1	-42.5
Productivity level: GAP estimate of potential productivity (9,000 kg/ha in pure stand)					
Scenario 3) Crop valued at median regional producer price					
Change in mean tot. net ann. income per capita, %	45.2	39.6	61.8	75.5	31.7
Change in poverty prevalence, percentage points	-27.2	-24.7	-30.2	-38.9	-24.1
Scenario 4) Crop valued at 90th percentile of real national consumer prices					
Change in mean tot. net ann. income per capita, %	281.9	245.1	390.9	461.8	201.6
Change in poverty prevalence, percentage points	-52.8	-40.3	-67.3	-42.9	-55.6
Baseline from IHS5 income analysis					
Total annual net income per capita, mean, MK	168,210	234,280	91,660	241,620	148,130
Poverty prevalence, % of households	62.5	48.7	78.5	45.9	67.1
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: The assignment of households to the 'Non-poor' and 'Poor farming households' categories is based on the results of the consumption-based poverty analysis of the IHS5. Consequently, some households in the 'Non-poor farming households' category may be found to be poor on the income basis used here.
GAP = *Guide to Agricultural Production and Natural Resources Management in Malawi* (Ministry of Agriculture and Food Security 2012).

The most readily achievable of the four scenarios considered—that of attaining the 90th percentile of monocropped improved maize yields reported in IHS5 with the maize produced being valued at the median national producer prices—results in only a 13 percent increase in income for all farming households, on average. Similarly, the impact of this higher maize productivity on poverty levels is not transformative. The share of farming households that are poor based on the income-based poverty line will decline by less than 8 percentage points under this yield and maize price scenario.

However, when farming households are disaggregated by (consumption-based) poverty status or landholding size, the effect of higher maize productivity on household income and income-based poverty differs by category. Based on the most achievable scenario of higher maize productivity—the 90th percentile maize yield from IHS5, it is households with the largest landholdings that see the largest increases in income and reductions in poverty prevalence. Their income increases by 22 percent on average, while the share of such households that are poor declines by almost 19 percentage points—a 40 percent reduction in the prevalence of income-based poverty among households in the category. In contrast, by raising their maize productivity farming, households in the smaller landholding category—which make up almost 80 percent of all farming households—see their incomes increase by less than 8 percent on average, and only 4.4 percent of households in the category move out of poverty.

The impact of higher maize productivity on the welfare of household incomes clearly is mediated by landholding size. These results suggest that with continued rural population growth resulting in declining average cropland holdings, fewer and fewer farming households will be able to farm themselves out of poverty even if they achieve significantly higher maize productivity levels.

In addition to the productivity component of this challenge to farming out of poverty in the face of declining household cropland holdings, there is a price element. The price that farming households can obtain for the maize that they produce off of their small cropland holdings generally is too low to generate sufficient income to enable most farming households to meet their basic needs.

The second scenario in Table 4.17 of attaining the 90th percentile of monocropped improved maize yields reported in IHS5 with the maize produced being valued at the 90th percentile of regional maize consumer prices reported in IHS5 shows how higher maize prices could contribute to significantly reducing poverty among farming households. At these much higher maize prices of about MK 550/kg — an over three-fold increase from the maize producer prices of about MK 150/kg, household incomes almost double, on average, and the share of farming households that are poor declines by over 40 percentage points—an almost 70 percent reduction in the prevalence of income-based poverty among farming households.

It was noted earlier that the price for maize that consumers pay, particularly at its highest seasonal level, may be used implicitly by farming households as the price at which they value their maize production for home consumption as they seasonally decide how much of their cropland to dedicate to each crop. That price represents the costs they would bear if they did not produce sufficient maize for their own consumption through to their next harvest and had to obtain maize for home consumption at the market. While in good cropping seasons they will not actually engage with the market at these prices, the risk that they might have to do so after a poor cropping season is why this very high price level is considered in this second scenario (and in the fourth scenario) in Table 4.17. The results obtained in the second scenario that values the increased maize production (90th percentile of improved maize yields reported in IHS5) at these much higher consumer prices may be an important component in what motivates most farming households in Malawi to continue to rely on their own-production to obtain the maize they require. Given cultural values of self-reliance and foresight, many farming households may

argue that so long as they have granaries with sufficient maize to meet their staple food needs, they cannot be poor—the sharp drop in poverty prevalence with high maize prices reflects such reasoning. While there may be some validity in such a perspective given the unreliability of agricultural markets in Malawi, such an argument, however, does not consider how the non-maize needs of the household will be met.

The results for the third and fourth scenarios of increased maize productivity in Table 4.17 assess the impact of maize productivity levels of 9,000 kg/ha, the maximum for Malawi estimated in the GAP. While this productivity target is extreme relative to current maize productivity levels, the results demonstrate that, at least when maize is valued at the producer price, the size of the cropland holding of the farming household still determines whether this higher productivity will translate into sharp reductions in poverty for farming households. At this high maize yield level, when the maize is valued using the producer price, only 7 percent of farming households in the larger landholding category remain in poverty. However, 43 percent of those in the smaller landholding category will not see their income rise above the income-based poverty line. Their achieving this highest level of maize productivity will bring relatively few poor farming households with small cropland holdings out of poverty.

For the other six crops examined, we only present the result of the most achievable scenario in which the 90th percentile of monocropped crop yields reported in IHS5 are attained with the crops being valued at the median producer prices reported in IHS5 (Table 4.18). The impact that higher productivity of each of these crops on the cropland a household currently allocates to the crop has on poverty levels depends primarily on how common it is for farming households to produce the crop, as well as the relative price of the crop.

Of the six crops, groundnut is the most commonly produced. Consequently, the impact that increased productivity of groundnut has on household income, especially, but also on the prevalence of poverty among farming households is somewhat higher than it is for the other crops considered in the table. Moreover, farming households with larger landholdings generally are much more likely to produce groundnut, as well as soyabean and tobacco, than are households with smaller landholdings (see crop-specific tables, starting Table 4.6 for rice). Consequently, it is particularly the one-fifth of farming households in the larger landholding category that see the largest increases in income and percentage point reductions in poverty prevalence with higher yields for groundnut. A similar pattern is seen for soyabean production by households in the larger landholding category. For households that produce tobacco, while their incomes rise considerably, since most are non-poor under current tobacco productivity levels, changes in poverty prevalence with increased tobacco productivity are more muted.

The impact on income and poverty of increased production of rice, cassava, and sweet potato is more limited. Despite the large increases in productivity for the two tuber crops, their per kg producer price value is only half that of maize and one-third or less than that of the other crops considered in these scenarios. Moreover, at least for sweet potato, households devote a relatively small share of their rainfed cropland to the crop compared to the other crops considered. Consequently, we see little effect on incomes or poverty with higher productivity of cassava and sweet potato. For rice, as with sweet potato, while rice prices are significantly higher per kg, the relatively small area that rice-producing households devote to the crop also moderates the impact increased productivity might have on the income and poverty status of these households.

Table 4.18: Higher non-maize crop productivity scenarios—total annual net income per capita and income-based poverty prevalence, productivity at 90th percentile of IHS crop yields and producer price crop values, 2019/20

Characteristic	Farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Rice (4,420 kg/ha in pure stand)					
Change in mean tot. net annual income per capita, %	1.1	1.1	1.3	1.6	0.9
Change in poverty prevalence, percentage points	-0.8	-0.9	-0.7	-1.1	-0.8
Cassava (7,966 kg/ha in pure stand)					
Change in mean tot. net annual income per capita, %	2.3	2.3	2.3	3.8	1.7
Change in poverty prevalence, percentage points	-1.6	-2.0	-1.2	-2.2	-1.5
Sweet potato (9,225 kg/ha in pure stand)					
Change in mean tot. net annual income per capita, %	0.8	0.7	1.0	1.7	0.5
Change in poverty prevalence, percentage points	-0.6	-0.7	-0.4	-1.4	-0.4
Groundnut (1,655 kg/ha in pure stand)					
Change in mean tot. net annual income per capita, %	2.9	2.6	3.8	6.1	1.5
Change in poverty prevalence, percentage points	-1.8	-2.0	-1.5	-5.3	-0.9
Soyabean (1,925 kg/ha in pure stand)					
Change in mean tot. net annual income per capita, %	1.8	1.5	2.5	4.0	0.8
Change in poverty prevalence, percentage points	-1.3	-1.5	-1.0	-4.3	-0.5
Tobacco (2,160 kg/ha in pure stand)					
Change in mean tot. net annual income per capita, %	1.5	1.5	1.5	4.1	0.4
Change in poverty prevalence, percentage points	-0.7	-0.7	-0.8	-2.9	-0.2
Baseline from IHS5 income analysis					
Total annual net income per capita, mean, MK	168,210	234,280	91,660	241,620	148,130
Poverty prevalence, % of households	62.5	48.7	78.5	45.9	67.1
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Assignment of households to the 'Non-poor' and 'Poor farming households' categories is based on the results of the consumption-based poverty analysis of the IHS5. Consequently, some households in the 'Non-poor farming households' category may be found to be poor on the income-basis used here.

The scenarios for which the results are presented in Table 4.17 and Table 4.18 involve two assumptions that, if relaxed, may provide additional understanding of how improved crop productivity might affect the income level and poverty status of farming households. First, each of the earlier scenarios is specific to a single crop, and second, those scenarios assume no change in the cropland allocated to a crop even with significantly higher crop productivity. We extend those earlier scenarios by assessing the impact on the income and poverty status of farming households:

- If all the crops of interest they reported growing are produced on the areas reported for each at the higher productivity levels—that is, for example, if they report growing maize, groundnut, and soyabean, the higher productivity levels are applied to all three crops, rather than to each crop alone, as was done in the two previous tables.
- If the household specializes in the production of the crop of interest at the higher productivity level when planted on all the cropland holding of the households that reported producing the crop.

We only present our results based on productivity at the 90th percentile of IHS crop yields and using producer price crop values, the most conservative scenario results.

Note that in both of these scenarios, we do not change which households produce the crops—the scenarios only apply to those farming households that reported in IHS5 producing the crop(s) of interest.

We acknowledge that this assumption is unlikely—farming households neighboring those achieving high productivity are likely to also begin producing the crop if they are confident that they can achieve similarly high productivity levels. We also are unable to consider the impact on crop prices of the significant increase in the supply of these crops to agricultural markets under these scenarios—the prices that producers receive will certainly go down and likely quite significantly, particularly for crops that generally are not exported.

Table 4.19: Higher crop productivity scenarios—joint production at higher productivity levels for the seven crops of interest that households reported producing—total annual net income per capita and income-based poverty prevalence, productivity at 90th percentile of IHS crop yields and producer price crop values, 2019/20

Characteristic	Farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Joint production at higher productivity levels of all crops of interest household reported producing					
Change in mean tot. net annual income per capita, %	22.7	20.6	28.9	43.3	13.4
Change in poverty prevalence, percentage points	-13.8	-14.6	-12.8	-30.9	-9.2
Baseline from IHS5 income analysis					
Total annual net income per capita, mean, MK	168,210	234,280	91,660	241,620	148,130
Poverty prevalence, % of households	62.5	48.7	78.5	45.9	67.1
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Assignment of households to the 'Non-poor' and 'Poor farming households' categories is based on the results of the consumption-based poverty analysis of the IHS5. Consequently, some households in the 'Non-poor farming households' category may be found to be poor on the income-basis used here.

The results of the scenario in which the crops of interest are jointly produced at higher productivity levels are presented in Table 4.19. The effect on household income and poverty status is considerably higher than when the crops are considered one by one with the higher productivity level applied to a single crop in isolation. Roughly, income levels almost double for all farming households and for the various farming household categories over what is seen with higher productivity levels in maize alone, the most commonly produced of the crops considered. We also find that the magnitude of the reduction in the prevalence of poverty is also almost double what is seen with higher productivity levels in maize alone.

However, the largest impact on incomes and poverty status of this joint production scenario is again seen among farming households with relatively larger cropland holdings. Most households with smaller cropland holdings likely are too land constrained to derive sufficient increases in their income from this higher productivity across all of the crops of interest that they produce on their relatively smaller plots to enable them to obtain all of their basic needs. Consequently, while the number of households with larger cropland holdings that are in poverty declines by two-thirds under this scenario, for households with smaller cropland holdings that are in poverty, the decline is only about 14 percent.

The results of the scenarios in which any farming household that reported in IHS5 growing a crop of interest then dedicate all of their rainfed cropland to the crop (all permanent cropland in the case of cassava), with productivity at the 90th percentile of IHS crop yields, are presented in Table 4.20. The results of this scenario are driven by the share of households that reported producing a particular crop and the overall size of their cropland holdings. Again, the greatest improvements in terms of income and escaping poverty occur among farming households with larger cropland holdings. The effects on

income and poverty of specialized crop production at high productivity levels are smallest for farming households with smaller cropland holdings.

Table 4.20: Higher crop productivity scenarios—specialized production of each crop of interest over entire cropland holding for households producing crop—total annual net income per capita and income-based poverty prevalence, productivity at 90th percentile of IHS crop yields and producer price crop values, 2019/20

Characteristic	Farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Maize (3,151 kg/ha in pure stand), rainfed crop area					
Change in mean total net annual income per capita, %	14.0	12.0	19.7	26.4	8.4
Change in poverty prevalence, percentage points	-9.4	-10.3	-8.4	-25.6	-5.1
Rice (4,420 kg/ha in pure stand), rainfed crop area					
Change in mean total net annual income per capita, %	3.7	3.2	5.2	5.7	3.7
Change in poverty prevalence, percentage points	-2.2	-2.1	-2.4	-2.2	-2.2
Cassava (7,966 kg/ha in pure stand), permanent crop area					
Change in mean total net annual income per capita, %	2.9	2.9	2.9	5.1	1.9
Change in poverty prevalence, percentage points	-1.8	-2.2	-1.4	-2.6	-1.7
Sweet potato (9,225 kg/ha in pure stand), rainfed area					
Change in mean total net annual income per capita, %	3.5	3.0	4.8	7.6	1.6
Change in poverty prevalence, percentage points	-2.1	-1.8	-2.4	-4.2	-1.5
Groundnut (1,655 kg/ha in pure stand), rainfed area					
Change in mean total net annual income per capita, %	9.0	8.2	11.1	21.0	3.6
Change in poverty prevalence, percentage points	-5.2	-5.2	-5.2	-16.0	-2.3
Soyabean (1,925 kg/ha in pure stand), rainfed area					
Change in mean total net annual income per capita, %	4.4	3.9	5.9	10.6	1.6
Change in poverty prevalence, percentage points	-3.0	-3.1	-2.9	-9.9	-1.2
Tobacco (2,160 kg/ha in pure stand), rainfed crop area					
Change in mean total net annual income per capita, %	5.8	5.4	6.8	15.1	1.6
Change in poverty prevalence, percentage points	-2.2	-1.8	-2.6	-5.6	-1.3
Baseline from IHS5 income analysis					
Total annual net income per capita, mean, MK	168,210	234,280	91,660	241,620	148,130
Poverty prevalence, % of households	62.5	48.7	78.5	45.9	67.1
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Assignment of households to the 'Non-poor' and 'Poor farming households' categories is based on the results of the consumption-based poverty analysis of the IHS5. Consequently, some households in the 'Non-poor farming households' category may be found to be poor on the income-basis used here.

Specialized maize production provides the largest effects on income and poverty, with groundnut second. This ranking by crop reflects the ranked share of households producing the crops and is consistently seen across the categories of the two farming household typologies.

Finally, in our assessment of the impact of higher crop productivity on farming households, we have focused on their poverty status. Eliminating poverty is a central development objective for Malawi. However, Malawi 2063, the current development vision statement for the country, also sets the goal for Malawi to be by 2063 "a self-reliant industrialized upper-middle-income country (National Planning Commission 2020, i)". Upper-middle-income countries are those with annual gross national income (GNI) per capita between USD 4,046 and USD 12,535. This goal provides an alternative quantitative development target at household level to the basic needs poverty line. In Text Box 4.2, we use the re-

sults of the scenarios presented in this chapter to consider whether significantly increasing the productivity levels of farming households across Malawi will contribute substantively to achieving this aim of achieving a GNI per capita of USD 4,046 and upper-middle income status for Malawi.

Text Box 4.2. Prospects for Malawi achieving middle-income status by 2063 through farming households sharply increasing crop productivity

The current development vision for the country, Malawi 2063, sets as a development goal for Malawi to be an upper-middle-income country by 2063. The World Bank assigns the world's countries to four income groups—low, lower-middle, upper-middle, and high-income—based on annual gross national income (GNI) per capita in current US dollars (USD). For 2019/20 when the IHS5 was undertaken, low-income countries were defined as those having a GNI per capita of less than USD 1,035; lower-middle income countries between USD 1,036 and USD 4,045; upper-middle income countries between USD 4,046 and USD 12,535; and upper-income countries more than USD 12,535 (World Bank 2022a). Malawi's GNI per capita in 2019 was USD 560 (World Bank 2022b).

In April/May 2019, at the start of the year of fieldwork for IHS5, USD 1.00 was valued at about MK 710. The lower-middle income threshold from that time corresponds to MK 735,560, while the threshold for upper-middle income status corresponds to MK 2,872,660. In the table, we present what percentage share of farming households will have income levels that do not surpass these two thresholds if they achieve significantly higher levels of crop productivity. We use the results of the scenario on the joint production at higher productivity levels for all crops of interest that households reported producing. This scenario uses productivity levels at the 90th percentile of IHS crop yields and producer prices to value the crop output (see Table 4.19). The table presents the percentage share of farming households that with joint production at higher productivity levels for all crops of interest that the households reported producing would remain with total net annual income per capita below the thresholds.

Households with total net annual income per capita below threshold, %	Farming households	Non-poor farming HHs	Poor farming HHs	Larger landholding	Smaller landholding
Lower-middle income threshold—MK 735,560	96.1	93.5	99.1	92.4	97.1
Upper-middle income threshold—MK 2,872,660	99.6	99.4	99.9	99.3	99.7
Observations	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.

We find that even with much higher crop productivity than they currently realize, very few farming households will be able to obtain incomes above even the lower-middle income threshold. The Malawi 2063 vision sets a very ambitious economic development goal for the country.

In categorizing countries based on GNI per capita, it is important to recognize that how income is distributed across the population of a country is not considered. For a country to be categorized in a higher category, it is not necessary that all households have attained the income per capita threshold, so long as the average income per capita is above the threshold. Consequently, in using these thresholds with the simulation results, our intent is more to show what share of farming households might attain those levels of income and what that implies for Malawi achieving such an income status, rather than strategizing on how to achieve that GNI per capita level for all Malawians primarily through agriculture. Nevertheless, our results show that without significant structural transformation in the agricultural sector in Malawi and in the levels of income farming households can derive from their production, agriculture based on generally small-scale farming households will not be a large element in how Malawi achieves its upper-middle-income country development goal by 2063.

Source: Authors' analysis.

Overall, these scenarios provide some insight on the potential for higher productivity of these major crops to enable farming households to avoid or escape from poverty. The main insight is that most farming households with relatively small landholdings are not going to be able to obtain sufficient income from the crops they plant on their land, even with substantially higher productivity levels, to meet their basic needs. The cropland holding threshold of 0.25 ha per capita used here to distinguish farming households with larger landholdings from those in the category with smaller landholdings is likely close to the cropland holding size below which rainfed farming as a household's principal livelihood is unlikely to offer sufficient returns to meet a household's consumption needs, even under significantly higher crop productivity levels.

We recognize that these scenarios are simplistic. The higher productivity levels are simply assumed to be achieved, with no consideration of how farming households will access high-productivity inputs in needed quantities, including inorganic fertilizer and improved seed, or how they will be able to use those inputs optimally to achieve maximum productivity. Poor access to inputs and inefficiencies in the use of the inputs that they do obtain are at the core of the low crop productivity levels, relative to potential maximums, reported by farming households across Malawi.

Moreover, the household income and poverty status impacts modeled under the scenarios here do not account for a range of second-round effects of higher productivity on the production decisions of farming households and on the prices of the crops or their subsistence value (shadow prices) for farming households. These include:

- With consistently higher productivity of food crops, in particular, we should expect that in the following seasons households will devote an increasing share of their cropland to commercial crops or to secondary food crops. With higher maize productivity, in particular, we should see a decline in the share of their cropland that farming households devote to maize—the share of cropland of all farming households that is planted to maize should fall from the close to 70 percent now planted.
- Similarly, with higher productivity, particularly for food crops, the prices used to value production of that crop will drop based simply on this increased supply. Consequently, the increases in farming household income and reductions in poverty prevalence shown in the higher crop production scenarios here certainly are overstated—prices will decline with higher production, resulting in smaller flows of income to the farming households than those modeled in these scenarios. While we show that higher crop productivity levels at constant prices are likely to provide welfare improvements for farming households with larger cropland holdings, significant drops in crop prices associated with the increased crop supply will likely mean that this increased productivity will not result in much additional income for such households and few poor households with larger cropland holdings will escape poverty. For significant rural poverty reduction effects, improvements in agricultural productivity levels must be accompanied by improvements in the performance of agricultural markets, particularly crop price stability (Timmer 2015).
- However, reliable increased supplies of food crops to markets that result from achieving higher crop productivity levels will also result in some erosion of the value for farming households of self-sufficient subsistence food crop production. With consistently higher food crop productivity overall, more farming households are likely to feel sufficiently confident that they always will be able to obtain the food they require from the market to supplement or replace that which they produce on their own cropland. With sharply higher crop productivity, the perception of many now that they must produce sufficient food, particularly maize, on their own cropland to meet their annual consumption needs will not be as compelling.

The income and poverty effects of higher crop productivity modeled in this chapter are unrealistic for most farming households in Malawi to achieve under their current patterns of crop production. Nonetheless, we find that most farming households will not see their welfare improve through reliance on rainfed farming on smaller and smaller cropland holdings, even using the most productive technologies to produce their crops. The current structure of household agricultural production in Malawi offers no pathway to sustained poverty reduction for many, if not most, farming households. Particularly poor farming households growing crops on small landholdings will not be able to escape poverty through their farming. Nonetheless, these results are instructive as to the scope for and limits to the possible transformations in the livelihoods and welfare of farming households to which higher crop productivity levels could contribute. Most farming households must increase their reliance on off-farm employment to reliably meet their basic needs.

CHAPTER 5. OFF-FARM EMPLOYMENT IN MALAWI

The income-focused scenarios presented in Chapter 4 on how sharply increased crop productivity levels might affect the welfare of farming households showed that raising those levels to approach the maximum that can likely be attained in Malawi is insufficient to bring most farming households out of poverty. The small cropland holdings for many households pose a significant impediment to their being able to rely solely on their crop production, even at much higher levels of productivity, to meet their basic needs. Moreover, the prices that farming households obtain for the crops that they produce off of their small cropland holdings generally are too low to enable them to generate sufficient income. Crop prices, particularly for food crops, also are quite unpredictable from year to year. Consequently, even households farming larger holdings cannot be confident that they will always be able to generate sufficient income from their crop production. To meet the basic needs of their members, most farming households, whether poor or non-poor, will need to pursue additional economic activities to their farming. Agriculture alone is insufficient.

As most crop production in Malawi is rainfed, the intensity of labor use within farming households can be highly variable across the year. This is particularly the case for the almost 80 percent of farming households that do not have access to any irrigable land to farm in the dry season. Between the period of land preparation in October and November through to the harvest of rainfed crops in April and May, the labor demands on workers in farming households are high, as they must ensure that all cropping operations are done in a timely fashion to ensure good productivity. This period is also when there is the highest demand in agricultural communities for daily or piecework-based *ganyu* labor, as farming households with insufficient labor seek to hire-in labor to complete urgent farming tasks. However, with the end of the rainfed cropping season, if continued income flows are needed to meet household needs, alternative employment to farming must be found by workers in farming households. The dry season is a period of general underemployment in most farming communities.

Workers in farming households have three principal options for off-farm employment—casual short-term *ganyu* employment, more formal longer-term wage employment, and operating commercial household enterprises. Farming households unable to generate sufficient income from their farming to meet all of their needs throughout the year will need to supplement their farm income with that obtained from these types of off-farm employment. Our analysis of the income sources for households across Malawi in Chapter 3 showed that the average farming household in Malawi already is heavily dependent on off-farm employment for income—around two-thirds of the income of farming households comes from off of their own farm. Expanding Table 3.8 to also consider the 16 percent of Malawian households that do not engage in farming, Table 5.1 summarizes the income that households in Malawi derive from these three principal forms of off-farm employment. In this chapter, we examine in more depth the nature of the engagement in these three types of employment for workers in both farming and non-farming households.

Table 5.1: Temporary employment (ganyu), longer-term wage employment, and household enterprise participation and income of Malawian households, 2019/20

	All Malawian	Non-farming	Farming (all)	Farming households			
				Non-poor	Poor	Larger lndhldg.	Smaller lndhldg.
Casual temporary employment (*ganyu*), households with members that engaged, %	69.5	49.2	73.3 ***	62.1	86.3 ***	62.7	76.3 ***
Temporary employment (*ganyu*) income per capita, all households, mean, MK	51,410	76,320	46,770 ***	46,870	46,660	44,970	47,270
As share of total net income of all households, %	31.7	31.3	31.7	23.4	41.3	23.0	34.1
For households with members engaged in any temporary employment (*ganyu*), MK	73,920	155,140	63,770 ***	75,410	54,060 ***	71,710	61,990
Median, MK	25,200	56,000	24,000	24,010	22,800	24,000	24,000
As share of total net income of these households, %	45.5	63.2	43.2	37.7	47.9	36.7	44.7
Longer-term wage employment, households with members that engaged, %	19.7	43.4	15.3 ***	20.1	9.8 ***	11.0	16.5 ***
Longer-term wage employment income per capita, all households, mean, MK	61,340	230,410	29,860 ***	50,980	5,390 ***	33,120	28,970
As share of total net income of all households, %	11.6	31.4	8.0	10.9	4.6	5.5	8.7
For households with members engaged in any longer-term wage employment, MK	310,740	530,300	194,860 **	253,370	55,180 ***	301,030	175,500 **
Median, MK	105,710	180,000	76,670	120,000	36,000	80,000	76,000
As share of total net income of these households, %	58.9	71.7	52.1	54.4	46.8	50.0	52.5
Household enterprise, % of households operating	37.9	45.5	36.5 ***	41.5	30.7 ***	32.3	37.7 ***
Household enterprise net income per capita, all households, mean, MK	39,430	115,180	25,330	40,680	7,540	30,570	23,900
As share of total net income of all households, %	17.1	25.0	15.6	24.6	5.2	4.7	18.6
For households that operated any household enterprises, MK	104,010	253,360	69,390	97,970	24,570	94,650	63,460
Median, MK	13,710	29,400	12,400	16,670	9,000	19,460	11,430
As share of total net income of these households, %	44.9	54.6	42.7	59.2	16.8	14.5	49.3
Observations	*11,434*	*1,864*	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*

Source: Authors' weighted analysis of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Asterisks on the statistics for 'All farming households', 'Poor farming households', and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-farming households', 'Non-poor farming households', and 'Larger landholding' households, respectively. This is not done for medians or the statistics on share of total net income. * = $p < 0.10$, ** = $p < 0.05$, *** = $p < 0.01$.

The longer-term rural economic development vision described in Chapter 2 will involve households that are not able to rely on their farming to meet their welfare needs increasingly relying on off-farm employment. To successfully transition from primarily agricultural to non-agricultural livelihoods, such households will need to obtain sufficient income from non-agricultural employment so that the rainfed farming that they can do on their cropland holdings increasingly is seen to be a poor economic choice for workers in the households. So far only a relatively small share of Malawian households have successfully navigated this transition out of agriculture. However, the significant share of the income of farming households that comes from off-farm employment and the growing numbers of farming households with members regularly seeking *ganyu* work or operating household enterprises suggests that agricultural livelihoods will become less and less central to the welfare of most Malawian households. Only through

primarily pursuing non-agricultural livelihood strategies will households with relatively small cropland holdings be able to meet the needs of their members and to invest for a better future for their children.

However, the three types of off-farm employment available to workers in farming households come with their own strategic challenges. *Ganyu* employment and seasonally operated household enterprises allow workers in farming households to focus on farming during the rainy season and then pick up temporary work or reengage in a household enterprise after the harvest. However, the income households can obtain from such work is uncertain. Demand for short-term workers in farming communities in the dry season is likely to be much lower than during the cropping season, while the supply of workers competing for *ganyu* labor opportunities at that time of year will be large. Similarly, the returns to household commercial enterprises will depend to a large degree on the nature of the enterprise—offering skilled services to other households typically will provide the household a larger income stream than will small-scale trading of local agricultural produce. Many households may not have the capital or skill sets to create sufficiently remunerative enterprises. In contrast, longer-term wage employment can provide a more assured income stream for the household. However, wage employment opportunities are rare, particularly in rural communities. Moreover, if a member of a farming household successfully finds wage employment, the household will face a reduction in the labor it has available for farming.

In the sub-sections that follow, we draw on the IHS5 dataset to develop a profile of who engages in the various types of off-farm employment and, when possible, what sort of work they undertake. Since it is the most important source of off-farm income for farming households and provides income to non-farming households equal to that which they derive from formal wage employment, we first examine *ganyu* employment. We then examine the various types of formal wage employment reported by workers in IHS5, examining who has found wage employment and what sort of wage work they do. Finally, we describe the commercial enterprises members of the IHS5 sample households reported operating. In presenting this information, our objective is to identify important barriers to remunerative off-farm employment and consider how they might be overcome.

Casual short-term ganyu employment

The IHS5 collects information, if limited, on participation by household members aged five years or older in *ganyu* labor—casual piecework or daily-wage-based work arrangements. The principal IHS5 data limitation is that no information is collected on the type of *ganyu* work done by household members or when in the year it was done. This limits the insights that can be obtained on the sort of tasks done under *ganyu* and, hence, the skills required for those employed. We also are unable to see how the type of work done under *ganyu* changes through the seasons of the year.

Table 5.2 provides summary results on participation in *ganyu* at both household and individual *ganyu* worker levels. Regionally among farming households, those in the Northern region are less likely to have members engaging in such work than are those in the Central and Southern regions. For non-farming households, those in the Central region are more likely to do *ganyu* than those in the other regions. Overall, farming households are considerably more likely than non-farming households to have members engaging in *ganyu*—almost three-quarters of farming households reported having a member who engaged in *ganyu* in the past year, compared to only about half of non-farming households. We presume that much of that done by farming households was done in the rainfed cropping season and involved neighboring farming households hiring-in their labor so that those neighbors can complete their crop operations in a timely manner. Among farming households, engagement in *ganyu* employment is correlated with poverty and with smaller cropland holdings. Poor farming households are almost

40 percent more likely to engage in *ganyu* than are members of non-poor farming households, while those with smaller landholdings are 20 percent more likely to do so than those with larger cropland holdings.[17]

Table 5.2: Profile of engagement in ganyu labor, 2019/20

					Farming households			
		All Malawian	Non-farming	Farming (all)	Non-poor	Poor	Larger hldg.	Smaller hldg.
Households with any members that engaged in casual temporary employment (*ganyu*), %		69.5	49.2	73.3 ***	62.1	86.3 ***	62.7	76.3 ***
Northern region		60.4	45.6	62.9 ***	56.4	80.5 ***	56.2	65.7 **
Central region		71.8	54.7	75.3 ***	61.4	87.5 ***	63.9	79.4 ***
Southern region		70.0	44.4	74.6 ***	65.0	86.0 ***	64.5	76.3 ***
Ganyu workers, % of all individuals aged 5 years and older		35.4	24.1	37.1 ***	30.8	42.5 ***	35.0	37.5 **
For households with workers engaging in *ganyu*, share of individuals aged 5 years and older in these households doing so, %		49.1	48.2	49.2	49.7	48.9	52.9	48.5 ***
Share of all *ganyu* workers in Malawi, %		100.0	8.6	91.4	35.4	56.0	15.0	76.4
Ganyu workers								
Total days per year worked:	average	68.0	106.3	64.4 ***	60.0	67.2 ***	60.7	65.2 **
	median	45	72	42	36	48	36	42
Months per year worked:	average	5.8	7.1	5.7 ***	5.3	6.0 ***	5.4	5.8 ***
	median	5	6	5	4	5	5	5
Daily wage reported, MK:	average†	1,539	2,136	1,483 ***	1,757	1,311 ***	1,490	1,482
	median	1,000	1,500	1,000	1,000	1,000	1,000	1,000
Female, %		49.5	44.8	49.9 ***	47.0	51.8 ***	49.0	50.1
Age, years:	average	30.5	28.5	30.7 ***	31.7	30.1 ***	34.4	30.0 ***
	median	27	26	27	27	27	30	27
Ages 5 to 14 years, % share of all *ganyu* workers		12.1	5.1	12.7 ***	9.4	14.8 ***	10.3	13.2 ***
Ages 65 years and older, %		3.7	1.5	3.9 ***	4.6	3.5 ***	6.8	3.4 ***
Sample households		*11,434*	*1,864*	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*
Sample ganyu workers		*14,766*	*1,320*	*13,446*	*5,653*	*7,793*	*2,156*	*11,290*

Source: Authors' weighted analysis of data from the Malawi Integrated Household Survey for 2019/20 (IHS5).
Note: Asterisks on the statistics for 'All farming households', 'Poor farming households', and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-farming households', 'Non-poor farming households', and 'Larger landholding' households, respectively. This is not done for medians. * = p < 0.10, ** = p < 0.05, *** = p < 0.01.
† As some outlier values seemed implausible, the lower and upper one percent of values for daily wages were not included in computing average daily wages.

The share of all individuals who reported engaging in some *ganyu* in the past year is much lower among non-farming households—about one-quarter of all individuals aged five years and above in non-farming households, but over one-third in farming households. However, note in Table 5.2 that those that engaged in *ganyu* labor in non-farming households reported relying on such work for considerably more days in the previous year than did *ganyu* laborers in farming households—106 days on average, compared to 64 days for *ganyu* laborers in farming households. Moreover, the average number of months in which those in non-farming households reported pursuing such short-term employment was

[17] These findings for farming households are similar to those of Whiteside (2000) in a critical review of the literature on the use of *ganyu* employment in the livelihood strategies of rural Malawian households.

just over seven months, while those in farming households reported doing so for 5.7 months, on average. This suggests that individuals in farming households are more constrained by seasonal factors in their ability either to take on or to find *ganyu* employment.

Daily wages reported by farming household members for any *ganyu* work they did were quite consistent across farming household categories at the median, although workers in non-poor households reported receiving wages on average that were significantly higher than those received by those in poor farming households. However, the largest difference in daily *ganyu* wages reported is between *ganyu* laborers in non-farming households and those in farming households. Individuals in non-farming households engaged in *ganyu* reported wages that on average were over 40 percent greater than those received by their counterparts in farming households. Almost three-fifths of non-farming households reside in urban centers across Malawi. Urban labor markets in Malawi are considerably more competitive and diverse than those in rural communities. The higher wages reported by individuals in non-farming households engaged in *ganyu* likely reflect this.

Women in farming households are as likely as men in those households to participate in *ganyu*. However, in non-farming households, men are somewhat more likely than women to do so. We also find that children not yet of working age (under 15 years of age) will engage in *ganyu* work. This is significantly more common in farming households than in non-farming households—12.7 percent of all individuals from farming households engaging in ganyu are children. The share of ganyu workers that are children is even higher in poor farming households and in those with smaller cropland holdings.

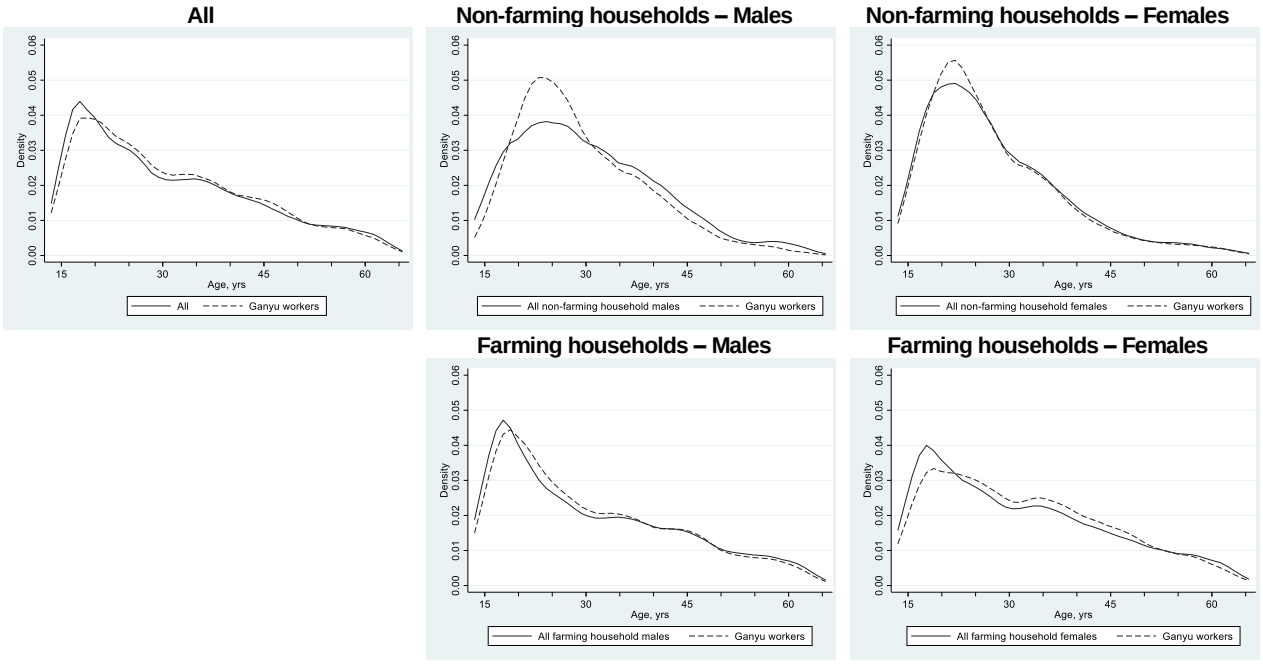
Adults who are no longer of working age (65 years of age and older) are unlikely to engage in *ganyu*. Nonetheless, older individuals in farming households are more likely than those in non-farming households to continue to participate in *ganyu* labor. Moreover, we see variation across farming household categories, but with a reverse pattern to that seen with the participation of children in *ganyu*—older individuals in farming households that are not poor or with larger landholdings are more likely to do *ganyu*.

The age profiles of those of working age (ages 15 to 64 years) who participate in *ganyu* labor show considerable differences between the non-farming and farming household categories, but smaller differences between the sexes within each category (Figure 5.1). In non-farming households, the engagement of men in *ganyu* labor is disproportionately seen between 17 to 30 years of age, with participation dropping off with increasing age. For women in non-farming households, the age period of strongest engagement in *ganyu* is briefer, being between 17 and 25 years of age. For non-farming households, likely *ganyu* is an important source of employment in the transition from schooling to either obtaining longer-term wage employment or establishing their own enterprise (or, for many women, increased child-rearing and other domestic obligations). While workers in non-farming households can and do rely on *ganyu* employment throughout their working lives, it is seemingly particularly in the period as they are entering the workforce out of school for which it is particularly important to their livelihoods. However, its role is transitional in nature, providing needed income while more remunerative, longer-term employment is sought.

In farming households, younger men also disproportionately engage in *ganyu* starting at about age 17, even if their engagement in *ganyu* does not demonstrate the strong peak seen for men around this age in non-farming households. However, men in farming households continue to engage in *ganyu* for a longer period than do male *ganyu* workers in non-farming households, through about 35 years of age. The pattern for women in farming households working at *ganyu* differs from that of women in non-farming households in two ways. First, they begin working at *ganyu* at a somewhat older age than do women in non-farming households—about age 22 years, some five years after women in non-farming

households.[18] Secondly, as with men in farming households, they continue to readily engage in *ganyu* over a much longer age range.

Figure 5.1: Age-specific participation in ganyu labor compared to share of total population in each age-year, by farming and non-farming household categories and sex, ages 15 to 64 years



Source: Authors' weighted analysis of data from the Malawi Integrated Household Survey for 2019/20 (IHS5).
Observations: All—all: 26,296; *ganyu* workers: 12,559. Non-farming households – Males—all: 1,911; *ganyu* workers: 712. Non-farming households – Females—all: 2,006; *ganyu* workers: 521. Farming households – Males—all: 10,567; *ganyu* workers: 5,784. Farming households – Females—all: 11,812; *ganyu* workers: 5,542.

Ganyu employment is engaged in by at least one member of almost three-quarters of farming households with almost half of all individuals aged 5 years and older in these households obtaining such employment. This suggests that such short-term employment is as central as farming on their own cropland to the livelihoods of most farming households. Certainly, *ganyu* employment is a valuable source of income for farming households to exploit during the dry season when, for those farming households without irrigable land, little farming can be done. However, the trend analysis presented in Chapter 2 comparing 2010/11 (IHS3) with 2019/20 (IHS5) shows that participation among all Malawian households in *ganyu* has increased significantly over this period (Table 2.7). Such employment appears to have become a necessary component of their annual income stream for growing numbers of farming households in Malawi, as their farming activities on smaller average cropland areas alone increasingly are proving to be insufficient in generating the income required to meet all of their needs. Unlike for many workers in non-farming households, *ganyu* does not appear to be a transitional form of employment engaged in by workers in farming households while they seek to secure more remunerative longer-term wage employment. Rather, it is a permanent component of their livelihoods.

[18] In farming households, the early engagement of men and the delay of women in *ganyu* employment may reflect gendered social norms in farming communities related to the degree to which younger adults can apply their labor outside of the household farm. However, whether this is the case cannot be confirmed using the IHS5 dataset.

Longer-term wage employment

An overview of the wage employment engaged in by members of IHS5 households over the previous 12 months is presented in Table 5.3. Such employment remains somewhat exceptional, particularly among farming households—while over one-third of non-farming households have a member with wage employment, only 15 percent of farming households do. Households in the Northern region are somewhat more likely to have members with wage employment than households in the other two regions. This regional pattern is seen across all household categories. Across the sub-categories of farming households, households with smaller cropland holdings are significantly more likely than those with larger landholdings to have a member with wage employment. However, non-poor farming households are more likely than poor farming households to have a member with wage employment.

Among individual workers, men are most likely to have wage employment—only just over one-quarter of those with wage employment are women, with a somewhat higher share among women from non-farming households. Moreover, it is older men that are most likely to have secured wage work—37 percent of those with wage employment are men between 35 and 64 years of age.

The most common type of wage employment in Malawi by industry is in the agricultural sector.[19] Such employment includes agricultural estate managers and employees, particularly in the tea and sugar sub-sectors; tenant farmers on tobacco estates; agricultural extension agents; staff at Agricultural Development and Marketing Corporation (ADMARC) depots; and staff of food processing firms, including local grain mills. Private household employment as cooks, cleaners, child caregivers, gardeners, guards, drivers, and the like is the second largest category of wage employment overall, engaged in by workers from farming and non-farming households to a similar degree.

Education is among the largest sources of wage employment. With schools found in most rural communities, teachers, administrators, and support staff in schools will quite commonly be members of households that also engage in farming. Consequently, we find that farming households are more likely to have members with wage employment in education than are non-farming households. However, the share of wage workers in the medical field is not different between farming and non-farming households. Although the pattern with educational employment reflects that most Malawians live in rural communities and that schools are present in most areas, this spatial pattern is not seen with hospitals and health centers. There is a lower density of hospitals and health centers across rural Malawi relative to schools. Moreover, higher-level medical centers that require relatively large numbers of health workers to operate effectively are typically located in urban centers.

For several of the other industry sub-categories for wage employment listed in Table 5.3, a significantly larger share of members of non-farming households engages in them than do members of farming households. This reflects the basic spatial pattern of industrial and commercial firms, providers of specialized services, and some government administration functions being concentrated in urban centers. It is these firms and agencies that provide much of the wage employment outside of agriculture in Malawi. As non-farming households also are concentrated in urban centers, their members are most likely to have secured wage employment in these industrial sub-categories.

[19] The variables on industry and occupation in the wage labor module in the IHS5 dataset were found to have been inaccurately coded in the released data files. Using the enumerator text notations on this information recorded in the datafiles, these variables were recoded record-by-record in a more consistent and accurate manner. The statistical software file created to recode these variables is available upon request.

Table 5.3: Profile of participation in wage employment in Malawi, 2019/20

	All Malawian	Non-farming	Farming (all)	Farming households			
				Non-poor	Poor	Larger landhldg.	Smaller landhldg.
Household member with wage employment, percentage share of households	19.8	43.4	15.3 ***	20.1	9.8 ***	11.0	16.5 ***
Northern region	23.2	47.2	19.2 ***	22.1	11.4 ***	11.5	22.5 ***
Central region	18.6	40.8	14.1 ***	19.6	9.4 ***	11.4	15.1 **
Southern region	19.8	45.2	15.3 ***	19.8	9.9 ***	10.0	16.1 ***
Working-age individuals (age 15 to 64 years) with wage employment, percentage share	9.6	23.7	7.2 ***	10.2	4.1 ***	6.1	7.4 **
Younger youth (15 to 24 years)	3.6	10.3	2.5 ***	3.4	1.6 ***	3.4	2.3
Older youth (25 to 34 years)	14.0	28.2	10.4 ***	15.0	5.5 ***	11.1	10.3
Non-youth (35 to 64 years)	13.2	37.4	10.1 ***	14.2	6.0 ***	5.9	11.3 ***
By age group, percentage share of all with wage employment							
Younger than working age (under 15 years)	0.7	0.2	1.0 **	0.2	3.0 ***	0.7	1.1
Younger youth (15 to 24 years)	14.2	16.4	13.0 *	12.2	15.0	18.4	12.0 *
Older youth (25 to 34 years)	33.9	38.6	31.3 ***	33.0	27.2 **	34.1	30.8
Non-youth (35 to 64 years)	47.5	42.2	50.4 ***	50.5	50.2	40.3	52.3
Older than working age (65 years or older)	3.6	2.5	4.2 **	4.1	4.5	6.5	3.8
Females with wage employment, percentage share of all with wage employment	26.8	31.6	24.1 ***	24.2	24.0	22.8	24.4
Industry sub-categories, percentage share of those with wage employment							
Agricultural production, processing, or sales	22.2	14.4	26.4 ***	20.3	41.3 ***	30.8	25.6
Private household (wage employment)	14.1	14.1	14.0	13.7	14.9	11.0	14.6
Other services	11.9	15.0	10.1 ***	10.8	8.5	8.1	10.5
Education	11.5	8.6	13.0 ***	16.1	5.5 ***	16.6	12.3
Security	6.2	8.2	5.1 **	4.9	5.6	3.7	5.4
Trade, non-agricultural	6.1	8.2	4.9 **	5.6	3.4 *	5.0	4.9
Construction, carpentry	5.6	4.6	6.1	6.0	6.5	3.1	6.7 **
Medicine	5.2	6.1	4.8	6.3	1.1 ***	5.2	4.7
Transportation	5.2	7.7	3.8 ***	4.5	1.9 ***	1.1	4.3 ***
Other products	2.8	2.7	2.8	2.4	4.0	3.0	2.8
Public administration or defense	2.3	2.1	2.5	2.8	1.7	4.8	2.0 *
Religious or political	1.9	2.0	1.9	2.3	0.7 **	1.0	2.0
Social work or development projects	1.7	2.8	1.1 **	1.0	1.3	0.4	1.2 **
Prepared food sales	1.4	2.3	1.0 **	0.9	1.0	1.5	0.9
Drink production and sales	1.1	0.9	1.1	1.1	1.4	2.5	0.9
Forestry, timber, wildlife	1.0	0.4	1.3 **	1.4	1.1	2.3	1.2
Occupational sub-categories, percentage share of those with wage employment							
Service workers	30.9	31.7	30.4	30.0	31.4	26.0	31.2
Processing and production, transport, other labor	25.4	23.9	26.2	25.1	28.9	19.2	27.6 **
Professional or technical	18.5	18.1	18.8	23.7	6.9 ***	25.5	17.5 **
Agriculture, forestry, fisheries - production	11.7	7.4	14.0 ***	9.4	25.4 ***	15.3	13.8
Sales	7.0	9.7	5.5 ***	5.9	4.5	7.1	5.2
Administrative, managerial, clerical	6.5	9.3	5.0 ***	5.9	2.9 ***	6.9	4.7
Sample size: Households	*11,434*	*1,864*	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*
Individuals of working age	*26,296*	*3,917*	*22,379*	*12,071*	*10,308*	*3,916*	*18,463*
Indiv. with wage employment	*2,840*	*1,012*	*1,828*	*1,367*	*461*	*270*	*1,558*

Source: Authors' weighted analysis of data from the Malawi Integrated Household Survey for 2019/20 (IHS5).
Note: Asterisks on the statistics for 'All farming households', 'Poor farming households', and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-farming households', 'Non-poor farming households', and 'Larger landholding' households, respectively. * = p < 0.10, ** = p < 0.05, *** = p < 0.01.
Industry and occupation categories coded from primary information recorded in IHS5 dataset.

The bottom panel of Table 5.3 on occupational sub-categories provides some indication of the distribution of skills among those with wage employment. As professional and technical workers include teachers and those trained in the health sciences, we see that such workers make up an equal share of wage employment among both farming and non-farming households, given that these skilled workers are found in both urban and rural communities. For individual members involved in service provision occupations and in processing, production, and transport of all sorts, we also find equal shares across farming and non-farming households. There is demand for workers who can produce these products or provide these services in both farming and non-farming communities. Value-addition processing of agricultural products as well as the provision of general skilled services, such as construction, falls into the processing, production, and transport occupational category. In consequence, there is not as strong a non-farming household bias to wage employment in this sub-category as we might expect. In contrast, administrative and sales workers make up a larger share of those with wage employment in non-farming households than in farming households, reflecting the concentration of workers with such roles in urban centers. Wage employment in primary production occupations, including agriculture, not surprisingly is primarily found among members of farming households.

Table 5.4: Wages, educational attainment, and urban proximity of those engaged in wage employment in Malawi, by industry and occupational sub-categories, 2019/20

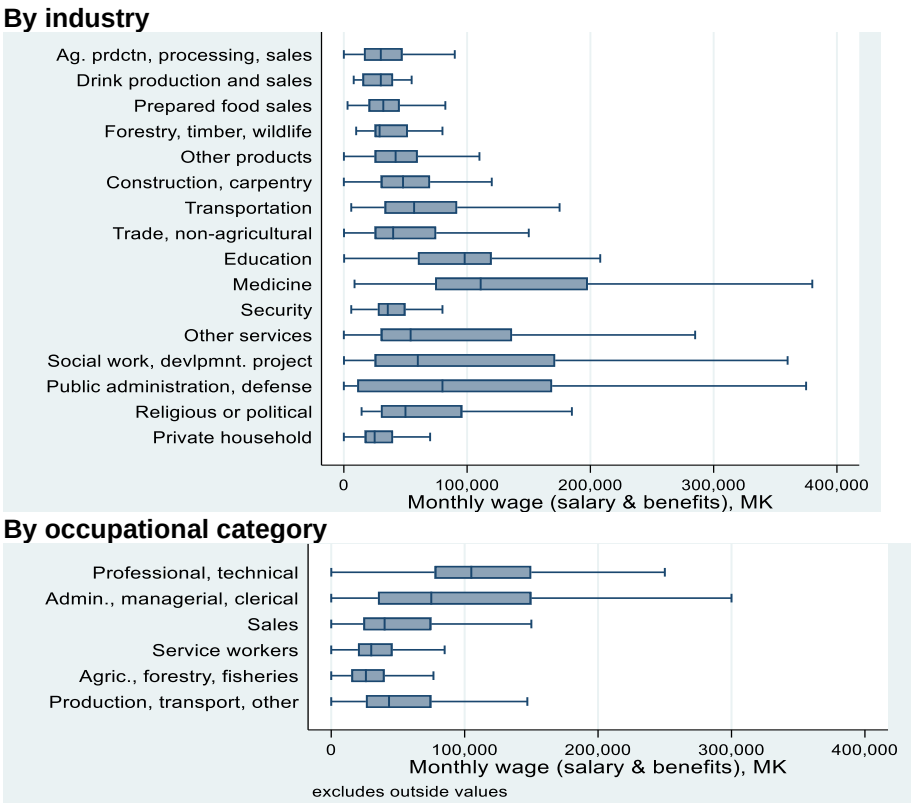
	Wage, MK/month		Schooling completed, years, mean	Distance to urban center, mean, km
	mean	**median**		
All those with wage employment	83,790	40,000	8.9	15.1
All individuals of working age (15 to 64 years)	*na*	*na*	*6.6*	*20.8*
Industry sub-categories				
Social work or development projects	245,270	60,000	11.4	12.2
Medicine	186,100	111,000	12.4	13.1
Public administration or defense	145,930	80,000	10.3	16.2
Education	126,000	98,000	12.2	19.5
Religious or political	119,960	50,000	9.6	15.0
Other services	111,990	54,170	10.2	9.8
Transportation	85,330	57,000	10.0	10.0
Trade, non-agricultural	77,570	40,000	9.8	12.3
Drink production and sales	73,150	30,000	8.5	13.3
Construction, carpentry	67,330	48,000	8.9	13.5
Security	61,700	35,650	8.5	11.2
Other products	59,350	42,000	8.6	19.3
Prepared food sales	52,050	32,000	8.3	9.5
Agricultural production, processing, or sales	49,850	30,000	6.4	21.0
Forestry, timber, wildlife	45,080	29,000	8.1	21.3
Private household (wage employment)	36,350	25,000	7.0	12.5
Occupational sub-categories				
Professional or technical	165,530	105,000	12.7	17.0
Administrative, managerial, clerical	162,950	75,000	11.3	11.7
Sales	77,790	40,000	10.2	12.7
Processing and production, transport, other labor	73,740	43,330	8.7	15.7
Service workers	44,920	30,000	7.4	12.8
Agriculture, forestry, fisheries - production	37,890	26,000	5.6	20.4

Source: Authors' weighted analysis of data from the Malawi Integrated Household Survey for 2019/20 (IHS5).
Note: Sample of individuals with wage employment: 2,840.
'Wage' includes both salary and value of other employee benefits reported. 'Distance to urban center' is based on travel distance to nearest center with a population of 20,000 or larger. Industry and occupation categories coded from primary information recorded in IHS5 dataset. 'na' = not applicable.

To better understand the level of income that households receive by having members engaged in wage employment, Table 5.4 presents by industry and occupational sub-category the average and median monthly wages workers reported receiving. Figure 5.2 presents box plots on the distribution of wages received by workers in the same categories.

The highest wages are received by some of those working in medicine, in education, in social work and on development projects, and in public administration and defense. However, there is considerable variation in wages within these industrial sub-categories, as shown in Figure 5.2. This reflects that each of these industrial categories employs workers across a range of occupational categories, with highly trained individuals, who receive relatively high wages, being supported through the services provided by much lower-paid workers in the schools, medical centers, or agencies in which they are all employed. The lowest variability in wages received is seen in the lowest-wage occupational categories—workers in private households; those engaged in agricultural production, processing, or sales; those producing drinks or preparing food for sale, those involved in forestry, timber, and wildlife management tasks; and those providing security services. Most of the jobs in these industrial sub-categories do not require specialized skills or high levels of education, so the wages are quite low.

Figure 5.2: Box plots of monthly wages reported for those engaged in wage employment, by industry and occupational sub-categories, 2019/20

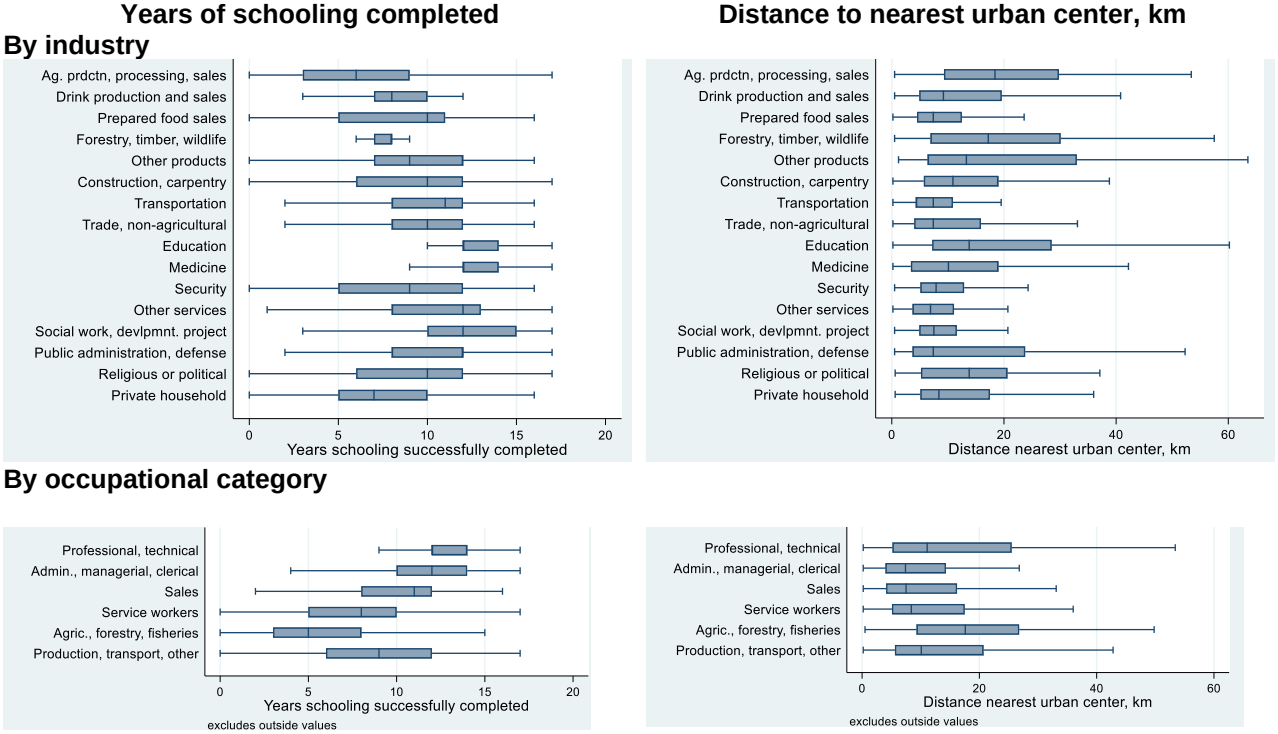


Source: Authors' weighted analysis (household) of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Wages include both salary and value of other employee benefits reported. Industry and occupation categories coded from primary information recorded in IHS5 dataset. The vertical centerline of each box is at the median of the distribution; the box ends are at the 25th and 75th percentiles; and the whisker lines span all data points within a range 1.5 times the distance between the upper and lower quartiles, stopping at the smallest/largest such value. In the graphs here, while all categories had values outside of the ranges of the whisker plots, those value points are not presented.

The average educational attainment of those with wage employment is also presented in Table 5.4 and on the left side of Figure 5.3. Those with wage employment have on average 2.3 years more of schooling than do all individuals of working age, suggesting an educational hurdle to obtaining any type of wage employment. The associations between the level of education attained and the quality of wage employment obtained are as expected. Statistically, higher educational attainment is significantly correlated with higher wages for all industrial sub-categories, except prepared food sales, and for all occupational categories. The highest-paid jobs— in medicine, in education, and in social work and on development projects—generally require that the worker completed secondary school.

Earlier in contrasting wage employment patterns by farming and non-farming households, it was repeatedly noted that farming households are generally rural, while non-farming households tend to reside in urban centers (see Table 3.1). We suggested that several industrial sub-categories of wage employment primarily are found in urban centers, so jobs in those industries are more likely to be held by workers from non-farming households. We examine this relationship more explicitly with a variable on the average travel distance to urban centers with a population of 20,000 or more for households with individuals with wage employment, disaggregated by industrial and occupational sub-categories. The results are presented in Table 5.4 and on the right side of Figure 5.3.

Figure 5.3: Box plots of educational attainment and distance to nearest urban center for those engaged in wage employment, by industry and occupational sub-categories, 2019/20



Source: Authors' weighted analysis (household) of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Distance to urban center is based on travel distance to nearest urban center with a population of 20,000 or larger. Industry and occupation categories coded from primary information recorded in IHS5 dataset. The vertical centerline of each box is at the median of the distribution; the box ends are at the 25th and 75th percentiles; and the whisker lines span all data points within a range 1.5 times the distance between the upper and lower quartiles, stopping at the smallest/largest such value. In the graphs here, while all categories had values outside of the ranges of the whisker plots, those value points are not presented.

Examining the industrial sub-categories, the most urban-centered are prepared food sales; the generic category of “Other services”, which typically are quite specialized in nature; and transportation. In contrast, the most rural are those involved in forestry, timber, and wildlife management; agricultural production, processing, or sales; education; and the generic category of “Other products”, which includes mining, tailoring, metalworking, and other somewhat specialized production. The other industrial sub-categories are more evenly distributed across rural and urban zones, at least based on the indicator used here. The pattern of average distance to urban centers for those with wage employment by occupational sub-category generally follows expectations. Administrative, managerial, and clerical occupations; sales workers; and service workers tend to be located relatively closer to urban centers than do other wage workers. The most rural are those with wage employment in agricultural production, forestry, or fisheries.

While wages are relatively low for all industrial and occupational sub-categories that do not require significant education, the rural-centered industries and occupations are notable for almost uniformly providing low wages. The only exception to this is in education, which is somewhat atypical of rural wage employment opportunities. The largest wage employment industry sub-category in terms of the number of workers nationally is agricultural production, processing, or sales. The median reported monthly wages in this sub-category are MK 30,000, 25 percent less than the median wages for all those in Malawi with wage employment. Given the sharp seasonality in labor use in rural communities, the relatively low wages that rural workers are likely to obtain if they do secure wage employment in agricultural production, processing, or sales reflects the fact that so many able workers are available to take on such work. There is an almost limitless supply of potential workers for employers offering wage employment in agriculture. The result is a strong downward pressure on rural wage levels.

That only about 10 percent of all those of working age in Malawi receive a salary for their work suggests that there are significant barriers to expanding formal labor markets of all sorts across the country. These barriers are particularly challenging for members of farming households—while 24 percent of those of working age in non-farming households have wage employment, only 7 percent of those in farming households do. The strong seasonality in levels of economic activity in rural communities and the continued ability, but declining sustainability, of most Malawians living in rural communities to engage in rainfed agricultural production is certainly an important part of the explanation for why wage employment opportunities are so limited in those communities. As discussed conceptually in Chapter 2, increased household income flows resulting from higher agricultural productivity levels could result in much greater demand for non-agricultural products and services in rural communities across Malawi. This increased demand would expand opportunities for off-farm employment, including some wage employment. However, the relatively sparse degree of participation by members of farming households in wage employment evident in the IHS5 dataset suggests that demand for such non-agricultural products and services is not increasing, at least not yet. Incomes for the larger and more commercially oriented farming households do not appear to be rising overall through higher agricultural productivity. In consequence, we are not seeing any sharply higher demand in rural communities for non-agricultural products and services or greater employment opportunities for those who might produce or provide them, including in formal employment work settings.

Household enterprises

The third type of off-farm employment that we examine is the commercial enterprises that household members entrepreneurially form to expand their sources of income. An overview of all household enterprises reported by IHS5 survey households is presented in Table 5.5, disaggregated between non-farming and farming households and sub-categories of farming households. Farming households are significantly less likely to have a household enterprise than households that do not farm—just over one-third of farming households reported having at least one such enterprise, while 45 percent of non-farming households do so. There is not much difference across the three regions in the share of households with such enterprises, although households in the Central region are somewhat more likely to operate one. Among farming households, non-poor households and those with smaller cropland holdings are significantly more likely to have a household enterprise than poor and larger landholding households, respectively. Only one of eight households with enterprises reported operating more than one in the previous 12 months.

Table 5.5: Household engagement in commercial enterprises in Malawi, 2019/20

				Farming households			
	All Malawian	Non-farming	Farming (all)	Non-poor	Poor	Larger lndhldg.	Smaller lndhldg.
Engaged in any household enterprises, percent of households	37.9	45.5	36.5 ***	41.5	30.7 ***	32.3	37.7 ***
Northern region	35.4	46.3	33.6 ***	36.7	25.2 ***	29.0	35.5 *
Central region	39.1	46.1	37.7 ***	43.7	32.5 ***	32.7	39.5 ***
Southern region	37.5	44.6	36.2 ***	41.7	29.7 ***	33.5	36.7
Have more than one household enterprise, percent of households with enterprises	12.5	13.1	12.3	14.3	9.3 ***	12.2	12.4
Age of head of households with enterprises, percentage share of those with enterprises							
Younger youth (15 to 24 years of age) – *9.2% of all households are in this category*	8.0	11.8	7.1 ***	7.5	6.5	6.1	7.3
Older youth (25 to 34 years) – *26.4%*	29.4	40.6	26.5 ***	26.7	26.2	22.0	27.5 ***
Non-youth (35 to 64 years) – *51.3%*	54.9	45.2	57.2 ***	56.4	58.5	52.3	58.3 **
Not in economically active age range (more than 64 years) – *13.1%*	8.0	2.4	9.3 ***	9.5	8.9	19.5	6.8 ***
Female-headed households with enterprises, percentage share those with enterprises.– *31.0%*	25.8	23.3	26.3	24.0	29.9 ***	21.5	27.5 ***
Percentage share of female-headed HHs	31.5	45.0	29.6 ***	32.8	26.4 ***	23.6	31.1 ***
Manager is a household member other than the head, percentage share all enterprises	30.9	33.5	30.3 *	30.8	29.3	26.5	31.1 **
Manager is spouse of household head, %	25.8	30.4	24.7 ***	25.9	22.6 *	21.8	25.4 *
Female manager, %	48.6	52.0	47.8 *	46.9	49.3	39.2	49.8 ***
Manager less than 35 years of age, %	46.0	61.5	42.5 ***	43.2	41.2	37.0	43.8 ***
Enterprise jointly owned with non-household member(s), %	3.9	5.9	3.4 **	4.1	2.3 ***	3.3	3.4
Sample households	*11,434*	*1,864*	*9,570*	*5,457*	*4,113*	*1,985*	*7,585*
Enterprises	*5,094*	*961*	*4,133*	*2,696*	*1,437*	*769*	*3,364*

Source: Authors' weighted analysis of data from the Malawi Integrated Household Survey for 2019/20 (IHS5).
Note: Asterisks on the statistics for 'All farming households', 'Poor farming households', and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-farming households', 'Non-poor farming households', and 'Larger landholding' households, respectively. * = p < 0.10, ** = p < 0.05, *** = p < 0.01.
Industry categories coded from primary information recorded in IHS5 dataset.

With regards to the demographic characteristics of households operating enterprises, those with older heads are more likely than those with younger heads to do so—this is particularly seen among farming households. We surmise this pattern reflects both greater capital accumulation out of which to establish a business by households headed by older individuals and such households being able to draw on longer experience and wider networks in operating the enterprise than can households with younger heads. Female-headed households are less likely overall to operate a household enterprise—while 31 percent of households are headed by women, only 26 percent of households with enterprises are headed by women. However, female-headed farming households account for most of this difference. Female-headed non-farming households are almost as likely as male-headed non-farming households to operate a household enterprise—45 percent do so.

Within the household, the head is most commonly the manager of any household enterprise. Across all household categories, about 70 percent of such enterprises were reported managed by the household head. If the head is not the manager of an enterprise, typically the spouse of the manager will manage it. Only 5 percent of enterprises were reported managed by a household member other than the head or the spouse of the head. Nonetheless, the overall demographic characteristics of enterprise managers differ from those of the heads of households that operate an enterprise. Almost half of enterprise managers are women and 46 percent are under 35 years of age. Among non-farming households, women and those under 35 years of age make up a majority of enterprise managers.

Considering farming households, households with relatively small cropland holdings are more likely to operate an enterprise and to give management responsibilities for the enterprise to a woman than is the case for households with larger land holdings. A similar pattern across these categories of farming households is seen with younger enterprise managers also. A possible explanation for these patterns may be linked to farming households with larger landholdings being able to meet their basic needs by dedicating most of their household labor to farming. In contrast, households with smaller landholdings must diversify how their labor is employed to generate sufficient income. While older men in such households may maintain a focus on farming, to supplement the more limited farm income from their smaller cropland holdings, women and younger members in these households may be more likely to allocate some of their labor to operate off-farm enterprises.

Ownership of enterprises does not commonly include individuals that are not household members. Only 4 percent of all enterprises were reported to be co-owned with others outside of the household. Outside ownership is somewhat more common for specific types of enterprises—18 percent of enterprises involved in construction or carpentry were owned jointly with non-household members, as were 11 percent of these involved in the production of other services, such as vehicle and bicycle repair or hair cutting and styling.

Less than one-third of household enterprises operate 12 months a year (Table 5.6). While non-farming households are more likely to operate their enterprises full-time, the proportion that does so is only 36 percent. Twenty-nine percent of farming households operate their enterprise year around, while 38 percent operate them for less than six months a year. For many, this pattern reflects the strong seasonality of agricultural production, with many households shutting down their enterprises during the cropping season when household labor is needed on their farm plots. Among farming households, non-poor households are most likely to have an enterprise that operates full-time. There are no seasonal distinctions in how farming households disaggregated by landholding size operate their enterprises.

Table 5.6: Seasonality in engagement and types of commercial enterprises in Malawi, by household category, 2019/20

	All Malawian	Non-farming	Farming (all)	Farming households			
				Non-poor	Poor	Larger hhldg.	Smaller hhldg.
Seasonality of household enterprises: percentage share of all household enterprises							
Operate less than 6 months a year	36.5	31.0	37.8 ***	36.0	40.7 **	37.6	37.8
Operate 6 months or more, but not full-time	33.0	33.1	33.0	32.0	34.7	33.4	32.9
Full-time, operate 12 months a year	30.5	35.9	29.2 ***	32.0	24.6 ***	29.0	29.3
Industry sub-categories, percentage share of all household enterprises							
Agricultural processing & trade	23.6	19.5	24.5 ***	23.9	25.5	27.4	23.9
Non-agricultural trade	18.6	28.2	16.4 ***	19.8	10.7 ***	16.6	16.3
Prepared food sales	17.0	15.7	17.3	17.1	17.7	14.2	18.0 **
Charcoal or firewood production	12.3	8.8	13.1 ***	9.2	19.7 ***	10.1	13.8 **
Drink production & sales	6.3	3.0	7.1 ***	7.3	6.6	7.0	7.1
Other services	5.4	8.3	4.8 ***	5.8	3.1 ***	5.0	4.7
Transportation	4.8	6.3	4.5 *	5.1	3.4 **	5.1	4.3
Other products	4.3	5.1	4.1	4.7	3.1 **	4.5	4.0
Traditional straw or wood products	3.9	0.8	4.6 ***	3.2	7.1 ***	5.5	4.4
Construction, carpentry	2.9	3.5	2.8	2.8	2.8	2.9	2.8
Medicine	0.7	0.6	0.7	0.9	0.4	1.7	0.5 *
Education	0.2	0.3	0.2	0.3	0.0	0.0	0.2
Enterprises	*5,094*	*961*	*4,133*	*2,696*	*1,437*	*769*	*3,364*

Source: Authors' weighted analysis of data from the Malawi Integrated Household Survey for 2019/20 (IHS5).
Note: Asterisks on the statistics for 'All farming households', 'Poor farming households', and 'Smaller landholding' present the statistical significance of differences in the statistic between these households and those in the 'Non-farming households', 'Non-poor farming households', and 'Larger landholding' households, respectively. * = p < 0.10, ** = p < 0.05, *** = p < 0.01.
Industry categories coded from primary information recorded in IHS5 dataset.

The household enterprises recorded for IHS5 survey households were categorized by the types of products or services sold.[20]

- Enterprises centered on agricultural processing, sales, and trade were the most commonly reported. Typically, households reported concentrating on trade in specific commodities, such as groundnut, rice, vegetables of various sorts, small livestock and poultry, or banana or other fruit. While farming households are more likely to be engaged in this type of agricultural product-focused enterprises, almost 20 percent of enterprises operated by non-farming households also are centered on agricultural processing, sales, and trade.
- Non-agricultural sales are the second-most common type of household enterprise overall and the most common for non-farming households. The operation of small grocery stores was commonly reported. Other households reported selling used clothing (*kaunjika*), cloth (*zitenje*), small manufactured items, or airtime for mobile telephones.
- Traditional value-addition activities using local natural resources are common enterprises. These include the production of charcoal and firewood and the weaving of mats and baskets from straw.

[20] The variables on industry in the household enterprise module in the IHS5 dataset were found to have been inaccurately coded in the released IHS5 datafiles. Using the enumerator text notations on this information recorded in the datafiles, these variables was recoded record-by-record in a more consistent and accurate manner. The statistical software file created to recode these variables is available upon request.

Both types are common enterprises operated by farming households, particularly poor farming households.

- Prepared food sales are common enterprises engaged in by both farming and non-farming households. While *mandazi* (deep-fried buns) is the most common food sold, a broad range of food is prepared for sale, including samosas, *zitumbuwa* (banana fritters), potato chips, and roasted meat. Related, the production of both alcoholic and non-alcoholic drinks is also a common enterprise—more so for farming households as factory-produced alcoholic beverages and soft drinks are less available in the rural areas in which most farming households reside.

- Fewer differences between household categories are seen in their engagement in most of the other types of enterprises. These include the production and sale of other products, which include pottery, tailoring, metalwork, mining and quarrying, and brickmaking; construction and carpentry, including furniture making; and providing transportation services of various sorts, including operators of *kabaza* bicycle and motorcycle taxis, as well as minibuses.

- However, for the 'Other services' enterprise category, non-farming households are more likely to operate them. Many of the enterprises offering the somewhat specialized services in this category will be located in urban centers where there is sufficient demand for those services. It is more likely that these service providers will not also engage in farming.

- In contrast to the case with wage employment, very few household enterprises offer medical or educational services. Most such services across Malawi are provided by institutions, whether public or private, that employ suitably trained individuals on a salaried basis. The few household enterprises that offer medical services are traditional medicine specialists, while those that offer educational services typically run nursery schools.[21]

Characteristics of household enterprises grouped by industry are presented in Table 5.7. Annual net enterprise income reported by survey households shows considerable variability. Most enterprise categories have a few extreme outliers for net income, both positive and negative. The mean net enterprise income values using all records for several enterprise categories are dominated by these outlier values. Consequently, trimmed means for net enterprise income are also presented in Table 5.7 to better represent the central tendencies in the distributions of enterprise income by category. Annual net enterprise income medians are also presented by category in Table 5.7 and graphed in Figure 5.4.

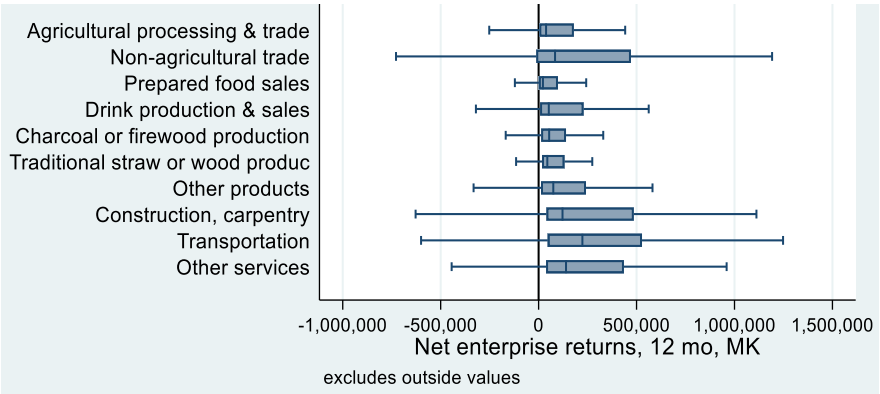
[21] Given their small sample sizes of 31 and 10 cases, respectively, the 'Medicine' and 'Education' enterprise categories are not included in the text discussion or in the tables that follow. However, the characteristics of such enterprises are included in computing any aggregate statistics for "All household enterprises".

Table 5.7: Income from and seasonality of operation of household enterprises in Malawi, by industry, 2019/20

	Annual net enterprise income, MK			Reported loss on annual net enterprise income, %	Months in operation each year, %			
	Mean, including outliers	Trimmed mean	Median		Less than 6	More than 6; less than 12	Full-time	*Sample size*
All household enterprises	367,500	160,890	55,000	16.4	36.5	33.0	30.5	*5,094*
Transportation	466,000	312,700	223,600	10.8	18.5	33.0	48.5	*251*
Construction, carpentry	-311,800	277,600	122,000	12.4	28.7	41.3	30.0	*173*
Other services	148,000	243,700	140,000	11.6	19.8	30.0	50.2	*267*
Non-agricultural trade	676,800	234,900	84,000	27.1	27.4	34.3	38.4	*989*
Other products	169,300	179,900	74,990	16.7	31.3	28.6	40.1	*220*
Drink production & sales	-130,600	165,500	52,000	15.8	29.5	35.4	35.1	*329*
Agric. processing, trade	817,100	125,500	38,000	17.3	44.7	30.8	24.5	*1,191*
Charcoal or firewood	115,900	117,600	54,000	5.2	42.4	31.7	25.9	*640*
Straw or wood products	169,400	102,500	44,500	3.5	40.4	36.8	22.8	*201*
Prepared food sales	17,200	98,300	22,000	18.4	47.3	34.7	18.0	*792*

Source: Authors' weighted analysis of data from the Malawi Integrated Household Survey for 2019/20 (IHS5).
Note: Sales information was missing for 40 enterprises, so statistics on net income do not include these enterprises. To compute the trimmed mean of annual net enterprise income, only values between the fifth and 95th percentiles for all enterprises were used (504 cases were excluded).
Industry categories coded from primary information recorded in IHS5 dataset.

Figure 5.4: Box plots of annual net enterprise income, by industry sub-categories, 2019/20



Source: Authors' weighted analysis (household) of 2019/20 (IHS5) Malawi Integrated Household Survey.
Note: Sales information was missing for 40 enterprises, so statistics on net income do not include these enterprises. The 'Medicine' and 'Education' industry categories are not presented due to their small sample sizes. Industry categories coded from primary information recorded in IHS5 dataset. The vertical centerline of each box is at the median of the distribution; the box ends are at the 25th and 75th percentiles; and the whisker lines span all data points within a range 1.5 times the distance between the upper and lower quartiles, stopping at the smallest/largest such value. While several categories had values outside of the ranges of the whisker plots, those value points are not presented.

The lowest incomes are found in prepared food enterprises followed by those in the agricultural processing and trade category. These are the two categories of enterprises which operators are most likely to operate for less than six months each year. The second lowest tier of enterprise categories in terms of net income are drink production and sales, charcoal and firewood production, and the production of traditional straw or wood products. Most households, particularly in rural areas, can engage in these enterprises. For both production of charcoal and firewood and production of straw or wood products, these enterprises are also quite seasonal with only a quarter of enterprises in either category operating full-time. The annual net incomes such enterprises provide are relatively small.

Enterprises in the non-agricultural trade category show some of the greatest variation in annual net income, both positive and negative, across the categories. Households operating such enterprises were the most likely to report net losses over the past year—27 percent of non-agricultural trade enterprises reported annual costs that exceeded sales. The risks of commercial losses associated with non-agricultural trade are considerably higher than they are for agricultural trade or for any of the other enterprise categories. However, many households involved in such trade do obtain positive returns and at levels higher than most enterprises involved in trading agricultural products obtain. Moreover, in contrast to agricultural processing and trade enterprises, many non-agricultural trade enterprises operate for much of the year, if not full-time. The median annual net income for households operating non-agricultural trade enterprises is more than double that obtained by households operating agricultural trade enterprises.

The annual net income obtained from enterprises that produce or provide other products is on average just below that obtained by enterprises engaged in non-agricultural trade. Net income from enterprises in the construction and carpentry, the provision of other services, and, especially, the transportation categories are significantly higher on average than for enterprises involved in non-agricultural trade. These categories of enterprises also are generally operated over most of the year. In contrast to non-agricultural trade, the share of enterprises in these categories that reported annual net losses is considerably lower.

Table 5.8: Labor sources, manager characteristics, and location of household enterprises in Malawi, by industry, 2019/20

	Household members that worked last month, mean, no.	Hire-in any labor, %	Manager not household head, %	Female manager, %	Manager less than 35 years of age, %	Schooling of manager, mean, yrs.	Has access to electricity, %	Distance to urban center, mean, km
All household enterprises	1.14	8.4	30.9	48.6	46.0	6.7	7.0	18.3
Agric. processing, trade	1.12	7.0	33.4	58.5	46.3	6.3	2.8	18.4
Non-agricultural trade	1.20	8.6	30.0	41.6	52.7	8.6	12.8	16.4
Prepared food sales	1.18	5.4	47.8	79.2	50.7	6.4	7.9	19.6
Drink production & sales	1.15	7.5	39.3	75.3	29.3	5.5	8.6	21.3
Charcoal or firewood	1.16	3.7	29.6	45.5	43.9	5.0	3.2	19.8
Straw or wood products	1.18	1.3	7.3	10.0	26.3	4.3	0.7	22.2
Other products	1.15	10.7	22.4	27.2	38.6	7.1	12.0	16.1
Construction, carpentry	1.04	33.7	10.1	5.8	32.0	7.6	2.0	15.2
Transportation	1.01	18.5	9.6	5.5	54.6	7.6	0.5	14.7
Other services	1.02	13.5	19.9	18.3	57.8	8.9	16.9	17.3

Source: Authors' weighted analysis of data from the Malawi Integrated Household Survey for 2019/20 (IHS5).
Note: Industry categories coded from primary information recorded in IHS5 dataset.

Most enterprises across all of the categories considered are one-person operations. The mean number of household members who were reported to have worked in the previous month in operating the enterprise is 1.14 across all enterprises (Table 5.8). While there is some variation between enterprise categories, no category uses much household labor beyond the manager. Enterprises in the transportation, the other services, and the construction and carpentry categories are notable for effectively only using one household member in their operations. However, enterprises in these categories are also the most likely to hire-in outside labor. Few enterprises in other categories employ outside labor.

Table 5.8 also profiles the managers of enterprises in each category. Several enterprises are female-dominated—prepared food sales, drink production and sales, and agricultural processing and trade. Recall that these are also the enterprises with the lowest net returns on average. Men dominate in the operation of enterprises in the other categories, although women make up a large minority of operators of enterprises involved in non-agricultural trade and in firewood and charcoal production. Younger managers are somewhat disproportionately more likely to operate enterprises involved in transportation, in providing other services, in non-agricultural trade, and in prepared food sales.

As with wage employment, we also consider whether some of the enterprises may require higher levels of education to operate by examining the average educational attainment of the enterprise managers (Table 5.8). The lowest educational attainment is seen in managers of enterprises producing traditional straw or wood products, followed by charcoal or firewood and drink production and sales enterprises. In general, these enterprises do not require skills that can only be obtained through formal education. The highest levels of education are found among managers of enterprises providing other services or those engaged in non-agricultural trade. Successful operation of such enterprises is likely to either require specialized skills or strong numeracy, to which formal education will contribute.

Table 5.8 also presents information on whether in operating the enterprise the manager had access to electricity—only 7 percent of enterprises reported having such access. We expected that the types of enterprises that are more commonly operated by non-farming households and, as such, more likely to be found in urban centers are those that have the greatest degree of access to electricity, and this is the case. However, even for these types of enterprises, access to electricity is rare at less than 17 percent of enterprises in any one category. This low prevalence of access to electricity overall makes it difficult to judge from these data whether poor electrification rates pose a barrier to enterprise creation by households or to increasing the net returns that they can earn from those enterprises. However, there is clear evidence globally that electrification is strongly and positively correlated with economic growth and improved welfare (Ayana and Degaga 2022). Poor access to electricity almost certainly imposes significant opportunity costs for many operators of household enterprises across Malawi.

Table 5.9: Location where household enterprise operates, by industry, percent of enterprises, 2019/20

	Household residence (inside)	Household residence (outside)	Market-place	Roadside	Mobile	Shop in commer-cial area	Industrial site	Other fixed place
All household enterprises	11	25	30	12	14	2	1	5
Agric. processing, trade	6	18	49	11	11	1	1	4
Non-agricultural trade	17	19	29	7	17	5	–	5
Prepared food sales	9	28	28	20	6	1	1	6
Drink production & sales	18	51	17	5	2	2	1	4
Charcoal or firewood	8	36	25	7	20	1	–	2
Straw or wood products	10	36	28	2	19	–	–	5
Other products	15	28	22	13	4	4	2	13
Construction, carpentry	8	22	11	11	29	6	1	13
Transportation	1	4	12	30	49	1	–	3
Other services	11	27	26	15	7	5	1	9

Source: Authors' weighted analysis of data from the Malawi Integrated Household Survey for 2019/20 (IHS5).
Note: Industry categories coded from primary information recorded in IHS5 dataset.

In compiling information on whether an enterprise might use electricity, the IHS5 questionnaire assumed that enterprises operating in marketplaces, on the roadside, or in a mobile manner did not have access to electricity. Enterprises in such locations are likely to also have limited access to other services, including water and sanitation, shelter, and security. Table 5.9 presents the share of enterprises in each category that operate in a specific type of location. While transportation enterprises are most likely to operate in marketplaces, on the roadside, or in a mobile manner (91 percent), 71 percent of those involved in the most common enterprise, agricultural processing and trade, operate in the same types of poorly serviced locations. For non-agricultural trade enterprises, 53 percent operate in such locations. Most enterprises involved in drink production and sales operate from the household residence. The residence of the household is also a common location at which non-agricultural trade enterprises operate.

The average distance from where the household operating an enterprise is located to the nearest urban center with a population of 20,000 or above is presented in Table 5.8 by enterprise category. The enterprises operating at the greatest distance from urban centers on average—the most rural categories of enterprises—are those in the straw or wood products and the drink production and sales categories. The enterprises most likely to be located in or close to an urban center are in the transportation, the construction and carpentry, and the other products categories. However, enterprises involved in trade of non-agricultural products also tend to be located closer to urban centers than most other types of enterprises and certainly closer than enterprises involved in agricultural trade.

Insights on how enduring the various types of household enterprises are can be gained from the columns in Table 5.10 on the number of years they have been in operation. Those with the shortest life expectancy based on the average number of years they have been in operation are in the transportation, the prepared food sales, and both the agricultural and the non-agricultural trade categories. Of these, enterprises in the prepared food sales and the agricultural trade categories have the largest share of enterprises that were created in the past two years.

Table 5.10: Years of operation and principal source of capital to establish household enterprise, by industry, 2019/20

	Years of operation			Source of capital to establish enterprise, %					
	Years of operation, mean	2 years or less, %	10 years or more, %	None	Savings from agric. activities	Savings from non-agric. activities	Sale of assets; other business proceeds	Loan, whether informal or formal	Gift; inheritance
All household enterprises	6.6	44.9	22.8	14.0	26.2	28.5	4.9	12.6	13.9
Agric. processing, trade	5.3	52.0	17.9	1.8	33.2	29.4	5.3	17.9	12.5
Non-agricultural trade	5.3	46.6	18.3	0.9	28.8	36.9	5.4	10.7	17.3
Prepared food sales	5.1	59.0	15.4	1.3	26.9	31.4	4.1	18.9	17.4
Drink production & sales	7.4	45.4	24.9	2.6	34.1	22.3	7.3	20.1	13.6
Charcoal or firewood	6.3	44.7	21.8	52.5	13.0	14.3	4.1	6.4	9.7
Straw or wood products	14.6	18.6	56.3	64.8	17.8	12.1	0.8	2.9	1.6
Other products	8.8	27.3	36.2	26.8	20.1	25.5	3.0	8.4	16.1
Construction, carpentry	14.5	10.7	62.2	24.4	25.4	32.9	3.3	2.8	11.4
Transportation	5.0	36.8	13.6	14.8	28.3	32.3	7.6	5.3	11.8
Other services	8.5	28.5	30.3	17.8	19.1	35.7	5.8	4.5	17.2

Source: Authors' weighted analysis of data from the Malawi Integrated Household Survey for 2019/20 (IHS5).
Note: Industry categories coded from primary information recorded in IHS5 dataset.

The categories with enterprises with the highest average years of operation are those for straw or wood product production and for construction and carpentry—enterprises in these categories are also the most likely to have been in operation for longer than ten years. It is not clear why straw or wood product production enterprises should endure over time. However, for construction and carpentry, we surmise it may be due to the specialized skills involved, the higher amounts of physical capital (tools and other equipment) necessary, and the importance of reputation in maintaining demand for the construction and carpentry services an enterprise offers. Enterprises in most of the other categories seem to allow for much quicker and lower-cost entry and exit than do construction and carpentry. However, closer analyses would be required to confirm these hypotheses.

The share of enterprises in each category that relied upon a particular source for the initial capital used to establish the enterprise is presented in columns on the right side of Table 5.10. Six sources, including 'None', are considered. More than half of the enterprises were established from the savings of the operator, whether savings from agricultural or non-agricultural enterprises. Only enterprises in the charcoal or firewood and the straw or wood products categories reported less than 30 percent of enterprises having relied on such savings to begin operations. However, this is primarily because most enterprises in these categories reported not requiring any capital to start, since they are based on natural resources that many operators can source at no cost and can process using commonly owned low-cost tools.

One-eighth of all enterprises reported relying upon a loan to establish their business. However, few of these loans were obtained from formal lenders—only 5.4 percent of enterprises that used a loan to establish their business obtained one from a formal lending institution or program. In contrast, 31.7 percent obtained loans from an informal money lender; 45.1 percent from family or friends, and 17.8 percent from a savings club. Moreover, these loans likely were not large, as the most common borrowers were those setting up what likely are relatively low-capital enterprises in the prepared food sales, the drink production and sales, and the agricultural processing and trade categories.

These tabulations and graphs from the IHS5 data show that some households generate considerable income from the enterprises that they operate. On average, households operating enterprises generate almost half of their total annual income from those enterprises (Table 5.1). However, there is considerable variability in the income generated from household enterprises. This variability is seen across the various categories of enterprises. Enterprises that are most likely to be located in or near urban centers and operated by non-farming households, such as those in the construction and carpentry, the transportation, and the provision of other services categories, can generate substantial income for many of their operators. In contrast, most of those categories of enterprises that have lower barriers of entry generate much lower income for their operators on average. These include enterprises that involve agricultural processing and trade, prepared food sales, drink production and sales, charcoal or firewood production, and the production of straw or wood products. The annual net income from such enterprises for most operators is unlikely to be sufficient to cover the basic needs of their household.

Variability in the income generated by household enterprises is also seen across operators of the same type of enterprise. While some operators do very well and generate significant returns, net losses over the year are not uncommon for other operators. This is most clearly seen and is most significant for non-agricultural trade enterprises, which make up over 18 percent of all enterprises. Over a quarter of non-agriculture trade enterprises reported an annual net loss on their business in the previous year. While we have no information on what caused these losses, the commercial risks to households engaging in such trade are substantial. They almost certainly are on par with the production failure risks that farming households across Malawi face in their rainfed farming.

While operating such enterprises is certainly an option for households to pursue to increase their income and to diversify their income sources, successfully doing so is not assured. The easiest sorts of enterprises to launch generally do not provide much income. The more remunerative types of enterprises may need to be located where there is sufficient demand for the products or services offered, so may not be viable in many rural communities or in economically depressed urban neighborhoods where few households can afford to purchase the products or services of the enterprise. Other enterprises to be commercially successful may require specialized skills or public services—notably electricity, but also transportation, communication, and information services. All household enterprises that require significant capital to launch will be hamstrung by the poor access that Malawian households have to credit. The challenges Malawian households face in successfully operating commercial enterprises are daunting.

However, that 38 percent of households operate enterprises reflects positively on the enterprising spirit of many Malawians, even as it also reflects the challenges they face in obtaining good work throughout the year in the context of limited wage employment options and seasonal agricultural production. The high level of entrepreneurship seen in IHS5 should prove to be an important resource to draw upon as the Malawian economy continues to evolve. If a process of agricultural transformation strengthens and if in parallel more wage employment opportunities emerge, there will still be a need for a large cohort of entrepreneurs to exploit new opportunities, respond to new demands, and propel needed adaptations in the structure of the economy.

Although in this chapter we have examined the income that non-farm employment offers all Malawian households, the focus of this paper is particularly on the income and welfare status of farming households. A central pattern seen with all three types of non-farm employment examined is that farming households with relatively smaller crop land holdings are significantly more likely to have members that engage in non-farm employment than do farming households with more cropland. Such off-farm employment enables these farming households to generate additional income to what their farming provides. However, for many, the additional income pooled together with their farm income still is not sufficient for them to meet all of their basic needs, so they remain in poverty.

Poor farming households particularly rely on temporary *ganyu* employment and on household enterprises based on community resources—such as charcoal or firewood production or traditional straw or wood products—to supplement their farming income. These types of off-farm work have lower barriers of entry, but also generate much lower income than employment requiring specialized skills. Although wage employment is rare for most workers in farming households, workers from non-poor farming households are more than twice as likely as those from poor farming households to have wage employment. Having a worker with wage employment is strongly correlated with a farming household not being poor.

Past economic development strategies in Malawi acknowledged that rural development requires more than simply focusing on agriculture. Vision 2020, the development vision for the country that the Malawi 2063 document replaced, explicitly noted that “raising people’s incomes to levels at which they can always afford to buy food requires … increasing rural employment opportunities, … [with] more rural industrialisation and increasing opportunities for people to engage in business enterprises by widening access to entrepreneurship training and credit (National Economic Council 2000, 63). However, support for the crop production of farming households then and now has remained the principal form that rural development efforts in Malawi have taken. Our analysis of the IHS5 data suggests that such crop production-focused strategies are not sufficient, particularly for the poorest and most vulnerable rural

households. Virtually all such households are already seeking off-farm employment to meet the needs of their household members. Most are not succeeding in finding sufficiently remunerative work to obtain enough income to meet those needs. Rural economic development strategies in Malawi must now go well beyond raising agricultural production alone—although significantly higher crop productivity remains a key driver of rural economic transformation—to pay more attention to increasing the number of jobs available in rural communities outside of agriculture.

CHAPTER 6. DISCUSSION AND POLICY RECOMMENDATIONS

In this final chapter, we summarize the findings from the IHS5 analysis presented in this report before considering what this evidence suggests for policies and strategic programs to improve agricultural sector performance and expand rural employment opportunities in Malawi.

Summary of key findings

The analysis in this report has focused on the crop productivity of farming households and the income that they obtain from their farming and on the off-farm income sources they also use to meet their basic needs. The main insights from the IHS5 analyses include the following:

For most poor farming households, farming out of poverty is unlikely, even with substantially higher crop productivity. Agricultural land-constraints are becoming binding for most poor farming households—most now farm areas of land that are too small to enable them to generate sufficient income to meet their basic needs. Relying only on their farming, using relatively limited amounts of commercial inputs, and primarily producing crops under rainfed conditions means that they are unable under their current productivity levels to meet their basic needs solely through their own farming. They will remain poor. With continued rural population growth, the share of farming households that will be unable to rely on their farming alone to meet their basic needs will increase each year under current agricultural production patterns.

Only farming households with more than 0.25 ha per capita of cropland are likely to be able to meet their basic needs through farming alone, and for many, this will only be possible with significantly higher levels of crop productivity. Households with less than 0.25 ha per capita are unlikely to be able to derive significant welfare benefits from sharply increased productivity. While such households can certainly achieve equal, if not superior, productivity increases to those which farming households with larger cropland holdings might achieve, starting from a low land and, hence, production base, the income they obtain will not be transformational to their welfare or fuel a process of economic transformation in their local communities. For many such households, their increased income from higher productivity will simply go to meeting currently unmet basic needs within their household. Crop production remains a critical component of the livelihoods of the 84 percent of Malawian households that reported engaging in some farming activity. However, we find that increasingly off-farm livelihood strategies of various types are becoming more central to the welfare of most such households.

Despite the limited prospects for sharply higher crop productivity enabling poor farming households to escape poverty, the gap in crop yields between what farming households realize and what agricultural researchers suggest that they should be able to achieve is sizable. With timely and effective field operations; the use of improved crop varieties adapted for local agroecological conditions; and adequate control of weeds, other pests, and diseases, farmers should be obtaining crop yields that are one-third higher for rice, pigeonpea, and tobacco; half again higher for groundnut and bean; more than doubled for maize, sorghum, cowpea, and soyabean, and tripled for cassava and sweet potato. The low yields that farming households now obtain result in much lower net agricultural incomes than they would achieve with good access to information on best crop production practices, to locally adapted improved seed and other planting materials, and to commercial inputs, particularly inorganic fertilizer.

Rainfed cropping still dominates the agricultural production of farming households across Malawi. Malawi has extensive water resources that could be further exploited for agricultural production. The IHS datasets demonstrate that the share of households engaging in any irrigated farming is rising over time—in part because many farming households are increasingly unable to meet their basic needs through rainfed cropping alone. However, the returns from such farming are inconsistent and generally low. Except for Irish potato and sweet potato, there is no strong evidence that irrigated farming as yet offers an important means for farming households with access to irrigable cropland to significantly increase the income they derive from farming.

The need to assure the annual food requirements of the household **—the subsistence imperative—still drives the production decisions of Malawian farming households.** Very few farming households are commercial in their orientation, at least by the metric of how much of their maize harvest they sell. Subsistence considerations continue to drive their cropping patterns and engagement with agricultural markets. Maize, the principal staple food for most of Malawi, remains equally dominant on agricultural land across the country during the rainfed cropping season. No evidence was seen of any farming households specializing in the production of other crops to the exclusion of maize. This is not to say that farming households are not diversifying their crop production or that the commercial production of other crops than maize by smallholder farming households is not important to their welfare. The income that many farming households obtain from selling a large share of their harvest of, in particular, rice, groundnut, soyabean, and tobacco is critical to the well-being of their members. However, very few farming households will specialize in the production of any one of these crops and not produce maize also. Markets for maize in Malawi remain too uncertain for farming households to exclude maize from their crop production plans, confident they can always use the income obtained from selling other crops to obtain the maize they require in local markets. Without agricultural markets in Malawi being sufficiently strengthened to operate sufficiently reliably so that farming households can have confidence in them as the source of the maize they require, the agricultural landscape of most areas of Malawi will continue to be dominated by plots of maize, constraining the total production of other crops, including commercial crops.

Off-farm income sources are critical to the welfare of most farming households. In beginning the analyses reported in this paper, we assumed that the agricultural activities of farming households across Malawi are the dominant livelihood strategies that they pursue to meet their basic needs. The IHS5 analysis shows that this is not the case now. Due both to the seasonality of agricultural production with significant underemployment in agriculture during the dry season of the year and the challenges of obtaining sufficient income from low-productivity rainfed farming on small cropland holdings alone, almost all farming households in Malawi obtain income from off-farm employment as well. Income from other sources than their own farming makes up the majority of the income of most farming households—three-quarters of farming households obtain more than half of their annual income from off-farm sources. The average share of their total household income coming from agriculture now is less than one-third for all farming households.

There are three main sources of off-farm employment—casual temporary *ganyu* employment, wage employment, and household enterprises.

The share of households with members engaging in **temporary *ganyu* employment** grew by over 25 percentage points between 2010/11 and 2019/20. The rising level of participation by workers from farming households in this form of off-farm employment shows that a growing share of such households is unable to meet the basic needs of their members through rainfed farming alone. The engagement of

workers in the household in *ganyu* labor helps bridge the gap between their insufficient agricultural income and the costs of the basic needs of a household. Thirty-one percent of all income reported in IHS5 was derived from casual temporary employment.

Ganyu is the default off-farm income source for workers in both non-farming and farming households. The costs of engaging in *ganyu* labor are much lower than for longer-term wage employment or for operating a household enterprise. Most workers with any productive skills will be able to respond to local demand for *ganyu* labor. This stands in contrast to longer-term wage employment. This is particularly seen with workers from poor farming households—only about 10 percent of poor farming households have members with formal wage employment, while 86 percent have members who engaged in *ganyu*. Consequently, poor farming households relied on *ganyu* employment for almost 70 percent of their off-farm income on average and on wage employment for only 8 percent.

However, different patterns of engagement in *ganyu* are seen between non-farming and farming households. Workers in non-farming households appear to engage significantly in *ganyu* labor as they seek wage employment or establish a remunerative enterprise, particularly early in their working lives. *Ganyu* for workers in non-farming households is a transitional work form as those workers build experience, capital, and personal networks that will better enable them to obtain wage employment or to establish their own enterprises.

In contrast, workers in farming households engage in *ganyu* quite consistently throughout their working years. This reflects both underemployment in farming during the dry season for most farming households and the absence of wage employment or remunerative household enterprises in rural areas in which to engage. For farming households, it appears that no one will be getting themselves to a better economic place by engaging in *ganyu*, in contrast to non-farming household workers. For farming households, g*anyu* is the default off-farm income source, but not a strategic one.

The share of workers in Malawi with **wage employment** appears to be declining over time—households that reported having members with longer-term wage employment fell from 23.0 percent of all Malawian households in 2010/11 to 19.8 percent in 2019/20. Wage employment is more common among workers in non-farming households than in farming households. Only 15 percent of farming households had members with wage employment in 2019/20.

Over 40 percent of farming household members with wage employment worked in agricultural production, processing, or sales or worked as domestic workers within private households. These two types of wage employment tend to have the lowest wages among all types of wage employment reported. Nonetheless, wage employment is the type of work most strongly associated with non-poor poverty status, at least among farming households. The income households receive from wage employment on average and at the median is about three-times larger than that earned from the *ganyu* labor employment of households with members doing *ganyu*.

The share of households operating **household enterprises**, like engagement in *ganyu*, also has increased significantly from about 20 percent in 2010/11 to 38 percent in 2019/20. Overall, non-farming households are more likely to establish enterprises and to derive higher levels of income from them than are farming households. The average annual per capita net income non-farming households derive from household enterprises is about four times greater than that earned by farming households from such enterprises. However, the returns households obtain from them are quite variable depending on how specialized are the services or products offered, the costs of establishing the enterprise, and competing economic activities, particularly rainfed agriculture.

The enterprises that farming households operate to a greater degree than non-farming households are in agricultural processing and trade, charcoal or firewood production, drink production and sales, and production of traditional straw or wood products using local resources. Non-farming households are more likely than farming households to operate enterprises focused on non-agricultural trade, including small neighborhood shops, and on the provision of specialized services, including vehicle and bicycle repair or hair cutting and styling. Farming households are less likely than non-farming households to operate their enterprises throughout the year and are more likely than non-farming households to operate their enterprises for less than six months each year.

In sum, the common assumption that agriculture is at the center of the livelihoods of rural households across Malawi and, hence, that their welfare is primarily dependent upon the quality of their annual crop production needs to be modified. While their crop production continues to be central to their welfare, of equal importance is their ability to obtain sufficiently remunerative off-farm employment. Poor farming households are not able as yet to consistently meet their basic needs by combining these income streams, although many are trying to do so. In developing strategies for rural economic and human development in Malawi, accelerating agricultural production growth, particularly through increased productivity, and increasing the returns to farming are necessary, but incomplete solutions. Equal attention must now be paid to how workers in farming households can also qualify for and obtain good off-farm jobs. Without increases in the number and quality of such employment opportunities, the economies of most rural communities across Malawi are likely to stagnate and poverty will deepen among households living in them.

Informing strategies for agricultural development and expansion of rural employment in Malawi

A range of agricultural development strategies for Malawi at both sector and sub-sector levels are now under discussion among sector stakeholders. Not unrelated, there also is growing attention to expanding employment opportunities across the country, including in rural communities. Here we discuss some of the insights the evidence generated from the analysis of IHS5 implies for the content of these two sets of strategies and the relative prominence given to dimensions within them. We discuss agricultural strategies in some detail, with a briefer discussion of strategies to expand access of workers in rural communities to better employment off-farm.

Agricultural sector growth strategies

At the center of the model for rural economic development used to organize the content of this paper is increased agricultural production for market sale through higher productivity. The engine is higher agricultural productivity. As the productivity of commercial farming households rises, their farm production expands, and their incomes increase. With increased income, they will demand more of the goods and services that their less agriculture-focused neighbors produce. This consumption linkage diffuses many of the economic gains commercial smallholders make from their more productive farming to those other rural households, deepening local markets, accelerating local economic activities, expanding local opportunities for off-farm employment, and improving access to food for economically active households in these communities, including the poor. Several strategies are critical to launching and sustaining such a rural economic growth process. These include:

More narrowly target agricultural policies and programs—To enable farming households to contribute to agricultural sector growth and transformation in the structure of agricultural production in Malawi,

agricultural policies and programs should be targeted towards those farming households that can generate significantly more production through higher productivity—these are farming households with relatively larger cropland holdings concentrated in the mid-altitude plateau areas of the Central and Northern regions. The sort of support that they require falls within a standard list of approaches to agricultural transformation, including improved agricultural extension services, public or private; improved transportation to reduce marketing costs and expand market sheds; improved communication and market information flows; electricity; strengthening rural finance; and external agricultural trade facilitation. While most of these public investments and public services are not specific to boosting agricultural development, those that are primarily justified on agricultural growth grounds should be targeted to these farming households or to neighboring agricultural enterprises that can generate the greatest returns from their provision. Targeting of agriculture-specific investments and programs is needed to only a subset of farming households, even if this will be politically problematic to implement.

Most farming households will not generate sufficient returns from agricultural growth-focused programs, as they have too small cropland holdings to generate significant returns on those investments and services. The government will need to act strategically so that this other set of farming households on relatively smaller cropland holdings, over coming decades, increasingly find that their welfare is best guaranteed through engaging in more specialized work outside of farming. These actions include expanding off-farm employment opportunities in rural communities and, through both general and vocational education and a range of other enabling services, aiding workers in those communities to be better qualified to take those new jobs.

Continued investments in agricultural research, in providing agricultural extension services, and in improving access to agricultural inputs—This call for more targeted strategic approaches to sharply raising the productivity of farming households with relatively larger cropland holdings requires continued investments in agricultural research, in providing agricultural extension services, and in improving access to agricultural inputs through private-sector mechanisms. Public investments in these areas should be increased and the quality of those investments improved. Barriers to private firms engaging in agricultural research, the provision of agricultural advisory services, and agricultural input supply should be rationalized and minimized, insofar as possible. Increased agricultural productivity across Malawi and a significantly higher-performing agricultural sector will be built on the knowledge and associated technologies developed through research and disseminated through agricultural advisory services. An expanded network of agricultural input suppliers ensures the availability to farming households of the inputs necessary to raise their crop productivity. Obtaining more output per unit of land, labor, or other input used must remain an important agricultural development goal if the country is to achieve the vision laid out in Malawi 2063.

Irrigated farming is an underexploited component of agriculture in Malawi. However, the analysis here shows that farming households with access to irrigable land often are unable to determine how to exploit the resource most profitably—many farming households that engaged in irrigated farming reported net losses from their efforts. The supply of water alone is not enough for irrigated farming to transform the farming practices of these households or to raise their agricultural income. Particularly more basic economic research on how irrigated farming can be made more commercially viable for farming households is needed. We should also consider whether there are any factors that make the profitability of small-scale irrigated farming more difficult to achieve than it is for larger-scale farming enterprises. These confounding factors might include production technologies and practices; water management, including the institutions involved; and the degree of access farming households have to markets in which irrigated crops can be more reliably marketed at a profit.

Agricultural market strengthening strategies are a necessary complement to any agricultural development strategies in Malawi. Reliable markets, in which sellers can be confident that they always will find buyers for the products they offer for sale and buyers can be confident that they will always find the products or services they seek to purchase, are critical to both agricultural and rural economic development.

Markets are now the primary source of the food that Malawian households consume—54 percent of the maize reported consumed in 2019/20 was purchased. As Malawian households increasingly are unable to meet their food needs solely from their own farm production and as Malawian workers consequently will increasingly seek livelihoods outside of farming, markets as the principal source of food for Malawian households, including farming households, will intensify. However, poor agricultural market performance remains a significant risk to the welfare of Malawian households. Variability in aggregate maize production from year-to-year results in significant supply-induced inconsistency in seasonal maize price patterns in domestic markets in Malawi. The uncertain prices that household face to acquire their staple food in the market results in many judging that the risks to the welfare of their household associated with relying on the market for food are too high. Consequently, few households are willing to rely on them to supply all of the food they require throughout the year. Until markets become more dependable, this subsistence orientation will be justifiable, even if the overall productivity of agriculture in Malawi suffers as a consequence.

Lower price volatility is a key target in efforts to strengthen agricultural markets. If households feel that they can confidently predict future movements of prices for the agricultural commodities they require across the year, they will be more willing to rely on the market to supply those commodities and devote more of their land to the crops that they can produce most profitably, rather than focusing first on maize production. However, prices in agricultural markets in Malawi remain unpredictable. Several factors contribute to price volatility in Malawi markets—shortfalls or gluts in rainfed production levels; macroeconomic factors, particularly sharp currency devaluations; changing policy stances of government on openness to trade in maize or other crops; and how Malawi's leaders balance the attainment of agricultural development goals through increased commercialization against assuring food security for all.

Stabilizing prices is neither an easy nor inexpensive task. It is exceedingly difficult to provide broad access to inexpensive staple food to those most in need of it while also offering farmers prices for their food crops, in particular, that will motivate them to increase production. Purely market-based solutions cannot jointly provide prices that offer sufficient incentives for higher food crop productivity; offer food prices that permit all households to meet their basic needs and guarantee their food security, and stabilize those prices into predictable patterns over the production year. Policy interventions and large-scale public investments are necessary complements to the efforts of market actors to create food crop markets of this quality (Timmer 2015, 70-71). There is nothing automatic in the performance of markets that will generate such desired outcomes.

The government of Malawi for some years has attempted to keep maize prices, in particular, within a band defined by a floor price expected to be attractive to producers and a ceiling price expected to be the maximum acceptable to consumers. However, the government's interventions in the maize market have generally been ineffective and fiscally very expensive. In the longer term, more stable agriculture markets are most likely to be achieved through increased marketed supplies of crops from the higher production of commercially oriented farmers obtained through higher yields coupled with increased purchasing power for consumers achieved through expanding the opportunities they have for obtaining remunerative off-farm employment.

Anchor farms to accelerate local agricultural development—For several years there have been discussions among agricultural stakeholders in Malawi on the value of large-scale anchor farms, or megafarms, to accelerate local agricultural development for neighboring smallholder farming households. Under this development model, these large commercial farms will partner with neighboring smallholder farming households to provide them with access to agricultural inputs, training, and more lucrative markets (Gondwe, et al. 2022). The flows of benefits to neighboring farming households essentially are positive spillovers from the commercial activities of the large farm.

The IHS5 analyses presented in this paper provide little direct insight into such an agricultural development strategy, as the IHS captures no information on this sort of interaction between farming households and larger farming enterprises. However, the model of rural economic development used to organize the presentation in Chapter 2 suggests that whether an anchor farm approach is likely to energize local economic activity in rural communities will be dependent on the design and extent of their engagement with neighboring households. As the model of rural economic development crucially depends upon consumption linkages between highly productive resident farmers and their neighbors engaged primarily in non-farm occupations, large farm owners who export most of the profits from their farming from the local area to invest elsewhere or to consume urban or imported products and services will provide quite limited advantages to the welfare of most households in those rural communities.

Productive megafarms that do not both directly and indirectly expand the employment opportunities for workers in neighboring rural communities and do not contribute to increased activity in the economies of those communities will not advance Malawi toward its development vision. Across a range of various megafarm-centered agricultural development strategies, in choosing which to move to implementation, if equity and inclusiveness in rural development matters, close consideration must be paid to the local consumption linkages and spillovers of each. The stronger these linkages, the larger the likely poverty-reduction and rural employment enhancement potential of such a partnership between the larger farm and the local community.

Estate revitalization—The farming households on which this report focuses, while they dominate employment and food crop production in the sector, are not synonymous with agriculture in Malawi. Estates—commercial farming enterprises generally operating under long-term leasehold land tenure arrangements—occupy an estimated 35 percent of the land available for production in Malawi. While in the colonial period and during the initial post-independence period under the rule of Kamuzu Banda, the state regulated and supported the estate sector differently than the smallholder sector, these policy distinctions are no longer maintained so clearly. Many estate owners are finding it difficult to generate consistent profits from farming. In this, estate owners face the same challenges that smallholder farmers face in deriving significant income from their farming. A recent study found that only about 40 percent of estate land was being cultivated (Deininger and Xia 2018). Large numbers of underperforming estates constitute a hugely underutilized agricultural resource for Malawi and its development.

The analyses in this paper offer no specific insights on how agricultural estates across Malawi could make optimal use of their land to generate high levels of productivity with good financial returns. Our focus has been on farming households, since our analysis is primarily based on a representative household survey. Estates operate as commercial firms and not as household enterprises. However, if, as we would argue, the distinctions between estates and farming households are more historical or institutional in nature than reflective of qualitative different modes of production, insights gained on raising the productivity levels of farming households and the income they derive particularly from the crop production will also apply to estates.

The constraints that estate operators face are not so different from those facing farming households, particularly those with relatively larger cropland holdings. These include, but are not limited to:

- The problematic economics of profitably using commercial inputs under rainfed production. That estates operate in smallholder-dominated farming systems exacerbates these problems with considerable instability in annual production levels, marketed supplies and, hence, prices, and, consequently, returns to the use of agricultural inputs.
- Not being able to obtain sufficiently reliable information on markets early enough to guide planting decisions.
- Limited access to technical information on best practices for production adapted to local conditions.
- The high and often prohibitive costs of obtaining financing to enable them to use higher-productivity crop inputs on all their land.
- Possible labor constraints when crops need time-critical farming operations to ensure high production.

As these constraints apply equally to farming households with relatively larger cropland holdings, targeted efforts to increase the productivity of such farming households and the profits they derive from their farming will be equally pertinent to estates. Maintaining any distinction between farming households and commercial agricultural estates in putting in place policies and strategic programs to achieve these objectives is of virtually no value.

However, where some dedicated attention to agricultural estates is required is in ensuring that estate owners use their land. The leasehold terms on which much estate land is held, or the enforcement of those terms, apparently do not provide sufficient economic incentives for owners either to bring all their land into production or to release the land to others who can better do so. Significant reform is needed on this point if effective use is to be made of the large areas of arable land in estates across Malawi that are now not being used. For estate owners to be able to leave much of their leased land unfarmed without suffering any consequences represents a policy failure on the part of the Malawian government. Raising rents on estates held under leasehold may provide an important incentive for estate owners to enterprisingly find economic uses for the land while generating more revenue for the government.

The recommendations made here on estates are inferences based only limited empirical evidence. Given the share of Malawi's arable land that is occupied by estates, from the perspective of how best to identify and implement strategies for sustained agricultural development in Malawi, estates merit receiving as much attention from policy researchers as do smallholder farming households. However, no regular data collection and analysis of the characteristics, productivity, and financial performance of estates is being done. Such up-to-date knowledge is needed to ensure that the agricultural resources of the country controlled by estate holders are used effectively to realize Malawi's development vision.

More broadly, while failing to energize the estate sector comes with important direct opportunity costs, including reduced government revenues and slower progress on agricultural development, the more important cost of weak agricultural estates is more indirect—the continuing immiseration of poor farming households trying to meet their basic needs on small cropland holdings even as they neighbor estates with much larger areas of land that is not cropped as effectively as it might be. Our analysis in this paper has shown that limited access to sufficient land is resulting in more farming households being un-

able to meet their basic needs, even with much higher productivity levels. If one dimension of the development vision for the country is that it be an "inclusively wealthy and self-reliant" country, equity and welfare considerations require that rationalization and redistribution of estate lands acquired under leasehold that are not being used effectively should remain on Malawi's agricultural policy agenda.

Rural employment strategies

Unfortunately, given the agricultural focus of this report and the strong agricultural content of the data used in our analyses, we have much less to say on what strategies are needed to expand opportunities for off-farm employment across Malawi than we do on agricultural development strategies. Increased public investment in several broad areas will enable workers to obtain better-paying jobs and will accelerate economic development. These strategies and investments provide support both to employers establishing the businesses—many of which will start as household enterprises—which can provide good wage employment to Malawian workers and to workers as they build the skills and knowledge they require to qualify for good-paying jobs. Included in this range of complementary efforts to increase rural employment are:

- Continuing investments in education and health to ensure a healthy, creative, and enterprising rural workforce. In education, continued provision of high-quality free primary education to all children is required. However, as primary education becomes universal, increasingly the focus needs to shift to expanded delivery of technical, vocational, and entrepreneurial training, together with access to secondary and tertiary education for a larger share of Malawi's youth. To improve health, continued investments in preventive and curative health services will ensure that children can develop their full economic potential and that adults can be economically productive for many years. Ensuring that all Malawian children are well nourished continues to be an important medium to long-term investment in expanding the human capital stock of the country and its economic potential.

- Substantial investment in electrification, particularly in rural communities, makes sense for both economic and human development reasons. Both traditional—large-scale hydropower, coal—and novel sources—decentralized systems built around solar, wind, or micro-hydro—should be exploited. Expanded rural electrification will enlarge local employment prospects, increase demand for agricultural commodities by extending the range of local agro-processing possibilities, help build local wealth, and reduce the use of biomass for the energy needs of rural households, reducing deforestation. More fundamentally, electrification is important simply for improving the quality of life of rural households.

- Continuing investments in communications, particularly fast, dependable, and widespread Internet connectivity. The enhanced access to information such communication infrastructure provides will expand the employment options for workers in rural communities. Increasingly, Internet connectivity will be a basic component of how Malawian workers can most profitably use their skills to generate income for their households.

- Prudent forward-looking investments are needed in urban systems, including in housing, transportation, communications, utilities, and social services, to accelerate urban-based economic development and the flow of labor to the urban manufacturing and services jobs located there. Malawi's cities and district centers need to be developed now to handle the growing flows of people who will seek their livelihoods there in the coming years. Moreover, increased government attention in the near term to the development of urban services and infrastructure will make Malawi's towns and cities attractive locations for additional private investment, expanding local prospects for employment.

Vibrant economies in communities across Malawi will generate increased employment opportunities. In most rural communities, agricultural productivity increases will remain the principal motor for accelerating rural economic transformation. Broadly, the increased availability of well-paying jobs in rural communities across Malawi will continue to be reliant upon increased agricultural productivity generating increased wealth in those communities, which in turn raises demand for locally-produced goods and services.

The evidence from several generations of not-fully-successful policy reforms and strategic programs to sustainably increase agricultural productivity in Malawi and provide remunerative jobs in rural communities demonstrates that these goals are not easy to achieve. This paper provides a needed close contextual description of the challenges hampering such progress. However, what steps are needed to move from the current situation, to overcome those challenges, and to achieve the agricultural and employment elements of the development vision for Malawi and how they should be sequenced will require additional analysis, debate, and informed leadership.

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