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Rural Income Diversification, Employment, and Differentiation in Kenya and Implications for Rural Change

MARIA FIBÆK

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Rural Income Diversification, Employment, and Differentiation in Kenya and Implications for Rural Change

Rural Income Diversification, Employment, and Differentiation in Kenya and Implications for Rural Change

Maria Fibæk

LUND
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DOCTORAL DISSERTATION

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Abstract

To contribute to contemporary rural development debates, the present thesis conducts a contextual analysis of rural development using Kenya as a case study from the colonial era to today. To perform the analysis, two critical trends in rural Africa are focused on: socioeconomic differentiation and rural income diversification, with a particular focus on large-scale farm employment. By pointing to these processes, the overarching aim of the thesis is to nuance conventional rural development theories. This is achieved by relating empirical livelihood changes to theories of agrarian change.

Three main conclusions can be drawn from the findings. First, the poverty/wealth outcome of rural households' income diversification is shaped by socioeconomic and historical structures, which govern households' access to farm- and off-farm incomes and, more crucially, their ability to successfully combine the two. Second, gender, conceptualised as the sex of the household head, does not necessarily affect the poverty/wealth outcome of income diversification. Against conventional theories, this thesis finds that social cleavages aside from gender affect diversification patterns and rural incomes. It follows that conventional literature, which has largely studied smallholder differentiation through the lens of gender, will require revisions that allow such studies to more effectively incorporate other social cleavages. Third, after having elucidated processes of income diversification and differentiation, a few tentative rural development trajectories can be described. Despite the conventional belief in African historiography, the diversification toward rural wage labour in settler economies does not appear to have caused widespread rural poverty during the colonial era. Contrarily, regions that supplied the bulk of agricultural wage labour also had rising rural incomes and high uptake rates of cash crops.

Since the post-liberalisation era, households have continued to derive a high share of income from off-farm activities; however, the associated rural change is ambivalent. Off-farm activities have low returns; furthermore, the majority of households that have become highly dependent on access to off-farm income appear to be on a path similar to the 'de-agrarianisation' thesis laid out by Deborah Bryceson and her co-authors, where diversification away from the farm is associated with high poverty rates. Yet, a minority of households (including women-headed ones) have been able to follow a more successful agricultural-based path where off-farm incomes are combined with commercial agriculture. This minority have followed a path of intensification (i.e., by applying more fertiliser and labour to small farms) and are thus less threatened by declining farm sizes.

In sum, post-independence income diversification and differentiation in Kenya do not seem to correlate with dynamic rural development. Profit possibilities in agriculture are low, as evidenced by a decline in real farm incomes among all income classes, including richer farmers. Instead of accumulation through farming, richer households have increased their income diversification towards better-paid off-farm activities. Consequently, the richer-income classes do not seem capable of driving future rural development. Instead, differentiation among smallholder farmers appears to mainly result in the impoverishment of a large proportion of households without a parallel expansion of commercially oriented and dynamic middle and rich classes emerging from the smallholder sector.

Key words Rural Development, Income Diversification, Differentiation, Agrarian Political Economy, Kenya

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Rural Income Diversification, Employment, and Differentiation in Kenya and Implications for Rural Change

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The single story creates stereotypes, and the problem with stereotypes is not that they are untrue, but that they are incomplete. They make one story become the only story.

Chimamanda Ngozi Adichie

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In 2018, I began an ambitious journey of collecting data in Tanzania, which will be included in a forthcoming article. Although the data did not feed into this dissertation, I would still like to express my gratitude to staff members at Research on Poverty Alleviation (REPOA) in Dar es Salaam for hosting me. In particular, I would like to thank Dr Jamal Msami and Mr Enock for their kind and generous assistance.

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Maria Fibæk

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Copenhagen, Denmark

List of papers

I Fibaek, Maria, Erik, Green (2019). Labour Control and the Establishment of Profitable Settler Agriculture, Kenya c. 1920-45. *Economic History of Developing Regions, Vol 34(1), 72-110.*

II Fibaek, Maria (2019). Working Poor? A Study of Rural Workers' Economic Welfare in Kenya. *Journal of International Development (review and resubmit).*

III Fibaek, Maria (2020). Are Women-headed Households Moving Out of Poverty? Gender and Income Diversification in Kenya. *Unpublished manuscript.*

IV Fibaek, Maria (2020). Rural Differentiation and Rural Change: Micro-level Evidence from Kenya. *Journal of Agrarian Change (under review).*

Prologue

As the majority of the world's poor reside in the African countryside, ways to reduce rural poverty and promote rural development have been perennially debated in scholarly and policy-oriented literature. For my master's thesis, I, together with a research team from the University of Copenhagen and the Rockwool Foundation, studied one such agricultural programme in northern Tanzania designed to alleviate poverty and food insecurity. In 2010, for the first time, I was able to spend an extended period of time in an African rural setting.

At that time, I was heavily inspired by the new development economics literature. In particular, my understanding of rural poverty had been influenced by the research by the Massachusetts Institute of Technology economists Esther Duflo and Abhijit Banerjee, who were awarded the Nobel Prize in Economics in 2019. Duflo, Banerjee, and their co-authors had published a range of exciting studies that used randomised control trials to test the impact of anti-poverty programmes and to develop new theory (Banerjee and Duflo 2007; Duflo 2000; Duflo, Glennerster, and Kremer 2007; Glewwe and Kremer 2006).

The aim of the agricultural intervention we were studying was simple. Through the supply of improved seeds and training at farmer field schools, smallholder farmers were expected to adopt a new strain of drought-resistant bananas. The adoption of improved bananas would increase production, allowing households to consume more and to sell surplus production to the market. The research team expected to find a large impact on enhanced food security and poverty reduction; however, when I conducted a quantitative impact evaluation of the programme for my thesis, I only found a modest impact. The only detectable effect was an increase in the number of protein sources consumed by the households who had adopted the improved bananas. There were no significant impacts on poverty measures nor on other food insecurity variables such as children's nutrition (measured by height and weight for age). Still, other factors not related to the programme had large impacts on poverty and food security. For instance, the number of acres a household cultivated, the household head's educational level, and the presence of a secondary school in the village strongly influenced households' poverty levels.

These findings raised fascinating questions that I was not able to answer with the impact evaluation: why did some households have more land than others did? Why did some villages have good public provision? From the visible socioeconomic differentiation among rural households, an appreciation for historical and political economy analyses emerged. I realised that to fully grasp rural development processes, it would be necessary

to link the 'micro' level to wider 'macro' factors such as socioeconomic and historical processes.

Fortunately, this is what I have been able to do with the present PhD thesis. In this thesis, the unit of analysis is the same: rural households in East Africa. I am still interested in understanding rural households' decision-making when it comes to, for instance, selling labour power or commercialising agriculture and the impact that such decisions have on economic welfare. However, I am less interested in testing a microeconomic causal relationship and more concerned with the historical and socioeconomic context that determines the opportunities and constraints households face and the wider rural change that arises from households' behaviour.

Maria Fibæk

Introduction

> A man engaging in migrant labour and using his wage only for his own survival and perhaps a few "luxury" purchases has quite different effects on agriculture from the same man using the wage to purchase land and to increase his household's agricultural production. (Orvis 1997: p. 47)

Motivation for the study

Sub-Saharan Africa[1] accounts for the majority of the world's poor, and the continent has seen a rise in the number of poor, from 278 million in 1990 to 413 million in 2015. Despite rapid urbanisation, an overwhelmingly large share of close to 80% of the poor live in rural areas (World Bank 2018, 2019a). Promoting rural development, therefore, remains a cornerstone of the global efforts to combat poverty.

To contribute to contemporary rural development debates, the present thesis conducts a contextual analysis of rural development using Kenya, from the colonial era to today, as a case study. To do so, the thesis focuses on two crucial trends in rural Africa: socioeconomic differentiation[2] and rural income diversification,[3] with a particular focus

[1] To ease readability Sub-Saharan Africa will be referred to as 'Africa' in the remainder of the text.

[2] This thesis adopts Oya's (2010b) definition of socio-economic differentiation as 'a process whereby inequality increases together with a growing fragmentation of labour into groups of people who increasingly depend on working for wages and groups who manage to accumulate a bit and employ other people's labour, and between groups who still depend on farm activities and groups who become increasingly reliant on non-farm sources of income' (p. 2).

[3] The term 'livelihood diversification' is commonly found in livelihood studies. Broadly, livelihood diversification is used to refer to: 'the process by which rural families construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standard of living' (Ellis 1998). Although income diversification has a similar meaning, income diversification which is often used in development economics literature typically refer to: 'the allocation of productive resources among different income generating activities, both on-farm and off-farm' (Babatunde and Qaim 2009). In this thesis, the latter definition is applied. The decision to do so is based on the data underpinning the research. As the thesis relies heavily on quantitative data, the narrow term was easier to operationalise.

on large-scale farm employment.[4] By pointing to these processes, the overarching aim of the thesis is to nuance conventional rural development theories. This is achieved by relating empirical changes at the micro-level to dynamics of rural change at the macro-level.[5] This relationship has been neglected in contemporary studies of rural livelihoods (Scoones 2009).

Conventional rural development theory has until recently frequently characterised rural sectors in Africa as comprising of homogenous households, being small in scale, and relying predominantly on family labour. Rural labour markets are assumed to either be thin or absent (Mueller 2011; Oya 2010b). When households diversify towards off-farm activities, this is in the form of self-employment such as petty trade or handicraft making.[6]

Consequently, rural employment plays an insignificant role in rural development theories. Instead, the gold standard of development policies has become the promotion of a market-oriented rural development based on small-scale production. Such a smallholder-led rural development model[7] is viewed as both egalitarian and efficient because it ensures high agricultural yields and an equitable income distribution (Deininger and Feder 2001; Griffin, Khan, and Ickowitz 2002; Larson *et al.* 2014; Lipton 2006).

Still, such a simplistic characterisation of the rural sector blurs rural structures that are critical in determining the success or failure of the smallholder-led rural development

[4] The distinction between large and small-scale farms is somewhat arbitrary. The thesis follows the definition applied by the Ministry of Agriculture in Kenya where farms above 100 hectares are classified as large farms. Recent literature has identified a rise in medium-scale farms defined as farms of 5-100 hectare. Data from Kenya suggests that 0.84 million hectares of land is controlled by these farmers (Jayne *et al.* 2016). Similarly to large-scale farms, medium-scale farmers are likely to rely on hired labour, however, due to paucity of data the study of workers employed on these farms is beyond the scope of the thesis.

[5] In the thesis, the term 'macro-level' is used to refer to changes in rural structures at the national level.

[6] The literature on rural livelihoods differ in its use of the terms 'off-farm' and 'non-farm' income or activity. The distinction farm/non-farm is useful when studying structural change as the term is used to refer to sectoral classifications where farm activities are associated with primary sector production processes while non-farm activities are related to secondary and tertiary sector production. The distinction farm/off-farm is locational and distinguishes between activities that takes place on one's own farm or away from one's own land (Barrett, Reardon, and Webb 2001b). In this thesis, the latter division between farm/off-farm incomes is applied. For instance, employment on someone else's farm is considered an off-farm activity. This distinction is applied, as the objective is to study rural change from the point of the view of the households.

[7] The smallholder-based rural development model is defined loosely as a model for development that focuses on smallholder farmers whose role is seen as critical to successful poverty reduction. Through the connection of smallholders with incentives and markets it is envisioned that smallholder subsistence agriculture can be transformed into a commercial agriculture sector capable of driving economic growth (see for instance World Bank [2008]).

model. The smallholder farming sector[8] is far from homogenous; rural households sell and hire labour and many rural people do not rely on farming as their main livelihood activity. Instead, rural households derive income from a myriad of activities. This trend has been referred to as rural income or livelihood diversification (Barrett, Reardon, and Webb 2001; Bryceson 2000a; Chambers and Conway 1992; Ellis 1998; Reardon 1997), which is a type of diversification that includes rural employment. Although rural employment has been understudied, several studies have confirmed that numerous rural people depend on rural employment on small and large farms for their subsistence (Cramer, Oya, and Sender 2008; Leavy and White 2000; Mueller 2011; Oya 2010b; Sender 2002; Sender, Oya, and Cramer 2006). Moreover, with the 2008 hike in global food prices and the subsequent expansion of commercial large-scale agriculture, the latter form of rural employment—which often engages the poorest rural segments—has become increasingly important to study from a pro-poor rural development perspective. For instance, a report by the World Bank argues that the expansion of large-scale farming can lead to poverty reduction by offering employment to the rural poor (Deininger *et al.* 2011).

Available data on rural households' incomes confirm the importance of off-farm activities (Figure 1). This is particularly the case for several Southern African countries and Kenya, where the share of off-farm income is higher than 50%. These countries' high share of off-farm income is conditioned by a colonial past that saw the emergence and expansion of large-scale agriculture and other industry relying on wage labour.

[8] The analytical terms 'smallholder sector' and 'smallholder' are used throughout the thesis to refer to a sector, which comprises rural households of various sizes, too small to be considered large-scale farms. Despite this decision, I agree with Cousins (2013) that in the wake of processes of differentiation, land concentration, and commercialisation it is somewhat misleading to refer to rural households as 'smallholders'.

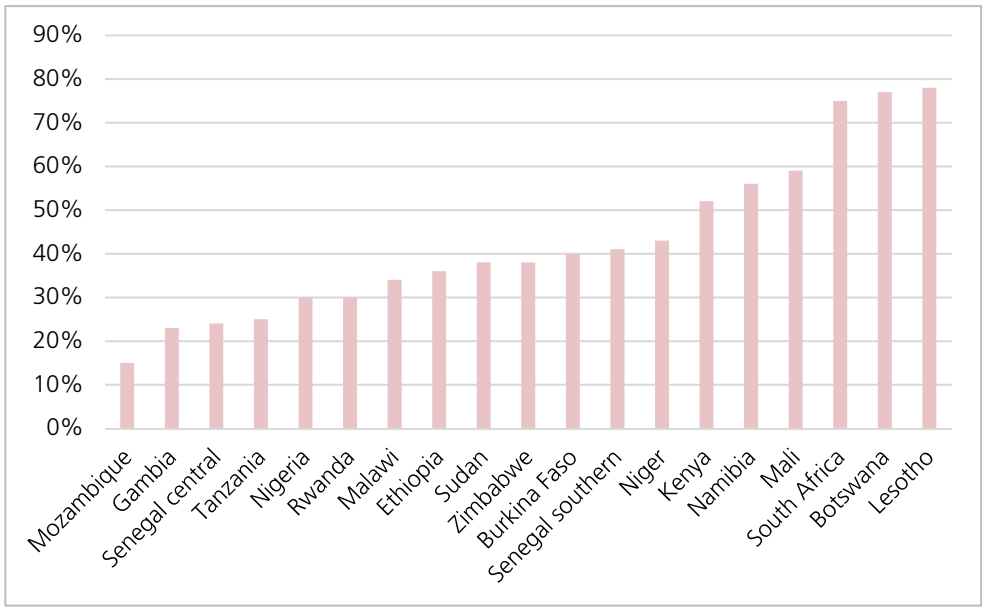

Figure 1: The importance of off-farm income – share of off-farm income/total income in %
Source: Reardon (1997)
Note 1: Reardon (1997) compiles data from a range of case studies. Off-farm income includes wages, self-employment, and remittances.
Note 2: The data are overwhelmingly from the 1980s and early 1990s and there is sufficient evidence that the share has grown in recent years; for instance, the De-agrarianisation and Rural Employment research project led by Bryceson finds a share in African countries of 60–80% (Bryceson 2002).

In addition, recent studies have challenged the notion that rural inequalities within the smallholder sector are diminutive, and such studies have pointed to increased socioeconomic differentiation among rural households (Jayne *et al.* 2019; Jayne, Mather, and Mghenyi 2010; Jayne *et al.* 2003; Ponte 2000). Rising differentiation among smallholders is driven by, among other factors, differences in households' ability to diversify incomes. As rural peoples reorient their livelihoods away from the farm, some will be more successful in diversifying towards better-paid activities, which is likely to aggravate existing rural inequalities (Bernstein 2010; Oya 2007; Reardon 1997; Rigg 2006). Such differentiation can take many forms, including youth versus elders and men versus women (Peters 2004). Indeed, several studies have shown that men and women face different rural development trajectories (Bryceson 1995; Razavi 2009; Whitehead 2009; Whitehead and Kabeer 2001).

Although the concepts of income diversification and (to a lesser extent) socioeconomic differentiation have found their way into mainstream rural development research (Barrett, Reardon, and Webb 2001; Barrett and Reardon 2001; Chambers and Conway 1992; Haggblade, Hazell, and Reardon 2010; Hussein and Nelson 1998; Jayne,

Mather, and Mghenyi 2010; Jayne *et al.* 2003; Kabeer and Van Ahn 2000; Reardon 1997; Reardon *et al.* 2007), a great concern with the conventional literature is the inability to abstract long-run rural development trajectories from the often micro-oriented studies. As this thesis will show, changes in livelihoods have implications for future rural development trajectories.

Because income diversification and socioeconomic differentiation can indicate both a prosperous and an unsuccessful rural development path depending on the context, the need exists for studies that are able to point to likely future scenarios of increased diversification and differentiation. To quote Scoones (2009):

> Finally, a fourth area that livelihood studies failed to grapple with were debates about long-term shifts in rural economies and wider questions about agrarian change. A rich description of livelihood complexity in the present was one thing, but what were future livelihoods going to look like – in 10, 20 or 50 years? (p. 182)

To provide examples of differing rural development trajectories, the cases of Southeast-Asian countries and China demonstrate how increased income diversification has enhanced rural incomes. In these countries, movements of labour towards rural employment greatly boosted rural household incomes with surpluses often reinvested into smallholder agriculture, causing a positive transformation of the rural sector (Bramall 2004; Bramall and Jones 2000; Rigg 2006). Simultaneously, income diversification can also lead to increased poverty. For African countries, a perennial debate is whether off-farm income can advance the same rural transformation witnessed in Asia (see e.g., Barrett, Reardon, and Webb [2001]; Ellis and Mdoe [2002]; Rigg [2006]), or whether income diversification is instead a sign of despair—a survival strategy that entraps individuals and households in poverty (see e.g., Bramall and Jones [2000]; Bryceson [1995], [1996], [1999], [2000b], [2002]).

Furthermore, the associated socioeconomic differentiation that arises, partly due to income diversification, influences future rural development. In the conventional literature, there is an often implicit assumption that rising rural inequality will impede future rural development. Because of the existence of an inverse relationship[9], smaller farms are more efficient than large farms. Hence, land concentration will not only raise poverty levels but also tend to lower agricultural yields (Carlsen 1980; Griffin, Khan, and Ickowitz 2002; Larson, Otsuka, and Matsumoto 2012; Ravallion 2018). By contrast, agrarian political economy studies have argued that rising socioeconomic

[9] The 'inverse relationship' between agricultural yield per acre and farm size was first conceptualised by Chayanov (1966). Berry and Cline (1979) have since applied the theory to contemporary developing countries and later, several seminal publications in favour of smallholder agriculture followed suit (see Griffin, Khan, and Ickowitz [2002]; Larson *et al.* [2014] Lipton [2006]).

differentiation may form part of a progressive and dynamic rural development path. Successful farmers will be able to consolidate more land. By using hired labour (drawn from poorer segments of rural society), these farmers can expand their agricultural production, enabling them to utilise economies of scale. In doing so, the rural sector will be transformed and agricultural productivity will rise (Byres 2003; Mueller 2011; Oya 2007, 2010b).

It follows that the long-run dynamics associated with income diversification and socioeconomic differentiation require attention. This thesis applies historical, descriptive, and econometric methods to describe and assess the long-run rural development trajectories associated with rural households' diversification and differentiation.

Although the contribution of this thesis does not lie in a complete dismissal of smallholder-led rural development theories, several arguments raised herein point to a need for the revision of conventional rural development theories. Using Kenya as a case study, I find that rural labour markets are indeed active and diversification towards, for instance, employment on large-scale farms has played a pivotal role in rural change. Although wages on large farms since the colonial era have been close to subsistence level, there are indications that rural wage employment allows some workers to progress by reinvesting wages in productive activities such as smallholder agriculture. This process is known as 'straddling'.[10]

During the colonial era, attempts to diversify income by seeking work on large farms appear to have been successful as areas that had a high share of wage workers also saw a high degree of agricultural commercialisation. This trend of using rural employment as a means to invest in agricultural assets such as land and livestock is also present in the post-independence period. In this regard, farm workers are able to slowly move out of deep poverty. Workers who have been able to straddle have often had skills in high demand, enabling them to earn higher wages and/or have been able to use employment to access economic capital in the form of loans or savings schemes. Meanwhile, workers who rely solely on wage income remain poor.

The finding that rural people might be able to use wages earned on large farms to invest in their agriculture points to a need for nuancing a classic debate found in conventional literature on optimal farm size. The old debate on small versus large-scale agriculture may be redundant and the questions of interest instead become how different farming

[10] For a rich coverage on the emergence of straddling households in colonial and post-independence Kenya see Collier and Lal (1986); Kitching (1980); and Orvis (1997).

models can co-exist and how poor rural people may be able to benefit from this co-existence.

Focusing on income diversification in the post-liberalisation era, I find large discrepancies among households. Although studies have suggested that gender differences in income and diversification patterns drive socioeconomic differentiation (Chant 1997a; Razavi 2009), this thesis finds that in the majority of regions in Kenya (five out of eight), gender–income gaps are small and do not differ statistically from one another. Consequently, not all women heads are disadvantaged and there exists large regional differentiation among women heads.

A group of women-headed households derives relatively high incomes by combining commercial agriculture with off-farm sources. Because these women heads have been able to follow a path of intensification (i.e., by applying more fertiliser and labour to small farms), they are less vulnerable to declines in farm sizes. Meanwhile, women heads who depend on maize cultivation are less likely to remain in agriculture. Unless a shift to higher-value crops occurs, declining farm sizes will make it difficult to raise sufficient income from low-value crop production, and this group of women heads might have to diversify to off-farm activities. For another group of women heads residing in low-potential areas, this process has already begun. Due to halted industrialisation and difficulties for the formal sector in absorbing the growing rural population, there is a lack of well-paid off-farm opportunities available and a shift away from agriculture is associated with high poverty rates.

These large differences in income diversification patterns affect both men and women-headed households. Hence, social cleavages aside from gender also affect differentiation and a narrow focus on gender may neglect other factors that cause differentiation. The heterogeneity among households has implications for conventional theory and policy. Implementing a smallholder-led rural development model under conditions of increased diversification away from the farm and differentiation threatens the two objectives of the model: poverty reduction and raised agricultural production. Only a small fraction of households have been able to successfully combine off-farm activities and commercial smallholder agriculture; thus, few households will gain from policies aimed at increasing smallholder production, while the majority who depend largely on off-farm income (including rural wage employment) might lose out to intensifying existing rural inequality and poverty levels. Moreover, as the majority of households have devoted their labour towards off-farm activities, it is doubtful whether the promotion of smallholder agriculture will be able to raise total agricultural production.

The findings of this thesis tentatively indicate a need for a balanced rural development where smallholder agriculture is supported alongside expansions of the rural off-farm

sector; for instance, by promoting commercial large-scale agriculture. The thesis finds evidence that large-scale farming is poorly remunerated; however, it has the potential to create off-farm opportunities for rural people who cannot be supported full-time by smallholder agriculture and/or who need to raise cash to invest in smallholder agriculture. However, a complete neglect of smallholder agriculture is not desirable and it is critical that investments in agriculture in African countries ensure the provision of decent employment without dispossessing large proportions of the rural population on their land. If the shift away from smallholder agriculture happens too quickly, then this will drastically raise rural labour surpluses, exerting downward pressure on rural wages and aggravating rural poverty for those who depend on off-farm income.

Although this thesis conducts a study of Kenya's specific agricultural history, I do not believe that the findings and conclusions are unique to Kenya in the sub-Saharan African region. For instance, long-run processes of rural employment, diversification, and differentiation have also been identified for other African countries such as Ghana (see Hill [1963b]; Austin [2005]), Mozambique (see Cramer, Oya, and Sender [2008]), Senegal (see Oya [2007]), South Africa (see Sender [2002]; Sender, Oya, and Cramer [2006]), and Tanzania (see Sender and Smith [1990]; Mueller [2011]).

Kenya as a case study

To examine trends in income diversification and socioeconomic differentiation, Kenya was selected as a case study. Kenya is an East-African country that borders Tanzania to the South, Uganda to the West, South Sudan and Ethiopia to the North, and Somalia to the East.

In the 1960s and 70s, Kenya became a poster-child for rural development in Africa as high growth rates in gross domestic product (GDP) and agriculture were recorded, driven largely by expansions of commercial smallholder agriculture (Clayton 1964). Since the boom years, volatile growth rates in GDP and agriculture value added best characterise Kenya, where years of high growth rates are followed by severe declines (Figure 2).

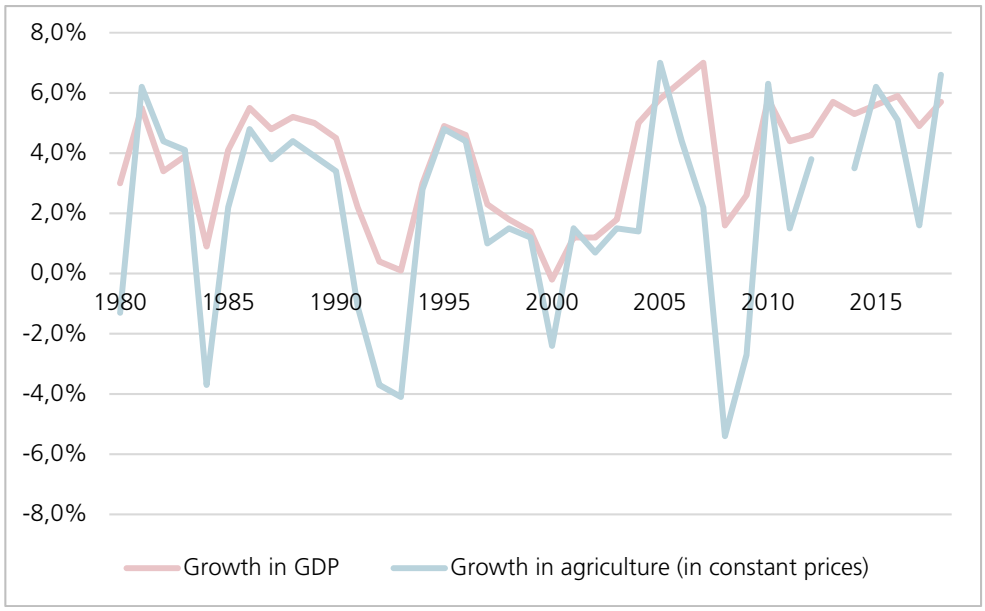

Figure 2: Growth in GDP and agriculture value added (in constant prices), 1980–2018
Source: The data are taken from the Economic Survey available online at www.knbs.co.ke (last accessed March 2020).
Note: Data for agricultural value added in 2013 are not available.

Being the single largest contributor to GDP (just below 22%), agriculture plays a critical role in Kenya's economy. Moreover, the smallholder agricultural sector employs almost 55% of the total labour force (World Bank 2019b). Consequently, the promotion of rural development based on smallholder agriculture is placed high on Kenya's economic policy agenda. Accordingly, in the Kenya Vision 2030 (Kenya 2010), Kenya's government writes the following:

> Vision 2030 has identified agriculture as one of the key sectors to deliver the 10 per cent annual economic growth rate envisaged under the economic pillar. To achieve this growth, transforming smallholder agriculture from subsistence to an innovative, commercially oriented and modern agricultural sector is critical. (Kenya 2010: p. 13)

However, access to land constrains agricultural development. As Figure 3 indicates, just 17% of land is suitable for rain-fed agriculture, and arid and semi-arid lands cover the remaining parts of Kenya (Mwagore 2015). In addition, as the figure shows, agricultural suitability varies within the country. High-potential areas include the fertile highlands in central and western Kenya. While the central highlands have a long history of cultivation of high-value crops such as certain vegetables and fruits, tea, and coffee, western Kenya is covered by maize or low-value cash crops. Consequently, some of the

highest poverty rates are found among rural people in western Kenya (Mwagore 2015). The arid and semi-arid lands where suitability is low cover most parts of northern, southern, and eastern Kenya. Here, crop failure is common and the land is mostly suitable for drought-tolerant crops, ranching, and pastoralism.

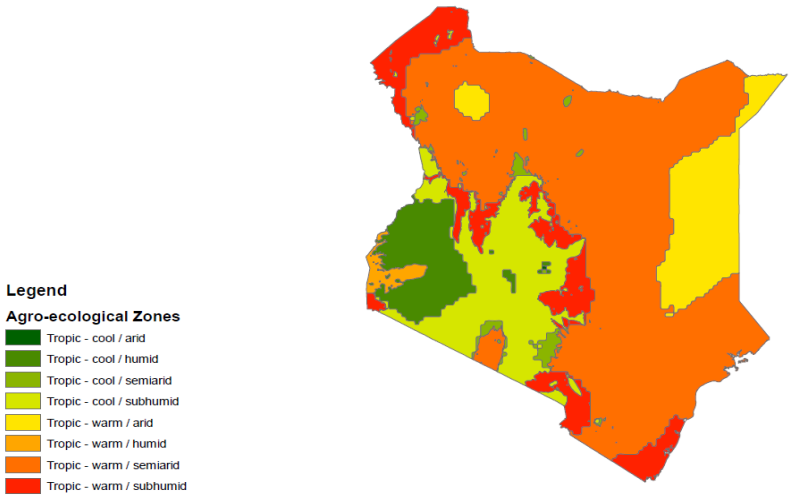

Figure 3: Agro-ecological zones, Kenya
Source: Data on agro-ecological zones are taken from the RCMRD GeoPortal database available at http://geoportal.rcmrd.org/ (last accessed 29 April 2020).
Note: Drawn by Michael Chanda Chiseni.

Population pressures intensifies land scarcity and population increases have played a large role in declines in average farm sizes and increases in land prices (Hall, Scoones, and Tsikata 2017; Jayne *et al.* 2016). Like many other developing countries, Kenya has seen rapid population growth. The first population census held in Kenya in 1948 enumerated close to 5 million people (Martin 1949). In the year preceding independence, 1962, the population had increased to 8.6 million people (Kenya National Bureau of Statistics (KNBS; 2019a), whereas the latest census of 2019 recorded a six-fold increase in population estimated at 47.5 million (KNBS 2019a). Nonetheless, it has been suggested that Kenya is advancing towards a demographic transition (Mutuku 2013). A remarkable decline in total fertility rate was recorded from 8.1 children per woman in 1977/78 to 6.7 in 1989 and 4.7 in 1998. However, infant and child mortality indicators worsened in the 1990s while the decline in fertility stalled, and in 2008/9 the total fertility rate of 4.6 was close to the 1998 level (Mutuku

2013). Recent data do indicate a return to declining fertility rates as the rate dropped from 4.06 during 2010–2015 to 3.52 during 2015–2020.[11]

When it comes to understanding long-run processes of income diversification and socioeconomic differentiation, Kenya makes for a fascinating case. Similar to South Africa and Zimbabwe, it is a former settler colony and has a long history of unequal rural structures, as evidenced by the existence of a commercial and highly capitalised large-scale farm sector that coexists alongside a smallholder sector with limited capital. The historiography of Kenya describes early colonial trends in income diversification towards rural and urban wage labour. It has been suggested that in the colonial era, households that were able to use off-farm income sources to invest in smallholder cash crop agriculture prospered while poorer segments that lacked access to wage incomes and/or cash crop agriculture lost out. As a result, the rural sector became highly differentiated (Cowen 1972, 1975; Heyer, Ireri, and Moris 1971; Leys 1975; Njonjo 1981; Orvis 1993; Orvis 1997; Swainson 1977).

These patterns are also present in contemporary rural Kenya. As Figure 1 revealed, off-farm income accounted for more than half of total household income in 1997. This finding was reiterated in a comprehensive study of Kenya's rural sector from 2010, where the share was 55% of total income (Scott *et al.* 2018). Moreover, Kenya is often characterised as a highly unequal country compared with other African nations. According to one study from 2004, Kenya is among the ten most unequal countries in the world and the most unequal country in East Africa. The study finds a rise in the Gini coefficient for Kenya from 0.45 in 1994 to 0.57 in 1999 and a Gini coefficient for rural areas of 0.54 in 1999 (Society for International Development (SID) (2004)). Recently, a report by Oxfam asserted that less than 0.1% of the population (or 8,300 people) owned more wealth than the bottom 99.9% (more than 44 million people) (Oxfam 2018).

Although inequality levels within the rural smallholder sector are rarely discussed, a study of five African countries[12] in eastern and southern Africa found that Kenya was the most unequal in terms of land distribution within the smallholder sector. Here, the highest per-capita land quartile controlled 15 times more land than households in the lowest quartile (Jayne, Chamberlin, and Headey 2014).

In summary, Kenya stands out due to its relatively longer history of land scarcity, uneven rural structures, large-scale farming and a high reliance on income

[11] Data is taken from the United Nations database available at data.un.org (last accessed April 2020). The fertility rate is higher than countries such as Mauritius, South Africa, and Botswana where advanced stages of their demographic transitions have been reached and fertility rates are below 3 children per woman (Canning, Raja, and Yazbeck 2015).

[12] Kenya, Ethiopia, Rwanda, Mozambique, and Zambia.

diversification. However, historical findings from Kenya might have implications for countries that are currently undergoing the same processes. Several studies have suggested that African countries are shifting from land abundance to relative land scarcity often accompanied by a rise in land concentration (Hall, Scoones, and Tsikata 2017; Jayne, Chamberlin, and Headey 2014; Peters 2004). Moreover, the continent has seen a rise in the importance of the rural off-farm sector including expansions of commercial mid-and large-scale agriculture (Haggblade, Hazell, and Reardon 2010; Jirström, Bustos, and Alobo Loison 2018).

Aim, research questions, and contribution

The overarching aim of this thesis is to contribute to the understanding of rural development in Africa by nuancing contemporary rural development theories. This is achieved by conducting a contextual analysis of rural development in Kenya from the colonial era to today focusing on rural livelihood change. Using various sources of longitudinal data, patterns in rural employment, income diversification in general, and socioeconomic differentiation are explored.

Through four separate yet interlinked papers, I challenge the following five stylised facts commonly found in conventional theories.[13] First, although several studies have recognised the importance of the off-farm sector, it is generally envisioned in conventional literature that the majority of rural people rely on small-scale farming.[14] Second, it is often assumed that the off-farm economy is made up of self-employed rural peoples. Third, rural labour markets are generally described as thin or absent and rural wage labour is seen as uncommon. Fourth and accordingly, conventional literature assumes that rural inequality levels within the smallholder sector are insignificant.[15] Lastly, although, inequality levels are generally seen as diminutive, the

[13] For discussions of stylised facts one to five, see Bernstein (2010), Cousins (2013), Leavy and White (2000), and Oya (2010b). Not all conventional scholars agree with the stylised facts and there are exceptions including the pioneering work by Thomas Jayne and his co-authors as well as Thomas Reardon who in 1997 already documented active rural labour markets across African countries (Reardon 1997).

[14] The rural off-farm sector was 'discovered' by conventional rural development scholars in the late 1990s and early 2000s (see Barrett, Reardon, and Webb [2001b], Haggblade, Hazell, and Reardon [2007]; Reardon *et al.* [2007]; Reardon [1997]; Reardon *et al.* [2007]), however, because land was considered to still be in abundance and the impacts of structural adjustment policies on the smallholder sector had yet to be studied, smallholder agriculture was seen as the dominant economic activity among rural people.

[15] Few studies have started to confront the assumption of an undifferentiated smallholder sector. The studies by Thomas Jayne and his co-authors show increased land concentration and the rise of medium-scale farmers who to some extent are the product of smallholder differentiation but also of land acquisitions made by urban elites (Jayne *et al.* 2019; Jayne *et al.* 2016; Jayne, Mather, and Mghenyi 2010). Despite this, studies on smallholder differentiation remain few in number. Moreover, the studies have yet to agree on the rural change that is associated with increased

exception is male-female differentiation. Conventional literature has begun to acknowledge significant gender-income gaps, which have grown larger in the post-liberalisation era (Bryceson 1995; Chant 1997a; Quisumbing and Pandolfelli 2010; Razavi 2009; Whitehead 2009; Whitehead and Kabeer 2001).[16] Consequently, women-headed households are often characterised as the 'poorest of the poor'.

To confront the stylised facts, the following key questions guide the analysis:

- First, what role did the large-scale farming sector play in households' poverty/wealth status in the colonial and post-independence eras?
- Second, in the post-liberalisation era, how does gender influence the poverty/wealth outcome of income diversification?
- Third, what is the long-run rural change associated with rural households' income diversification and differentiation?

Each of the thesis' four articles has a separate focus that illuminates the wider aim and addresses the research questions.

By narrowing in on rural employment, Papers 1 and 2 explore an income diversification strategy that has played a dominant role in Kenya's agricultural history: employment on large-scale farms. The aim of Paper 1 is to analyse how colonial structures affected the emergence of a class of African rural workers; while Paper 2 examines more closely the poverty/wealth outcome of employment on large farms, extending the analysis to the post-independence period. To elucidate income diversification and gender, Paper 3 explores regional differentiation among women-headed households in the post-liberalisation era. Finally, Paper 4 investigates the role that socioeconomic differentiation plays in wider rural change in the post-liberalisation era.

Combined, the papers contribute new evidence on rural labour markets, income diversification, and differentiation. The evidence is used to engage in debates on wider rural change. In doing so, I show why there is a need to revise conventional smallholder-based rural development theories, proponents of which include powerful international agencies such as the World Bank, the Food and Agricultural Organization (FAO), the United Nations, and most African governments (Larson *et al.* 2014).

differentiation (see Hall, Scoones, and Tsikata [2017] and Jayne *et al.* [2016] for discussions on implications for rural change).

[16] The studies argue that the gender-income gap has been intensified by structural adjustment policies introduced in the 1990s. Because men have traditionally been responsible for farming cash crops, they have been better able to grasp the new market-oriented opportunities that have arisen under structural adjustment while women have been forced to diversify towards low-paid off-farm activities.

The thesis does not dismiss entirely smallholder-based rural development theories. Instead, it contributes to rural development debates by nuancing the dominant conceptualisations of rural households. Specifically, the thesis contributes by showing the following:

- In contrast to the limited attention paid to rural labour markets in conventional literature, rural employment on large farms has played an important role in Kenya's agricultural history. Yet, while large-scale farm production might indeed have high productivity levels and employ numerous rural poor as Kenya's horticulture sector seems to suggest[17], real wages are low and close to subsistence. However, a permanent wage income enables some workers to access economic capital in the forms of loans and savings schemes. A synergistic scenario where farm workers benefit through reduced poverty therefore exists when employment can be used as a 'base' from which investments in other productive activities such as smallholder agriculture can be made. Such complex combinations of livelihoods are rarely achievable for the poorest workers, as they require a certain level of skills and access to assets such as land.

- In the post-liberalisation era, only a small fraction of rural households is able to successfully produce and market high-value crops while the majority struggle to preserve a foothold in agriculture. Promoting a smallholder-based rural development model under such conditions will only benefit a few, challenging the poverty reduction objective of the smallholder model.

- Consequently, rural households are differentiated. Rural inequality levels within the smallholder sector are high. Yet, the rural development outcome associated with smallholder differentiation is not, as the agrarian political economy's differentiation theory imagined, a dynamic rural development, because the richer farmers are unable to drive rural development. Instead of accumulating through farming, the richer households have increased their diversification towards high-return off-farm activities such as non-agricultural wage labour. As a result, richer farmers are not able to effectively employ the poorer rural households who struggle to survive off smallholder agriculture alone.

[17] Data from the Economic Survey suggests a rise in horticulture production from 49,200 tons in 1990 to 304,100 tons in 2017. Output per worker calculated as number of tons of production divided by number of employees rose from 0.37 tons in 1990 to 1.59 in 2017. Finally, the number of workers employed in the sector increased from 133,584 to 191,268 in the same period. The Economic Surveys are available online at www.knbs.or.ke (last accessed February 2020).

In addition, separate contributions are made to the livelihoods literature. One influential narrative of the trajectories of change in rural livelihoods is that of 'de-agrarianisation'.[18] De-agrarianisation occurs because the smallholder farming sector no longer provides sufficient means to sustain rural livelihoods at a decent level, forcing a large share of rural peoples to diversify away from smallholder farming. Due to halted industrialisation in many African countries, returns to off-farm activities are low, and hence a shift away from smallholder agriculture is correlated with increased poverty. As mentioned, in livelihood studies women-headed households are believed to be especially disadvantaged as they, due to their precarious foothold in agriculture, have been unable to engage in commercial agriculture (Bryceson 1995; Francis 1995; Whitehead 2009; Whitehead and Kabeer 2001). Although the thesis approaches a general conclusion similar to the 'de-agrarianisation' thesis, it contributes to the livelihood literature in two ways:

- The de-agrarianisation thesis fails, as Mueller (2011) has also noted, to take sufficient account of differentiation among rural households. Therefore, the general conclusion reached on livelihood diversification and future rural development is pessimistic. Contrarily, this thesis shows that rural peoples are indeed differentiated. Not all rural households have lost their foothold in agriculture, and the processes of de-agrarianisation and successful agricultural commercialisation are occurring simultaneously.

- A common notion found in the livelihood literature that women-headed households are disadvantaged in their attempts to diversify incomes is challenged. This thesis demonstrates that in a majority of regions, women-headed households' incomes are on par with the income of men-headed households. Furthermore, against conventional wisdom, a minority of women-headed households are able to successfully produce and market high-value crops.

Finally, I contribute to the African historical literature on development in settler economies. By providing detailed district-level data, the thesis shows that settler-owned large-scale agriculture was not associated with a decline in African agriculture. This confronts a dominant view that living standards declined where settler-agriculture emerged (Arrighi 1970; Palmer and Parsons 1977; van Zwanenberg 1975b). Thereby, a contribution is also made to the new institutional economics literature that stresses that the underlying mechanisms for increased labour supply in settler economies in Africa have had long-lasting negative impacts on rural poverty levels (Acemoglu, Johnson, and Robinson 2001; Acemoglu and Robinson 2010; Bowden, Chiripanhura, and Mosley 2008).

[18] Deborah Bryceson and co-authors define de-agrarianisation as 'a long-term process of occupational adjustment, income-earning reorientation, social identification and spatial relocation of rural dwellers away from strictly agricultural-based modes of livelihoods' (Bryceson 2002: p. 726).

Economic historical background

To situate income diversification, rural employment, and differentiation in their proper historical context, this section delineates the modern economic history of Kenya from the very late pre-colonial era to the present day. A particular emphasis is placed on exploring the historical structures from the point of view of rural livelihoods, the focal point of the thesis.

To summarise the long economic history, one could divide Kenya's history into important political eras such as colonialism, post-independence, and the multi-party system. Yet, to explore how shifts in the socioeconomic structure have affected rural livelihoods, Kenya's modern history is instead structured according to dominant economic historical eras. The shifts in Kenya's economic history are summarised below and illustrated in Figure 4.

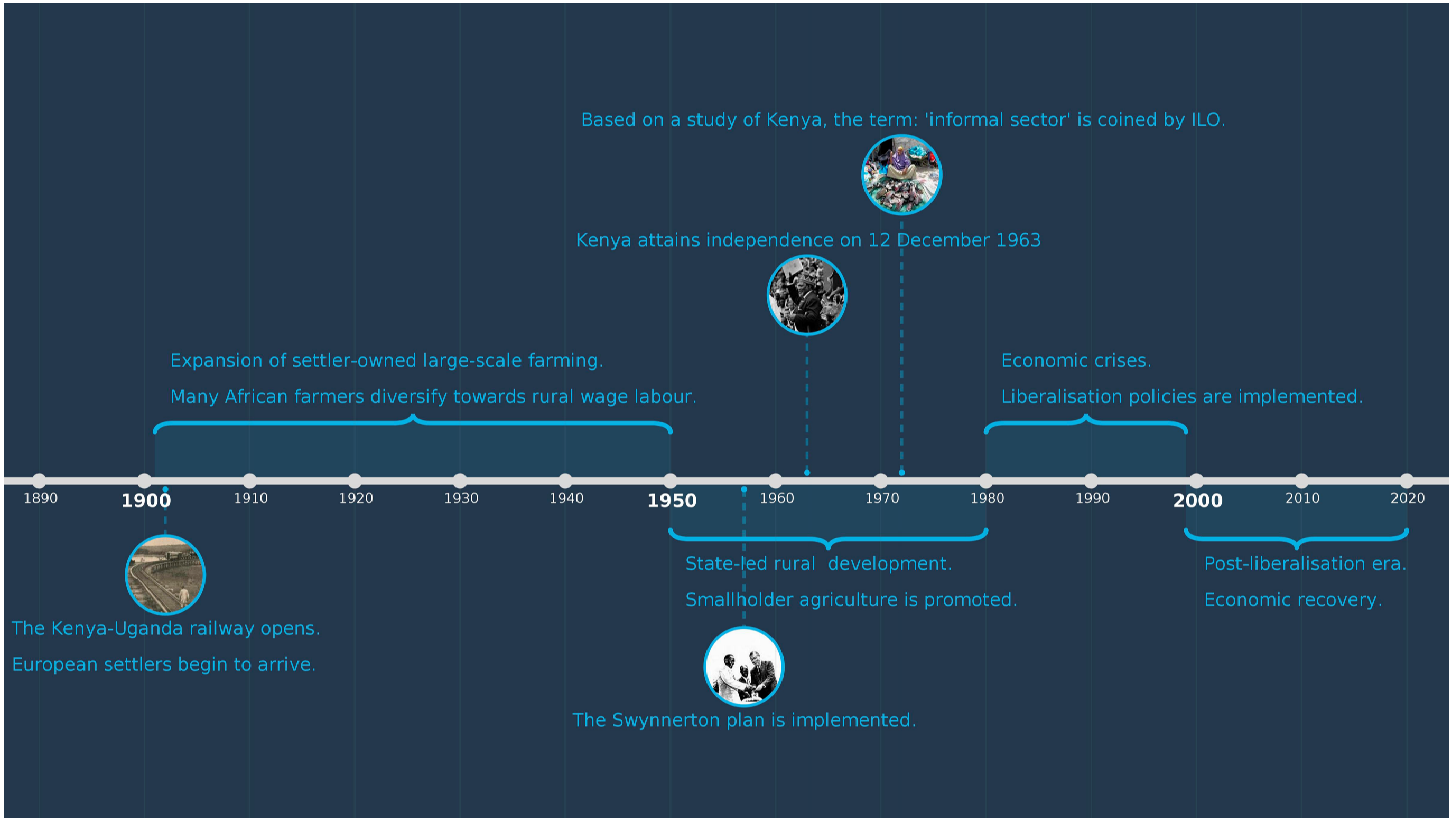

Figure 4: The periodisation of Kenya's economic history
Source: Drawn by Maria Fibæk.

This thesis begins by discussing the transition to colonial rule and the arrival of European settlers. Through the expansion of large-scale farming in the Kenyan countryside, the arrival of settlers had a profound impact on rural livelihoods. In that period, numerous rural people diversified towards employment on European-owned large-scale farms.

Next, the period after the 1950s to the late 1970s is discussed. From the 1950s, a pivotal shift occurred. After decades of support for large-scale farming, the first state-led rural development programmes aimed at improving smallholder agriculture were implemented. The focus on state-led rural development would continue after independence and to the late 1970s.

From the 1980s and for nearly two decades, economic crises and growth stagnation dominated Kenya's economy. In the wake of the crises, economic liberalisation policies were implemented. Both the removal of state involvement in agriculture and the liberalisation of the cereal markets are said to have had negative effects on rural livelihoods as more rural people were forced to diversify towards low-paid activities in the informal off-farm sector.

Finally, the two decades since the turn of the millennium and until today are summarised. This era differs from the 1980s and 1990s because a return to higher growth rates in agriculture has been recorded. Moreover, the era is characterised by a return to large-scale farming and in particular, the floriculture industry has boomed, creating new rural jobs. Meanwhile, performance in the smallholder sector has been ambiguous.

From where? Colonial rule, African wage workers, and signs of increased differentiation

Patterns in diversification and differentiation among rural households have changed throughout Kenya's modern economic history. The economic system of late pre-colonial East Africa including Kenya differed from that of West Africa. A consensus holds that in the east, surplus production and capital accumulation were limited compared with the west (Amin 1972; Austen 1987). Similar to West Africa, a pre-colonial long-distance trade referred to as the 'oriental trade' (Amin 1972) had been established. However, East-African long-distance trade did not rely on specialised goods such as gold, salt, and copper, but instead on non-renewable 'assets' such as slaves and ivory (Austen 1987; Gray and Birmingham 1970; Green 2018).

Although the short-distance trade between neighbouring ethnic groups did involve trade in various foodstuffs such as banana flour, beans, sorghum, and sugar cane (Robertson 1997a), it depended on surplus production, which has been described as limited (Ndege 2009; Orvis 1997).

Due to minor surplus production and a small number of rural people involved in commercial activities, there was less socioeconomic differentiation among households. Producing grain surplus did allow for some accumulation, yet land was abundant and labour was scarce. Hence, to accumulate, men had to gain control over labour, which essentially meant marrying more wives. Surplus production could be traded for cattle, which could then be used as a dowry. However, accumulating many wives through securing cattle was a difficult strategy to pursue and differentiation remained low (Orvis 1997).

This changed drastically in the colonial era. During this period, Kenya developed into a settler-economy and rural capitalism emerged. In 1902, a railway linking the coast of Kenya to the shores of Lake Victoria opened. The railway took almost five years to construct and it was a costly affair. To raise earnings from the railway, the colonial administration considered several income-earning possibilities. After deliberation, which included the possibility of settling Jews and Persians, it was decided that settlement by people of European decent should be promoted (Clayton and Savage 1975). This caused an influx of settlers who were given easy access to the fertile highlands in central Kenya and the Rift Valley, and the highlands quickly became known as the 'white highlands'. It is commonly assumed that settlers initially became highly dependent on support from the colonial state as it aided them in gaining access to land, capital, and indirectly labour, allowing them to expand their production (Berman 1990; Berman and Lonsdale 1992; Brett 1973; Clayton and Savage 1975; van Zwanenberg 1975b; van Zwanenberg 1975a; Wolff 1974).

At first, settlers struggled to produce sufficient yields, but as demands for foodstuffs increased with the influx of settlers, African-grown agricultural produce blossomed. Therefore, to gain adequate incomes to pay taxes, African farmers had the choice of selling produce to the market or diversifying towards wage employment on settler estates. As settler agriculture expanded, high demands for African labour were created and wages increased substantially. Due to complaints from settlers regarding labour shortages and high wages, the colonial state intervened in the land and labour markets. In 1904, policies to settle Africans on 'native reserves' were introduced. These reserves were ethnically defined administrative units and served as the precursors of the modern-day districts and locations in Kenya (Wakhungu, Nyukuri, and Huggins 2008).

Scholars have argued that the relocation of many African farmers to the less fertile native reserves was an indirect yet intentional political act, which served to regress African agriculture. Lower agricultural yields combined with increased direct taxation ensured a steady supply of cheap labour to the settlers (Brett 1973; van Zwanenberg 1975b; Wasserman 1974; Wolff 1974). Furthermore, policies such as the pass law, which forbade every African Kenyan to leave the reserves without an identification card, and the resident native labour ordinances, which regulated the labour supply of African tenants residing on European land, increased settler farmers' control over African wage workers (Anderson 2000; Berman 1990; Berman and Lonsdale 1992; Clayton and Savage 1975).

It has been disputed, however, whether labour supply was in fact secured through these political mechanisms or if economic forces such as labour migration and the employment of women and children served to close the gap between labour supply and demand (Fibaek and Green 2019; Mosley 1982a, 1983). To Palmer and Parsons (1977), the former certainly was the case:

> Thus by the end of the 1930s, the agricultural economy of the Shona and the Ndebele, like that of the Kikuyu and most South African peoples, had been destroyed (p. 243).

Despite a conventional belief that income diversification is a relatively new phenomenon that can be traced back to the structural adjustment era, the colonial era saw large increases in rural peoples' diversification towards rural employment. Whether due to political or economic forces, the number of African wage workers increased drastically from the 1920s. Consequently, more women in the labour-supplying areas became 'de facto' household heads (Stichter 1982).

During the colonial era, the number of farm workers rose from 53,709 in 1920 to 267,749 in 1960.[19] In addition, African tenants residing on European farms per law were required to work a fixed number of days per year. Up to 1944, this labour force consisted of roughly 33,000 men and their families. Hereafter, the system of labour tenancy was slowly abolished.

Considering that close to 8 million African Kenyans were enumerated in 1948 (Martin 1949), the share of farm employment to total population was rather small. However, for certain ethnic groups such as the Kikuyu, Embu, and Meru who resided in close proximity to the settler farms and the Luo and Luhya who dominated the supply of

[19] Data on employment are taken from Agricultural Census 1920-1945 and the Labour Department from 1946-1960.

labour migrants as many as 70% of all adult males had at one point worked on a large farm (Stichter 1982).

The majority of farm workers were men, however, from the mid-1940s, a steady increase in women's labour supply occurred. Following the 1952 Mau Mau uprising and the subsequent ban on male labour from the Kikuyu, Embu, and Meru ethnic groups, women's employment took a drastic jump (Figure 5). Despite this, women were disadvantaged, earning on average 90% of the male wage in 1927 and 70% of the male wage in 1957.[20]

Figure 5: Number of African men and women employed in settler agriculture, 1920-1963
Source: Years 1920-1945 are taken from the Agricultural Census. Years 1946-1963 are taken from the Labour Department annual report.

The colonial era also saw increased differentiation among rural peoples. Demand for education rose alongside needs for semi-skilled and skilled labour, and those who had been able to obtain access to mission education were able to exploit the large skills–wage gap. By reinvesting wage incomes into smallholder agriculture (straddling), a new rural elite emerged who were able to send their children to good schools, ensuring future off-farm income streams (Collier and Lal 1986; Kitching 1980).

[20] Data on wages are taken from the Agricultural Department annual report 1927 and from the Labour Department annual report 1957.

In addition to growing wage differentials, land inequality also worsened. From the 1930s, increased population pressures and differentiation caused a tendency towards land consolidation leading to land shortages in the native reserves. The rising inequality, and a 1950s expulsion of African tenants who prior to the eviction had resided on settler farms in return for labour services, caused rising social tension that culminated in the 1952 Mau Mau emergency (Furedi 1989; Kanogo 1987; Kitching 1980; Lonsdale 1986). [21]

State-led rural development – Kenya as a success story: 1950s to the late 1970s

After decades of the prioritisation of large-scale farming, the post-war period saw a shift towards smallholder cash-crop production. Prior to WWII, investments in smallholder agriculture had been limited, but social tensions eventually led to the implementation in 1957 of a large rural development programme known as the Swynnerton Plan (Swynnerton 1954).

In the wake of the Mau Mau uprising, to improve African living standards, or perhaps to gain support from African rural communities, the colonial government abandoned the dominant 'settler agriculture' strategy. The colony's political and economic well-being had hitherto been based on European-owned large-scale agriculture, yet with the implementation of the Swynnerton Plan, a comprehensive effort to inject capital and technology into the smallholder sector was conducted (Carlsen 1980; Clayton 1964; Collier and Lal 1984; Collier and Lal 1986; Heyer, Ireri, and Moris 1971; Leys 1975). The plan also removed a ban on African-grown, high-value cash-crop production and sought to encourage land consolidation in the native reserves.

The outcome was a major shift in income diversification as more rural households began to cultivate high-value crops and rapid growth was recorded in coffee, pyrethrum, and to a lesser extent tea. The take-up of high-value crops coincided with a post-war commodity boom and rural incomes of smallholders increased (Mosley 1982b). Despite the rise in smallholder commercial agriculture, diversification towards

[21] Owning to the works of Atieno-Odhiambo (1991), Furedi (1989), and Lonsdale (1986) the Mau Mau uprising from 1952 to 1960 now plays a pivotal role in Kenya's historiography. The Mau Mau movement has been described as a rebellion against colonial rule, as a peasant uprising, and as a civil war within the Kikuyu community between rural people who were loyal to the British regime and rural segments who had become increasingly marginalised having lost access to land and livelihoods.

rural employment remained an important livelihood strategy, especially for the poor and/or landless rural peoples (Leys 1975).

In the decades after independence, the state-led agricultural development programmes continued albeit with a new focus on land redistribution, which was achieved by subdividing large-scale farmland and selling it to smallholder farmers (Heyer, Ireri, and Moris 1971). The new political elite led by Jomo Kenyatta had strong ties to the emerging African landed elite in central Kenya, which might explain why rural accumulation and agricultural-led exports were encouraged and supported by the state (Leys 1975, 1971). Subsequently, the two decades after independence are heralded as a rural development success story as the period saw high agricultural growth rates of 6% annually (Ndege 2000). Due to a continued expansion of high-value crops and the uptake of improved cattle used to produce milk for the growing dairy sector, smallholder production boomed in the 1960s and 1970s. A coffee price boom from 1976–1979 further increased rural incomes and generated a higher demand for rural labour, goods, and services, intensifying the positive trends (Bevan, Collier, and Gunning 1987).

Nonetheless, it has been suggested that the boom in smallholder production in Kenya exacerbated existing rural inequalities as few rural people were able to benefit from the spread of cash crops (Njonjo 1981). Agro-ecological as well as political and social factors determined the areas where the high-value crops coffee and tea could be cultivated (Heyer, Ireri, and Moris 1971; Leys 1975). Moreover, to invest in new crops, cash incomes were often required. Consequently, households that resided in high-potential agricultural areas *and* that were able to straddle by combining off-farm incomes with smallholder agriculture benefitted greatly from the spread of high-value crops (Clayton 1964; Collier and Lal 1980, 1986; Kitching 1980). These straddling households were, according to Kitching (1980), better educated and therefore gained access to higher formal-sector wages, enabling them to make investments in land and the required productive capital.

Apart from straddling smallholders, other rural segments that benefitted during the period were owners of large farms. At the top of the income distribution were large-scale landowners, of whom some were African Kenyans who had purchased farms from European settlers. Political and economic interests ensured that large-scale farming continued alongside smallholder cultivation, and it has been estimated that only 20% of former large-scale farmland was subdivided and sold to smallholder farmers (Ndege 2000). The large farms were taken over by the new rural elite, where many allegedly belonged to the Kikuyu ethnic group and to members of the political elite (Leys 1975).

While straddling smallholders and large-farm owners became wealthy in this period, other parts of the rural population were less fortunate. The land consolidation that took place as part of the rural development programmes probably caused poorer households to lose access to land (Ng'ang'a 1981; Njonjo 1981). Poorer households were often not able to obtain access to high-return off-farm activities and, to offset declines in farm incomes, had to diversify for survival towards low-return wage labour or similarly low-return self-employment activities (Orvis 1997).

A large proportion of the landless communities continued to work for wages on large agricultural estates. During the colonial era, a large proportion of straddling households derived their off-farm income from large-scale farm employment (Kitching 1980). However, after independence, the gap between rural farm wages and urban unskilled wages widened as the Industrial Court accepted that only minor increases in the minimum wage paid to farm workers would occur. Moreover, farm workers were poorly organised compared to urban workers (Kitching 1980; Leys 1975). Consequently, farm workers' ability to straddle most likely diminished as the gap between the estate rural wage and the urban wage grew larger during the post-independence period.

Women might also have been disadvantaged in their access to commercial agriculture. It has been suggested that Kenya's rapid post-independence rural development disadvantaged women-headed households. At the height of Kenya's cash-crop boom, an influential report by the International Labour Organization (ILO) recognised gender disparities in relation to rural opportunities. It was a deliberate and official policy not to offer extension services to women, although a large proportion of smallholder plots were in fact managed by women (ILO 1972).

Economic distress and liberalisation: 1980s to the mid-1990s

The rapid smallholder-led rural development came to a halt in the early 1980s. The global oil crises of the late 1970s and 1980s and the corresponding economic collapse placed constraints on the state-led rural development model, and the ability to successfully straddle was reduced as formal-sector employment shrank. No longer guaranteed a job in the formal sector, many households diversified towards the informal sector, which was officially 'discovered' in 1972 by the ILO (ILO 1972). Here earnings were often below the minimum wage (Orvis 1997).

The contraction of formal-sector employment adversely affected women who struggled to gain a foothold in formal employment. Instead, the informal sector became a major employer of women. However, low wages in the sector suggested that the diversification towards informal employment was not out of choice but because it might have been the only place to get employment (Atieno 2006).

Further intensifying the economic crises was a drop in agricultural growth rates from almost 6% in 1979 to –3.7% in 1984 (Ndege 2000). Severe droughts exacerbated the trend. Declines in commodity prices led to a near collapse of the traditional marketed crops, affecting both smallholder and large-scale producers (Bates 1983). Furthermore, the economic decline combined with pressures from the donor community led to a dismantling of state intervention in agriculture. In Kenya, these attempts to liberalise the economy started in the 1980s and were still being implemented in the early 1990s (Nyoro, Kiiru, and Jayne 1999). Government and parastatal workers were retrenched, leading to higher levels of unemployment and a casualisation of the workforce. Moreover, price controls were deregulated and subsidies were removed (Bates 1989).

The effects of economic liberalisation policies are still debated. One influential viewpoint holds that the policies, not only in Kenya but also across most countries in the developing world, led to increased rural distress and a rise in income diversification towards poorly remunerated off-farm activities (Bryceson 1996; Bryceson 1999; Bryceson 2000b; Bryceson 2002; Chambers and Conway 1992; Ellis 1998; Ponte 2000, 2002; Whitehead 2009; Whitehead and Kabeer 2001). Indeed, it has been suggested that in Kenya smallholders were hardest hit as the deregulation of price controls led to severe drops in maize prices. Furthermore, the removal of subsidies raised the price of agricultural inputs (Nyoro, Kiiru, and Jayne 1999). On the other hand, smallholder tea grew rapidly throughout the period and can be regarded as a success story as both land productivity and the number of growers steadily rose.[22]

It has been further suggested that men and women were differently affected by the liberalisation policies. Scholars have argued that women heads' high dependence on food crop production made them even more vulnerable to the witnessed decline in cereal prices in Kenya and elsewhere (Bryceson 1995; Palmer 1988; Razavi 1998, 1999, 2003; Whitehead 2009; Whitehead and Kabeer 2001). At the same time, however, the decline in farm earnings might have caused a break-up of traditional gender divides in

[22] Data on number of small-scale tea growers is available until 1989. The number increased from 19,775 at the eve of independence to 153,290 in 1989. Average yield per hectare rose from 603 KG in 1980 to 1,915 KG in 1999. Data are taken from the Economic Surveys available online at www.knbs.co.ke (last accessed January 2020).

agriculture as both men and women diversified to off-farm sources of income (Bryceson 2018).

To where? Post-liberalisation era: the mid-1990s to today

After two decades of poverty and economic difficulties, the late 1990s saw improvements in economic performance. Agriculture grew by 3.4% annually from 1995 to 2003 and further rose to 4.3% annually from 2005 to 2012 (Kenya 2018).

Smallholder agriculture continued to increase its dominance and today supplies three-quarters of total marketed output. Still, the performance has been ambivalent. While official data show a rise in not only tea but also maize production, which doubled from 1980 to 2014, a decline in smallholder coffee production is registered.[23] Moreover, several factors suggest that the opportunities available to the rural population have contracted compared with the 1970s. For instance, arable land per capita has declined from 0.32 hectare in 1970 to 0.12 hectare in 2016.[24]

Despite the recovery of the economy, the creation of formal sector jobs has been largely stagnant and the share of workers who are formally employed has continued to decline affecting the off-farm opportunities available to those who cannot derive sufficient incomes from smallholder agriculture.[25] Meanwhile, rural areas have seen a rise in the number of large-scale farm jobs available. Although the large commercial farming sector has witnessed waning in traditional export crops such as coffee and sisal, there has been a steep rise in horticulture.

The sector comprising both national and foreign capital (Azizi 2019) initially relied on contract farming, whereby smallholders would produce for large agribusinesses. With a subsequent boost in consumer demand in Europe and a call for year-around availability and high quality, the production changed from out-grower schemes to large-scale production (Dolan and Humphrey 2000; Dolan 2005). In particular, the expansion of floriculture is regarded as a success story. In 1996, the sector was consolidated with the establishment of the Kenyan Floriculture Association. Since then, the sector has come to serve as a crucial rural employer. Consequently, the number of workers employed in the large-scale sector has risen from 173,000 workers in 1968 to

[23] Data is taken from the Economic Surveys available online at www.knbs.co.ke (last accessed January 2020).

[24] Data on arable land per person is taken from the World Bank Database: data.worldbank.org (last accessed January 2020).

[25] See the latest Statistical Abstract for a summary of formal job creation in Kenya (KNBS 2019b).

289,800 permanently employed workers in 2017.[26] In addition, an uncounted number of casual workers are employed.

Although, the rise in farm employment has been unable to keep up with population growth in rural areas, the sector is a critical driver of private sector employment as it employs roughly 30,000 more workers than manufacturing (KNBS 2016). It has been argued that working conditions and wages are poor especially for women who are often casually engaged and thereby have come to serve as a cheap and flexible labour force (Bryceson 2018; Dolan 2005; Dolan and Sorby 2003; Whitehead 2009). However, other studies find that permanently employed farm workers account for 79-84% of all workers employed on farms and that women are as likely as men to be promoted to permanent positions (Gibbon and Riisgaard 2014; Ksoll, Macchiavello, and Morjaria 2011). Moreover, to adhere to international demands for fair trade and to retain the workforce, permanent workers often receive salaries above the minimum wage and non-wage benefits such as paid leave and bursaries (Gibbon and Riisgaard 2014).

In summary, Kenya's agricultural history exhibits important shifts in rural peoples' opportunities and constraints, affecting their ability to successfully diversify incomes. Not only have opportunities differed over time but they have also differed across space, giving rise to differentiation within the rural sector. Gender might intensify the differences, as women may have been less fortunate in their access to formal jobs and agricultural extension services.

The expansion of large-scale farming in the colonial era did create new opportunities in rural areas. However, the historiography suggests that African Kenyans were prevented from reaping the full benefits as coercive colonial policies kept wages low. By contrast, other works have described how some were able to gain from employment, enabling them to straddle by combining wage employment with commercial smallholder agriculture. The rapid economic development of the 1950s–70s raised opportunities in urban and rural areas alike, and the literature suggests that in this period more households were able to successfully straddle. Yet, after liberalisation, the opportunity structure worsened and many households were forced to diversify incomes towards the off-farm sector not to accumulate but to survive. The past two decades have seen a revival of the large-scale farming sector. At the same time, developments in smallholder farming have been ambivalent.

To provide context to the analytical framework presented in the following section, an overview of previous rural development theory and research is first provided.

[26] Employment data is taken from the Economic Surveys available online at www.knbs.co.ke (last accessed January 2020).

Theory and previous research

To locate the current debates on rural employment, income diversification, and differentiation, it is necessary to start with a review of rural development thinking. Consequently, this section begins by summarising the main ideas from the decade after WWII to the present. The section then trails back to a 1920s debate between Lenin and Chayanov on smallholder agriculture versus capitalist rural development. To the reader, it might seem odd to bring to light a long-forgotten debate about the Russian countryside when exploring trends in contemporary rural development issues in Africa. However, as will be shown, the concepts developed during the debate of smallholder-led rural development, differentiation, and implicitly income diversification towards rural employment, have had a huge influence on contemporary thinking.

Since the 1980s, smallholder theories have merged with market-oriented theories to form the dominant strain of microeconomic neoclassical theories that today have largely crowded out other rural development social sciences such as sociology or history (Mueller 2011). Alternatives to the prevailing microeconomic rural development approach do exist. One such alternative, which is presented next, is the livelihood approach. Similar to microeconomic rural development models, livelihood approaches analyse rural development through the micro-level study of rural people. However, rural people and their economic activities are considered in connection with a broader 'macro' structure, which includes formal and informal institutions. Nevertheless, despite the ambition to bridge the micro–macro divide that plagues rural development studies, this thesis argues that livelihood approaches have often failed to do so through mirroring neoclassical economic theories. Therefore, three alternatives to livelihood approaches are presented as follows: the de-agrarianisation theory, agrarian political economy variations, and gender and development literature. In addition to livelihood analysis, the three theories have served as inspiration for developing the thesis' analytical framework, as they have been fairly successful in bridging the micro–macro divide that plague studies of rural development.

A brief overview of rural development theories

In the decade following the end of WWII, multitudes of approaches to rural development in poorer countries have emerged. To provide context, Figure 6 presents a brief overview of important paradigm shifts in rural development thinking.

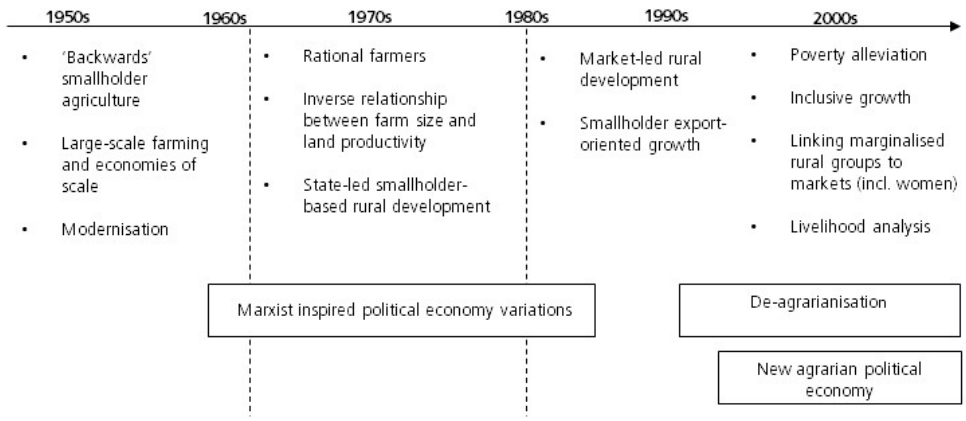

Figure 6: Shifts in mainstream smallholder rural development thinking
Source: Inspired by Ellis and Biggs (2001).
Note 1: The dotted line constitutes a pivotal shift.
Note 2: The boxed constitute theories that in one way or the other challenge mainstream rural development theories.
Note 3: One can argue that 'new' agrarian political economy theories can be traced further back; however, the date is set to the year 2001 when the influential Journal of Agrarian Change was inaugurated.

The 1950s and 1960s saw the birth of economic development thinking. Macro-economic models were developed to show how poorer countries could 'modernise' and thereby catch up with the developed economies. The focus was on capital accumulation (Domar 1946, 1947; Harrod 1939) and labour movements from the 'backwards' smallholder sector to the modern sector consisting of industry and large-scale farms (Lewis 1954).

Nonetheless, sparked by a seminal publication by Schultz (1964) where he showed that smallholder farmers were efficient and rational in their resource allocation, a decisive shift in thinking took place in the 1970s. While smallholder farmers were indeed capable of driving rural development (and economic growth), they were often held back by post-independence policies that had a clear 'urban bias' favouring urban capital at the expense of smallholder farmers (Lipton 1977). The viability of smallholder agriculture was intensified by arguments that an inverse relationship exists in agriculture whereby the yield per acre declines as farm size increases (Berry and Cline 1979).

From the seminal studies an understanding that 'small is beautiful' emerged, which placed rural smallholders at the centre of economic development. Drawing inspiration from the green revolution in Asia, 1970s theories and policies focused on state-led support to smallholder farming as a key driver of economic development (Ellis and Biggs 2001).[27]

The 1980s saw another pivotal shift in development thinking that would move the emphasis from state-led towards a market-oriented smallholder-based rural development. In the wake of economic crises and what were considered government failures, the International Monetary Fund and the World Bank called for adjustment policies aimed at increasing market forces. The policies touched on all economic sectors, yet in agriculture, adjustment policies were largely aimed at getting 'prices right' by removing state subsidies and government control over cereal markets (Nyoro, Kiiru, and Jayne 1999). Smallholder agriculture remained a crucial driver of rural development, and by creating better incentives and linking farmers to global markets it was envisioned that the full potential of smallholder agriculture would be set free (Ellis and Biggs 2001).

A decade later, realising that structural adjustment policies had failed to alleviate poverty (Bryceson 1993; Bryceson 1996; Ponte 2002), attention was placed on pro-poor growth and inclusion. Market-led smallholder agriculture continued to gain support in academic circles and among policy makers (Barrett, Bellemare, and Hou 2010; Griffin, Khan, and Ickowitz 2002; Larson *et al.* 2014; Lipton 2006), yet more emphasis was placed on linking marginalised rural peoples to markets. Borrowing heavily from Amartya Sen's capability framework (Sen 1981; Sen 1988), ideas of the participation, empowerment, and inclusion of marginalised rural people including women were coupled with the continued promotion of market-led smallholder growth.

Despite their popularity, conventional smallholder theories have come under critique for their assumptions that the rural sector is made up of homogenous small-scale family farmers who are all capable (provided assistance) of producing for the market. A specific critique has surfaced in the strain of rural livelihoods literature (Bryceson 1996; Bryceson 1999; Bryceson 2000b; Bryceson 2002; Chambers and Conway 1992; Ellis 1998, 2000a, 2000b; Hussein and Nelson 1998; Scoones 1998). While not encompassing a new paradigm,[28] the livelihood approach has challenged conventional

[27] Ideas of economies of scale and the superiority of large-scale farming has continued to lure in the background albeit at a much limited scale compared to the dominant 'small is beautiful' thinking (see for instance Collier and Dercon (2014).

[28] See Fine (2002) and Pontara (2010) for excellent discussions of why the new microeconomic development approach including livelihood studies do not constitute a paradigm shift in the

rural development thinking by highlighting rural complexities. Rural households are not equated with smallholder farmers; instead, the livelihood approach analyses and builds theories around the multitude of farm and off-farm activities that households engage in (Ellis and Biggs 2001).

Similarly, the agrarian political economy tradition has always been sceptical of conventional smallholder theories, reasoning that the theories are rooted in methodological individualism, and thus failing to adequately explain the structures that govern rural peoples' livelihoods (Bernstein 2010; Byres 2003; Mueller 2011; Oya 2007, 2010b, 2010a; Pontara 2010).

The disagreement between agrarian political economists and conventional smallholder rural development theories has deep roots that can be traced back to the aforementioned 1920s Russian agrarian debate. Here, the disagreement on the role of differentiation within the 'smallholder' sector played a profound role. Consequently, the debate has served as inspiration for designing the thesis' analytical framework where differentiation is placed at the core of rural change.

The 1920s Russian debate

While the early classic political economists (e.g., Adam Smith, David Ricardo, and Karl Marx) saw smallholder farming as backwards[29], the 1920s Russian debate placed smallholder family farms at the heart of the agrarian debate. Although contemporary rural development literature seldom refers back to the classic agrarian debates, the theories have gained much of their theoretical insights from Chayanov (1966; first published in 1925) a Russian economist belonging to the populist tradition of Russian agricultural science who, among others, conceptualised the 'inverse relationship'. Moreover, contemporary agrarian political economists draw much of their inspiration from the work of Lenin, especially on theories of smallholder differentiation and (capitalist) rural development. Thus, as Byres (2003) also noted, the disagreement between Lenin and Chayanov is highly relevant today as the concepts and conclusions developed as part of it heavily influence contemporary debates.

Kuhnian sense. Although, the 'social' is studied in the theories this is done through the continuing reliance on a methodological individualism framework.

[29] Smith did not believe that the small farmers (the peasantry) would play a role in economic growth. Ricardo stated that technological change was possible in agriculture but only on large capitalist farms (Green 2005). Marx believed that the peasantry would disappear in the process of primitive accumulation (Mueller 2011).

During the 19th century, scholars were divided on the role of the peasantry. Lenin, similar to Marx, saw the dissolution of the peasantry as the logical and inevitable outcome of capitalist development. Although Lenin did not believe in the desirability of smallholder agriculture, he differed from Marx by envisaging the peasantry as capable of playing a critical role in agricultural transformation.

Occupied by the questions of transition to capitalism, Lenin (1956; originally published in 1899) identified different paths to capitalism, differentiating between capitalist development from 'above' and 'below'. 'Capitalism from above', Lenin, argued arose when a landlord class extracting rents transformed into a capitalist class relying on hired labour to expand and accumulate. Such a path had occurred in Prussia where the feudal landlord economy had evolved into a capitalist (bourgeois) Junker landlord economy. Over decades, a transition from feudal bondage into servitude and capitalist exploitation occurred causing widespread suffering for the majority of the peasants. Consequently, Lenin saw such a path as a reactionary resolution to the agrarian question due to a slow transition to capital and to vast exploitation and suffering.

In the second case, which Lenin titled 'capitalism from below', there is no landlord economy or it has been weakened often due to a previous revolution. As peasants become exposed to national and international market relations, a gradual differentiation of more and less successful farmers transpires, causing the formation of a landed class of capitalist farmers who rely on hired labour and landless peasants supplying labour. According to Lenin, such a process of peasant differentiation had occurred in (North) America and was underway in Russia. Building on the work by Engels (1972; first published in 1894), Lenin distinguished between three groups of peasants as follows:

- Poor peasants: farmers who due to competition and impoverishment have too little land and must sell their labour to reproduce themselves;
- Middle peasants: peasants who own enough land to survive without having to sell their labour.
- Rich peasants: the rural 'capitalist' class. Rich peasants have large land holdings and are fully commercialised. To produce for the market they rely on hired labour.

Over time, as market compulsions and competition grow, the middle peasantry may dissolve into poor or rich peasants and two distinct rural classes can emerge. The first is a class of poor farmers who over time lose access to land, forcing them to diversify towards rural wage employment for survival. The second is a class of rich commercially

oriented peasants. As long as the wealthy farmers are able to exploit economies of scale by initiating and expanding a cycle of extended production based on the accumulation of land and use of hired labour, they will develop into capitalist farmers (Bernstein 1982). The differentiation thesis envisioned by Lenin is illustrated in Figure 7 below.

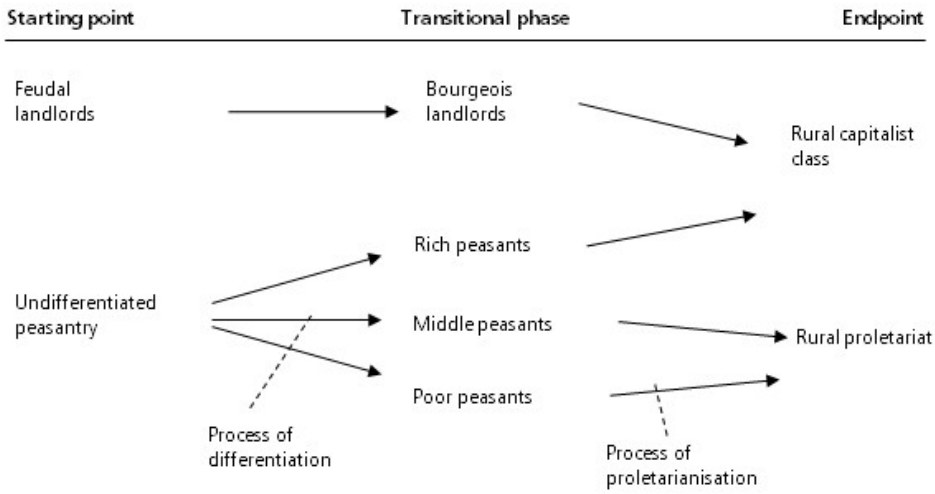

Figure 7: Lenin's path of capitalist rural development
Source: Modified from Djurfeldt (1982).

A contrasting perspective, which defended peasant production, can still be found in much of contemporary rural development thinking. In a seminal book, Chayanov (1966), developed an analysis showing that rural development based on family farmers using family labour to produce was efficient.

Differing from Lenin, Chayanov did not believe that increased market integration would cause massive differentiation among family farmers. Chayanov did not see the peasant economy as driven by capitalist motives, implying that peasants - although partially integrated into the capitalist economy (Green 2005) - would not be absorbed into the economy as Lenin had prescribed. Instead of a capitalist maximisation logic where hired labour is used to produce a profit, peasants were driven by a desire to ensure the subsistence needs of the peasant family. Consequently, households seek to meet their consumption needs taking into account the 'drudgery' of work. Although households do not desire to accumulate profit, Chayanov's model did not imply zero differentiation among households either, yet differentiation would only be temporary. The balance between consumption and work changes over a family's life cycle.

Differentiation arises due to demographic differences. Households who have younger children have higher consumption needs and to meet these, the peasant household may choose to work longer hours or to use more land, hire labour, or buy livestock to expand consumption. This pattern in differentiation Chayanov described as 'demographic differentiation'. Still such differentiation would only be temporary. When children grow up and form their own households, the consumption needs of the family will contract again.

Because family farmers were not dependent on a profit for survival to ensure subsistence needs, they would work harder, sell at lower prices, and not obtain a surplus while still managing to continue their production year after year - an ability that large farms did not possess. Consequently, Chayanov advocated for a rural development based on modernising smallholder agriculture through extension services and co-operative organisation.

Drawing on Chayanovian arguments, the conventional rural development theories that this thesis seeks to confront, also view smallholder farming as a superior driver of rural development.

Current rural development theories

Conventional smallholder theories

In the wake of the economic crises of the 1970s and 1980s, 'modernisation' in many developing countries seemed more complex than the macro-economic theories had predicted. Solutions to (rural) economic development were difficult to find in the models and a new strain of micro-oriented development theories emerged. As the majority of poor were found in rural areas, development economics merged with Chayanov-inspired theories to advocate support for market-oriented smallholder production (Byres 2003). The strength of the smallholder models came to lie in their ability to simultaneously consider concerns of equity (as smallholder farmers retain land) and increased agricultural production (as small farmers are more efficient).

Since the 1980s, the field has expanded. Noticing that poorer people struggled to benefit from increased market integration, attention was placed on the role of structures. However, this was done not through a structuralist analysis but instead through applying a neoclassical micro-oriented framework to the role of structures and history. Concepts such as market imperfections were developed to explain how

structures could lead to quite heterogeneous and at times inefficient outcomes (see Stiglitz [1986, 1989]).

Out of this new strain of neoclassical microeconomic modelling of heterogeneity among rural peoples emerged studies of income diversification. In the late 1990s and early 2000s, it was recognised that households in Africa and Asia derive a large share of their incomes from sources other than farming (Barrett, Reardon, and Webb 2001; Barrett and Reardon 2001; Haggblade, Hazell, and Reardon 2007; Reardon 1997; Reardon *et al.* 2007). As a consequence, the concept of income diversification has been used to enhance the understanding of rural people by dismissing the reductionist view that all rural households are farming households (Ellis and Biggs 2001).

By applying the concept of income diversification to the microeconomic study of rural development, the field has moved away from a pure Chayanovian smallholder model where all rural households farm. Consequently, the field has attempted to incorporate income diversification into standard microeconomic modelling of household behaviour. Income diversification was conceptualised as a maximisation strategy where households allocate labour to different activities to maximise the long-run return to their labour. In doing so, households take into account incentives, resource endowment (such as human and physical assets), and the desire to minimise risk (Reardon *et al.* 2007).

While earlier studies modelled households' decision to diversify as a choice stemming from differences in the preference for risk (Fafchamps 1992; Reardon, Delgado, and Matlon 1992), influential studies by e.g. Barrett, Reardon, and Webb (2001) have not viewed diversification as an entirely voluntary activity shaped by risk preferences. Instead, access to resources such as land, labour, and credit influences how households diversify. Moreover, high entry costs into certain types of high-return activities impede the entry of poorer households. While some households diversify to accumulate wealth driven by 'pull' factors such as new opportunities, poorer households are 'pushed' to diversify to manage risk, to cope with negative shocks, or to offset declining farm incomes (Barrett, Reardon, and Webb 2001; Ellis 1998; Reardon *et al.* 2007).

Despite the crucial contributions made by the conventional neoclassical smallholder theories to the understanding of complex rural realities, the theories have come under attack by livelihood and agrarian political economy theories. A general concern has been the critique that neoclassical smallholder theories are ahistorical and tend to abstract a few sets of variables such as risk or market access from a much more complex political economy. The underlying mechanisms that generated the differences in the first place are seldom explicitly addressed (Bernstein 2004, 2010; Byres 2003;

Chambers and Conway 1992; Hussein and Nelson 1998; Mueller 2011; Oya 2007, 2010b, 2010a; Pontara 2010).

The livelihood approach has emerged as an alternative to neoclassical smallholder theories. Here, the attempt is to study the diverse nature of rural households' economic activities alongside the wider social and economic structures that govern them.

Drawing on livelihood approaches, this thesis places rural livelihoods at the centre of analysis. Moreover, the livelihood theories have motivated the design of the analytical framework applied in Paper 2. However, as I show the theories also have certain limitations.

Livelihood analysis

A major theoretical effort was made in the 1990s to incorporate rural households' numerous activities into a wider rural development framework (Chambers and Conway 1992; Scoones 1998). Similar to the income diversification approach, livelihood analysis does not deduce that farming lies at the core of rural livelihoods, and consequentially rural households do not represent a homogenous group of producers. Still the approach seeks to differentiate from microeconomic studies by considering the wider structures that govern rural livelihoods.

In the livelihood approach, livelihood activities are usually classified into agricultural intensification/extensification, livelihood diversification, or migration. Hence, one can decide to gain more from agriculture by farming land more intensively or by farming more land; to diversify towards off-farm activities; to move away and seek a new livelihood (temporarily or permanently) elsewhere; or to combine several such activities together (Scoones 1998). Because households have diverse access to assets, better-off households will be able to combine well-paid wage labour with investments in smallholder agriculture while others will diversify not to accumulate but to survive, causing stratification within the rural sector (Ellis 1998, 2000a).

Similar to microeconomic theories, livelihood approaches are actor-focused, and drawing on the work of Amartya Sen (Sen 1981; Sen 1988) on human development they examine how rural people use tangible and intangible assets to strategically cope with risk and vulnerability. By enabling the individual/household to pursue different livelihood diversification activities, the assets serve as a 'base' from which livelihoods are constructed. However, an alleged difference between microeconomic income diversification studies and livelihood analysis is the ability of the latter to incorporate 'structures' into the analysis of livelihood diversification. Although livelihood studies

apply an actor-oriented approach, factors that strengthen or weaken access to assets are considered (Whitehead 2002).

Examples of such factors include social relations such as a position within society, gender, class, and formal and informal institutions. In addition, these mediating factors are themselves influenced by trends in, for example, population, migration, and technological change (Ellis 1998, 2000a). Hence, to fully grasp livelihoods and associated rural change, an institutional analysis must be incorporated examining the roles of formal and informal institutions and of power relations in terms of enabling or disabling people to pursue certain livelihood activities (Scoones 1998).

Despite the ambitious attempts to link micro and macro approaches, the field has come under criticism. Although the livelihood framework has great potential in rethinking conventional smallholder theories, the discipline is criticised for attempting to analyse social structures through the lens of actor-oriented methodological individualism. In doing so, livelihood approaches end up mirroring the conventional smallholder theories that they sought to criticise (Fine 2002; Mueller 2011; Pontara 2010; Scoones 2009; Toner 2003; Whitehead 2002).

Although the livelihood approach can be criticised for failing to adequately factor in the wider structure, one of its great values is that it views households as engaging in numerous economic activities. Moreover, the approach has reignited the use of heterogonous source material such as village studies, life history interviews, and case studies.[30] Consequently, by investigating diversification towards off-farm income and the combination of farm and off-farm income, elements from livelihood approaches are used throughout the present thesis. However, to engage with wider questions of rural change in Paper 3 and 4 inspiration was drawn from a specific strain of livelihood studies that has been better able to bridge the micro–macro divide. The de-agrarianisation theory developed by Deborah Bryceson and her co-authors (Bramall and Jones 2000; Bryceson 1996, 2000b, 2000a; Bryceson 1999, 2002), have sought to incorporate the concept of income diversification in a contextual framework that takes into account social, economic, and political processes. In doing so, their studies are able to discuss the trajectories of change in rural livelihoods.

[30] For excellent examples see Whitehead (2002) who uses longitudinal household data to study livelihood change in Ghana and Wiggins (2000) who applies village studies from the 1970s-1990s to explore rural change.

Rural livelihood diversification and de-agrarianisation

According to the de-agrarianisation theory, the witnessed rise in livelihood diversification among smallholders is an indication of increased rural distress and an inability for the smallholder sector to sustain rural households. The fundamental problem, according to the theory, is the failure of smallholders to compete in global markets, which is made worse by globalisation and structural adjustment. In the 1980s, the increased integration of smallholders into global markets occurred alongside declines in government support for the rural sector. Furthermore, the removal of input subsidies coincided with a worsening of smallholders' global terms of trade, exacerbating the downward trend in farm earnings and causing a 'scramble for cash' as rural households struggled to sustain their livelihoods through farming. Due to halted industrialisation efforts during the 1980s and 1990s economic crises, labour in rural and urban areas has ventured into the informal sector to carve out a living through engaging in a multitude of off-farm activities. The outcome of income diversification is a long-run process not of rural prosperity but of 'de-agrarianisation', a shift away from farming, as the smallholder sector can no longer sustain rural livelihoods (Bryceson 1996). The process causes migratory pressures and both rural and urban poverty rates to increase. Hence, the de-agrarianisation process is both a long-term historical process and simultaneously a risk minimisation strategy that households engage in, where incomes are diversified to smooth consumption.

However, the de-agrarianisation thesis has received subtle criticism in agrarian political economy literature. One critique is that the theories by being able to take in processes of differentiation reaches conclusions that are too 'pessimistic'. Smallholder differentiation and/or an entire shift away from smallholder agriculture could, in the long-run, indicate a more dynamic economic development (Mueller 2011; Pontara 2010). Consequently, agrarian political economy theories offer yet another alternative to mainstream rural development theory where structures are explicitly discussed in relation to rural change. The theories have strongly motivated the framing of Paper 1 and 4.

Agrarian political economy variations

Whereas income diversification and livelihood analyses are viewed as relatively new concepts within rural development theories, the 1970s agrarian political economy debate on labour supply in settler economies indirectly placed income diversification at the forefront. Contrary to contemporary livelihood analyses, the debate related income diversification to structures and was thus able, to discuss the wider rural change

associated with diversification towards wage labour. The consensus found in the literature that households were 'pushed' away from their farms towards wage labour is confronted in Paper 1.

The 'racial rents' school

In the 1970s, a subset of Marxist and neo-Marxist scholars used political economy analysis to explain how settler-owned business was able to attract African wage labour. Gibbon (2011) referred to this group of scholars as the 'racial rents' school. The scholars did not consider income diversification towards wage labour as a rational response to new opportunities, but instead as a reaction to coercive colonial policies that forced African farmers to work for low wages.

Whereas contemporary agrarian political economy studies typically direct their critique towards the Chayanovian-inspired smallholder theories, the racial rent scholars were critical of 'modernisation' theories. For example, the two-sector model of Lewis (1954), argues that economic forces governed the transfer of labour from the traditional smallholder sector to the modern plantation/industrial economy. Later, Barber (1960) used Lewis' model to explain labour supply in colonial Zambia and Zimbabwe, concluding that new wants and needs among the African population caused them to free up labour from farming to seek work in large-scale agriculture and mining. Because African farmers were seasonally unemployed, they were willing to work for low wages.

In a critique of Barber's theory of labour supply, Arrighi (1970) instead claimed that during the colonial era, African farmers' diversification towards wage labour was caused not by new opportunities, but by a colonial policy-induced decline in farm incomes. Thereafter, a range of critical publications on African labour supply in South Africa (Bundy 1979), Zimbabwe (Palmer and Parsons 1977), and Kenya (Brett 1973; van Zwanenberg 1975b; van Zwanenberg 1975a; Wasserman 1974) followed suit.[31]

According to these publications, in the early colonial period, African commercial smallholder farmers played a critical role in supplying foodstuffs to the growing rural and urban sectors, creating labour shortages. Therefore, African farmers (mainly men) had little incentive to diversify towards wage labour unless real wages rose substantially. To prevent wage increases, the settler farm community lobbied for coercive land and labour policies.

[31] The 'racial rent' scholars were more 'radical' than 'Marxist' in their writing often pointing to the inefficiency of (settler dominated) large-scale farming arguing that, had it not been for interference by the colonial state, the smallholder sector would have been more dynamic and capable of supplying the market with surplus production.

Similar to the arguments put forward in the section on Kenya's economic history, the racial rents scholars maintained that legislative and administrative actions were taken to create a class of impoverished rural wage workers. First, taxation was introduced to 'motivate' Africans to obtain cash through, for instance, rural employment. However, the increase in taxation did not affect labour supply as the African farmer could raise cash by selling produce to the market. Therefore, to increase the supply of African labour without having to raise wages, the settlers managed to lobby for land tenure policies that led to the establishment of labour reserves and a reduction in the size of land available to Africans. Subsequently, Africans were gradually relocated to the native reserves located in less fertile areas where land was typically of lower quality. Due to population pressures, the reserves soon became overpopulated and with the extensive nature of African agriculture, this caused a decline in average agricultural yields forcing African farmers to seek work on large farms.

Thus, the racial rents scholars assume that income diversification in the colonial era was due to push mechanisms as households could no longer sustain their livelihoods through smallholder agriculture. The expansion of large-scale farming relying on hired workers who become increasingly marginalised to some extent resembles Lenin's theory of 'capitalism from above'. However, the settlers were not strong enough and to start processes of accumulation they needed assistance from the colonial state. Consequently, the combination of taxation and land tenure policies became a precondition for the establishment and expansion of large-scale agriculture. The outcome was massive rural poverty as African agriculture regressed.

Although the theories of the racial rents school apply to rural development in the colonial era, the structures that were imposed on rural societies might have implications for contemporary rural development. Recent publications have used the racial rents interpretation of labour supply in former settler colonies to explain why the countries continue to experience stunted (rural) economic development (Acemoglu, Johnson, and Robinson 2001b; Acemoglu and Robinson 2010; Bowden and Mosley 2008; Frankema and van Waijenburg 2012).

The racial rents interpretation of the underlying mechanisms of African labour supply has, however, been challenged by Bolt and Green (2015) and Mosley (1983). The scholars have downplayed the role of political mechanisms and instead argued that economic factors such as migration and the increased employment of women and children helped close the gaps between labour demand and supply. Paper 1 engages with this debate by, among others, exploring whether diversification towards wage labour was the result of forceful 'push' mechanisms.

In recent years, there has been a renewed interest in the political economy of agrarian change theories. Concepts such as capitalist farmers, income diversification, differentiation, and rural labour markets have resurfaced. Inspired by the theories, an explicit assumption is made throughout the thesis that the concepts are crucial to consider when analysing past and present rural change in Kenya. More explicitly, the differentiation theory's appliance in contemporary developing countries has motivated the framing of Paper 4.

Contemporary agrarian political economy theories

Unlike the conventional smallholder rural development theories, in the contemporary agrarian political economy literature strong attention is paid to differentiation among rural people.[32] Where conventional smallholder theories typically assume, similar to Chayanov, that inequality levels between smallholders are low, agrarian political economy theories see the smallholder sector as being differentiated. Farming households in contemporary capitalism are products of a process of differentiation, which typically includes rural labour markets and labour hiring (Bernstein 2004).

Inspired by Lenin's smallholder differentiation thesis presented in Figure 7, Byres (2003) and Oya (2007, 2010a) noted that rising rural inequality levels can form part of a positive rural development process as increased socioeconomic differentiation among farmers can lead to the upgrading of groups of small farmers into a rich and accumulating landed rural class. Such an agricultural path, similar to Lenin's capitalism from below, is regarded as a favourable rural development path for contemporary developing countries (Byres 2003; Oya 2007, 2010b, 2010a).[33]

The field has also added greatly to our knowledge on rural labour markets in Africa. While conventional rural development literature has argued that rural labour markets being thin or absent in African countries, Oya (2010b), for instance, noted that rural

[32] Few anthropological studies have also studied differentiation in the rural smallholder sector. For instance, Whitehead (2002) applies anthropological evidence to argue that socio-economic differentiation has increased in Ghana in the years after the implementation of structural adjustment programmes. Peters (2004) uses anthropological case studies to put forward the argument that differentiation is on the rise in post-liberalisation Africa. The differentiation takes many forms including men against women, youth against elders revealing new social divisions.

[33] Bernstein, on the other hand, was sceptical that contemporary developing countries can follow a smallholder differentiation path to (capitalist) rural development. Due to rapid globalisation and the extension of liberalisation policies, agriculture no longer plays any role in setting the stage for structural transformations. Global capital accumulation now occurs in the service and finance sectors and agriculture has been 'decoupled' from processes of global capital accumulation. This has changed rural conditions for the worse, and as little accumulation and development occur in rural areas, rural peoples are finding it harder to sustain their livelihoods (Bernstein 2004, 2010).

labour markets are active. Many smallholders hire wage labour while others rely mainly on selling their labour power. This finding has been reiterated in several agrarian political economy studies that have actively examined the role of rural labour markets in wider rural development, including employment on both small and large farms (Cramer, Oya, and Sender 2008; Mueller 2011; Oya 2010b; Sender 2002; Sender, Oya, and Cramer 2006; Sender and Smith 1986; Sender and Smith 1990).

Evidence to support the notion of stratification in rural areas and/or the emergence of rural capitalist elites can also be found in the historical literature. In a comprehensive project on historical inequalities in Africa led by Ellen Hillbom, articles show that already in the colonial era, widespread differentiation among rural peoples into commercial farmers vis-à-vis subsistence farmers drove inequality levels (Aboagye and Bolt 2020; Bolt and Hillbom 2016). Furthermore, historical studies have confirmed the existence of labour hiring rural capitalist classes (see Hill [1963a][34], Austin [2005], Green [2010] on rural entrepreneurs in West Africa and Malawi respectively).

A general concern with much of the literature presented thus far is the lack of attention paid to women and rural development. This is despite the fact that women have been shown to dominate the smallholder sector in many African countries. Consequently, inspired by a growing number of studies on gender and development, Paper 3 explicitly examines women's income diversification and the associated long-run rural development trajectory.

Gender and rural development theories

Studies of gender and rural development were sparked by the seminal work of Boserup (1970) who argued that women play an important role in agricultural production. Prior to her work it was commonly assumed that women's role in agriculture was passive, limited to that of assisting the male farmer.[35] Since then, a wide strain of gendered rural development studies have followed suit. The gender-related themes are numerous and cross many disciplines such as livelihood approaches and ordinary microeconomic studies. The themes covered include, among others, gender inequality and poverty

[34] Studies of rural capitalism and rural capitalist classes owes much to the seminal historical work by Hill. She studied various forms of rural capitalism in West Africa in cocoa farming, livestock, and fishing and she has produced a vast account of the emergence of capitalist rural classes on topics such as how they acquire initial capital, how they accumulate land and mobilise labour, and savings and investment patterns.

[35] A few historical studies such as Roberts (1968) nevertheless describe how in the 19th century already women increased their labour time in agriculture to replace the labour power lost as men migrated in the search for work. Similarly, Robertson (1997a, 1997b) portrays women's active role in short-and long-distance trade in the pre-colonial era.

(Deere and Leon 2003; Dzanku, Jirström, and Marstorp 2015; O'Laughlin 2008), gender and agricultural production (Dorsey 2008; Doss and Morris 2000; Jones 1983; Kabeer and Van Ahn 2000; Udry 1996), gendered labour market participation (Cramer, Oya, and Sender 2008; Sender 2002; Sender, Oya, and Cramer 2006; Sender and Smith 1990), and gender and structural adjustment (Elson 1994, 1995; Palmer 1988).

A complete discussion of all gender and rural development literature is beyond the scope of this thesis, and instead the focus is on research related to women's income diversification. Gendered studies have contributed to the strain of literature on income diversification through explicitly exploring women's entry into rural labour markets or other off-farm activities and the associated outcomes.

The mentioned studies by Sender and his co-authors not only advocated for rural employment opportunities in the large-scale farm sector, but they also had a strong gender component. Sender and Smith (1990) noted that it was mainly single, divorced, or widowed women who participated in the casual wage labour market. This, the authors argued, was because married women were not allowed by their husbands to enter the off-farm markets. Because men had access to land via customary rights, for women to access land it was necessary to marry. Through marriage, men gained control of not only land but also women's labour. Unmarried women, however, did not have access to the means of production and were therefore 'free' in the Marxist double sense to work for wages.

The rise of a female labour force ready to work for wages can in combination with expansions of large-scale agriculture lead to positive rural development. A comprehensive study of rural labour markets by Sender, Oya, and Cramer (2006) concluded that an increase in the number of rural wage earning opportunities would likely have a strong effect on poverty reduction, especially among single or divorced women who are often the poorest of the poor. By decoupling from men, women are able to raise higher incomes than what is possible in male-oriented and backwards smallholder agriculture (Cramer, Oya, and Sender 2008; Palmer 1988; Sender 2002; Sender, Oya, and Cramer 2006).

Differing from the viewpoint of Sender and his co-authors, several scholars have viewed women's entry into the off-farm markets as associated with a negative rural development characterised by increased vulnerability and poverty. Due especially to unmarried women's disadvantaged access to agricultural resources; women often have a precarious foothold in agriculture. The decline in farm earnings following liberalisation policies has intensified this trend. Hence, the prevailing rural crises in African countries force women to commodify their labour under distress, making them

accept low wages in return for their labour. Exacerbating the low wages are social constructs of women's labour as low skilled (Bryceson 1995; Bryceson 2002; Bryceson 2018; Razavi 2009; Whitehead 2009; Whitehead and Kabeer 2001). This also applies when women enter into self-employment because they continue to be crowded into a limited range of activities with fewer entry barriers, but also much lower returns (Whitehead and Kabeer 2001). Men on the other hand, who have traditionally been responsible for farming cash-crops, have been better able to grasp the new market-oriented opportunities that have arisen under structural adjustment. Moreover, men have easier access to well-paid jobs.

Therefore, while the long-run agrarian change associated with income diversification might be positive for some men, for women the outcome is usually long-run poverty as they are forced to diversify away from agriculture (Bryceson 1995; Whitehead 2009; Whitehead and Kabeer 2001; Whitehead and Tsikata 2003). This argument is supported by studies that have found large gender-income gaps (see e.g. Doss and Morris [2000] and Quisumbing and Pandolfelli [2010]).

However, a concern with the dominant literature is the tendency to portray women as a homogenous entity. They are often lumped together in one group said to represent the 'poorest of the poor' (Chant 1997b). A rare exception is a research project led by Andersson Djurfeldt and her co-authors, which showed that women-headed households' income diversification and outcomes are highly context-specific and distinguished by regional characteristics (Andersson Djurfeldt 2017; Andersson Djurfeldt, Djurfeldt, and Bergman Lodin 2013). Building on this work, regional variation in women's income diversification is used as a point of departure in Paper 3 to study the rural change that is associated with women's income diversification.

Next, the analytical framework, which has been inspired by the theories reviewed, is presented.

Analytical framework

The analytical framework does not serve as a theoretical model; instead, the objective of the framework is to highlight the main relationships under study and relate the four empirical papers to each other.

Based on the study of previous theory and research, three main considerations influence the formulation of the framework. First, there is a recognition that to grasp past and present rural development it becomes necessary to borrow from the livelihood approach and acknowledge that rural households engage in numerous economic activities. Second, socioeconomic differentiation that arises due among other reasons to gender and differences in income diversification strategy is crucial to consider. Third, a need exists to bridge the classic divide between micro-oriented household-level analyses with macro/structuralist studies of rural change.

As discussed, studies on income diversification have often been 'micro' in nature. By placing rural peoples and their decision-making at the centre of analysis, socioeconomic or political structures have rarely been discussed unless in abstract ways that relate to variables such as risk aversion or access to credit. A contrasting analytical perspective places structures at the heart of the analysis. For instance, the aforementioned 1970s racial rents literature emphasised the role of structures such as the colonial penetration of capital into rural areas and coercive policies. Because macro-level analyses are unconcerned with particular micro-level realities, the structuralist models cannot, for instance, analyse farmers' different responses to market integration. Meanwhile, the micro-oriented literature, rooted in methodological individualism theories, assumes that farmers can take action beyond what the structures allow. Scoones (2009) explained this micro–macro dilemma well:

> […] an unhelpful divide often persists in livelihoods analyses between micro-level, locale-specific perspectives, emphasising agency and action, and broader, macro-level structural analysis. Both speak of politics and power, but in very different ways. This is down in large part to disciplinary proclivities, separated out along the classic structure-agency axis of the social sciences. Yet, livelihood perspectives must look simultaneously at both structure and agency and the diverse micro- and macro-political processes that define opportunities and constraints (p. 186)

It follows that both theoretical schools are insufficient. Individual choices take place in specific geographical, social, and historical contexts. Therefore, in this thesis, a middle way is proposed. The relationships between the micro- and macro-levels and the four papers are presented in Figure 8.

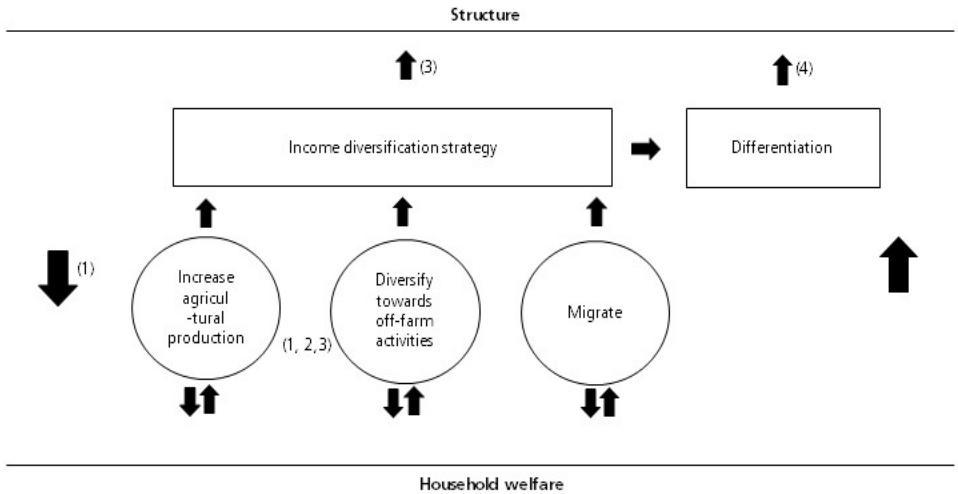

Figure 8: Analytical framework that ties the thesis' topics and the four papers together
Note: Paper numbers are denoted in parenthesis for instance (1) refers to Paper 1.

Central to the analytical framework presented in Figure 8 are the productive activities of rural households. As the large arrow to the far left illustrates, structures affect household welfare. For instance, a negative or positive shock such as the introduction of austerity policies or a new rural development programme will lower or raise households' welfare. At the same time, associated differences in households' welfare leads to differentiation. This is represented by the second large arrow to the far right.

As a response to changes in welfare, households can, as previously mentioned, increase agricultural production (through the intensification or extensification of agriculture), diversify towards off-farm activities, or migrate (Scoones 1998). Meanwhile, the choice of income diversification also affects households' welfare. This feedback relationship between welfare and diversification is represented by the small arrows towards the bottom of the figure, which point in opposite direction.

In reality, households often combine several such activities together into one overall income diversification strategy. Hence, combinations of farm- and off-farm diversification are jointly considered in this thesis. Migration, nonetheless, lies outside the scope of the study.

Households have dissimilar diversification strategies. Some households are able to pursue a lucrative diversification that combines better-paid off-farm activities such as formal wage labour with reinvestments in agriculture allowing for accumulation. Others diversify out of need towards low-paid activities in the informal sector. Low-paid activities, while allowing households to survive, do often not enable processes of accumulation and often reinforce existing poverty levels (Ellis 1998, 2000a). As mentioned, women are often seen as unable to raise incomes from commercial agriculture and have instead been forced to diversify towards low-paid off-farm activities such as petty trade, basket making, or hairdressing. Consequently, as the figure shows, differences in income diversification strategies are likely to cause increased differentiation among rural households.

At the same time, as the quote by Orvis presented in the introduction reminds us, diversification also affect the 'structure'.[36] The emergence and dominance of households that are able to engage in the aforementioned straddling process, where off-farm sources are reinvested in smallholder agriculture, may give rise to a rural development path driven by a successful transformation of smallholder agriculture (Barrett, Reardon, and Webb 2001; Ellis 2000a; Ellis and Bahiigwa 2003).[37] On the other hand, if households use off-farm income not to invest, but to survive, an associated rural development path is likely to be de-agrarianisation, a shift away from farming, as the smallholder sector can no longer sustain rural livelihoods. Such a shift has in African countries often been associated with increased rural poverty (Bryceson 1995; Francis 1998; Razavi 2009; von Bülow and Sørensen 1992; Whitehead 2009; Whitehead and Kabeer 2001).

Moreover, differentiation also affects rural change. As mentioned, according to the de-agrarianisation theory, increased stratification within the smallholder sector often occurs alongside a general rise in rural poverty. Meanwhile, the new agrarian political economy literature described how differentiation among rural households may lead to a progressive rural development path due to the upgrading of groups of small farmers into a rich and accumulating landed rural class[38] (Byres 2003; Oya 2007, 2010b, 2010a) capable of driving future rural development.

[36] By structure is implied rural change at the national level.

[37] The positive link between off-farm income and agricultural improvement has frequently been described for south Asian countries (Rigg 2006); however, studies confirm its existence in African countries (Clayton 1964; Collier and Lal 1986), and in Kenya in particular (Andersson Djurfeldt 2012; Lay, Mahmoud, and M'Mukaria 2008).

[38] Non-mainstream scholars who are nevertheless sceptical of the emergence of a capitalist rural class include Berry (1993) who sees the dominance of certain values such as decent and seniority as an impede to accumulation. The values underpin access to resources and accumulation logic causing

To bridge the macro–micro divide, this thesis combines household-level analysis with secondary and historical research. However, as Figure 8 demonstrates, the analytical approach differs slightly between papers. In Paper 1, the colonial structure and its effect on rural households' is explored. In Papers 2 and 3, the poverty/wealth outcome from income diversification is considered, and Paper 3 also discusses (women's) income diversification in relation to wider rural change. Finally, in Paper 4, the role of smallholders' differentiation in wider rural change is explored.

surplus to be redirected towards consumption and not productive accumulation thereby preventing the emergence of a capitalist class.

Methods and data sources

Having discussed the analytical framework, this section presents an overview of the methods applied in operationalising the framework and in answering the research questions of the thesis. The methods and data sources are tailored to each of the topics treated in the four individual papers and they are discussed in detail in each paper. The chosen methods are first presented before a description of the data sources and their limitations are provided.

Methods

The thesis is concerned with the study of livelihood change at the micro-level. However, to achieve sufficient knowledge on the social and political contexts that constrain or facilitate households' choices and welfare and to engage with debates on wider rural change, methods that capture long-run change were chosen. Three research methods were applied in the thesis: the reconstruction of incomes, qualitative analysis of life stories, and econometric panel data analysis.

Reconstruction of incomes

In Papers 1 and 2, the real wages of rural workers were calculated by applying Robert Allen's Basic Needs Poverty Line approach (Allen 2013; Allen 2009). This approach has been widely used in economic history to study changes in the welfare of various types of workers over time (Allen 2001; Allen *et al.* 2011; de Haas 2017; Frankema and van Waijenburg 2012). The approach expresses the real wage as a welfare ratio, where annual wage income is divided by annual subsistence costs.

In addition, to engage with the racial rent theories, earnings in settler agriculture were reconstructed in Paper 1. Settler farm earnings were estimated by deducting the depreciation expenses of agricultural machinery, annual labour, fertiliser, transport, and other transaction costs from the annual agricultural production values.

Qualitative analysis of life story interviews

In Paper 2, welfare ratios were reconstructed for the post-independence period, but this time the quantitative wage data were complemented by qualitative life story interviews. Because memory is the product of a complex interplay between recall, interpretation, and reinterpretation (Walker 2006), the analysis of life histories presents challenges. To quote Francis (1992):

> The life story approach is an intellectual construct whose structure and content reflect the priorities of the researcher and the images the informant projects back into the past, as much as tangible realities. (p. 93)

Hence, life stories could be treated, for example, as actual events that can be analysed or as a narrative developed in the specific encounter between the informant and the researcher. For this thesis, a positivist approach was selected and interviews were treated as actual events. Therefore, interviews were analysed to detect similarities and differences among the respondents' life stories, and the identified patterns were summarised into more generalised findings. Consequently, a thematic analysis was conducted where the interview text was closely examined to identify commonalities and differences among the respondents. Using Nvivo software, codes were developed in a partly structural manner, where codes were based on the study's research question, and a partly inductive manner, where codes were constructed as they arose from the raw data.

Econometric panel data analysis

To study income diversification and differentiation in the post-liberalisation era, Papers 3 and 4 relied on econometric panel data analysis. In contrast to the dominant micro-economic studies of livelihoods, these papers did not rely on causal analysis, but instead used descriptive analysis in combination with secondary and historical research. This approach was selected to be able to relate changes at the micro-level with agrarian change debates.

Data sources and limitations

To examine long-run changes, it would have been ideal to use a longitudinal dataset spanning several decades. However, the absence of such data makes it difficult to research long-run change in Africa, and thus, the researcher must be creative. One must

rely on annual statistics, snapshot cross-section data, oral sources, or, in a few lucky cases, on panel data, which are only available for a few years. To overcome the void in data sources, several quite heterogeneous data sources with various pros and cons are combined in this thesis. The data sources are presented below and detailed in each of the individual papers.

Colonial archival material

To reconstruct settler farm earnings and real wages of African farm workers, collected archival material was applied. The archival material used in the thesis includes sources widely used in the new African economic history literature such as Colonial Blue Books and other annual administrative government statistics. The national annual statistics were collected by Erik Green and myself at the United Kingdom National Archives located in Kew.

National statistics for Kenya, however, omit important data such as the rural price data required to calculate welfare ratios of farm workers, African agricultural production, and the railway rates required to estimate transport costs. Such information is only available in district-level reports. To obtain regional statistics, I spent several months during 2016 and 2017 at the Kenya National Archive in Nairobi collecting data on, among others, rural prices, railway rates, and African agricultural production.

The use of district-level data served as an advantage. Because previous studies have relied on the urban price data available in the national annual statistics, the welfare of rural workers (the bulk of the colonial labour force) had hitherto remained unstudied. Still, the colonial material has certain limitations. The annual statistics had a standardised reporting format used across the British colonies and were compiled using information gathered at the district level. Reports were then sent to the colonial office in London for reporting purposes. Often it was just a small proportion of the material that was sent back to the United Kingdom, and the selection of material was most likely not random but intentionally curated to portray a certain picture of progress and development in the colonies. This introduced a bias in the data and often poverty and suffering among the rural population were downplayed. Such a bias is for instance evident in the omission of data on forced labour, which in the first decades of colonial rule played a vital role (see van Waijenburg (2018)).

Affecting the results of this thesis are bias in reported wages, population, and/or employment series. The official wages reported in colonial statistics were used to calculate real wages, yet there is no way of knowing if the official wages were always paid. To implement a solution, where available, detailed district-level wages, which are

more likely to reflect true wages, were used to estimate an average population-weighted wage.

Another concern that might affect the results presented in Paper 1 is incorrect estimates of population and employment. Until the 1940s, employment data were based on employers' self-reporting. According to Kitching (1980), self-reported labour returns were often missing or incomplete and the employment data reported in the official statistics might have been miscalculated, causing an underestimation of average earnings in the settler-dominated large-scale farming sector.

The opposite is true for the African smallholder earnings constructed in Paper 1. Frankema and Jerven (2014) showed how colonial officials often underestimated the African population, and if that is true for colonial Kenya, then earnings calculated by dividing total agricultural income at the district level by population size might be slightly overestimated.

Another data limitation arises from the fact that the colonial administration was more concerned with the developments in large-scale settler agriculture, and therefore asserted little effort to collect systematic data on, for example, African agriculture, African household size, and patterns of labour hiring by smallholder farmers. This makes it extremely difficult to trace past changes in income diversification and differentiation. Furthermore, no rural surveys exist on the expenditure patterns of rural wage workers and it was not possible to fully establish the link between wage employment and agricultural commercialisation using quantitative data.

Post-independence annual statistics

To construct post-independence welfare ratios, data on wages were collected from annual statistics such as the Statistical Abstract and Economic Survey available online at the Kenya National Bureau of Statistics (KNBS) website, from collective bargaining agreements,[39] and from minimum wages reported in the online archives of major newspapers.[40] Rural price data were infrequently reported in the national statistics, and therefore to collect price data I visited the KNBS head quarter in Nairobi in 2018. The official library did not have data on rural prices but a senior statistician (Mr. Pasquel Kagema Gichohi) held a private archive in his office, which had several rural price data series that I was given access to.

[39] Available online at www.africapay.org (last accessed February 2020).

[40] Newspaper articles were retrieved from the Daily Nation available online at www.nation.co.ke (last accessed February 2020) and the Standard available online at www.standardmedia.co.ke (last accessed February 2020).

The official post-independence statistics including the Economic Surveys and Statistical Abstracts suffer, in many instances, from the same bias as the colonial statistics. The annual statistics do provide a useful range of data on wages and employment. Unfortunately, it is not always clear how the data were collected making it difficult to detect and correct any bias. Moreover, the data are often quite superficial. For example, wages are at times reported as the total wage bill divided by the total number of employees. Because the underlying income distribution is not considered, such an average wage masks true earnings. To overcome such limitations, where possible, I triangulate data by comparing wages collected from different sources. A large proportion of the labour force employed on large-scale farms are either seasonally or casually employed, yet wages only refer to permanently employed workers. Thus, the real wage series in Paper 2 should be treated as an upper bound as it can only offer an indication of the purchasing power of wages for workers who are permanently employed.

Oral life story interviews

Life story interviews differ from other in-depth interviews because they collect information on an entire lived life including childhood and adolescence. The life story method has been widely used in African historiography to reconstruct the lives of ordinary Africans and/or to overcome some of the bias present in the official colonial records (for excellent examples, see van Onselen 1996; Anderson 2005; and Elkins 2005). Because a high level of contextual and historical detail can be gathered, life story interviews have also become a commonly used method for conducting contemporary analyses of poverty dynamics (Davis 2006; Hulme and Sheperd 2003; Lawson, Hulme, and Muwonge 2007).

During November 2018, 22 interviews were conducted. All interviews, lasting approximately one hour, were conducted in Kiswahili by myself and voice-recorded. The interviews were semi-structured and an interview guide was prepared for use during them. Questions were open-ended and the interview was always allowed to divert from the guide.

To solve potential bias at the interview stage, several factors were incorporated into the interviews. First, I attempted to avoid asking general questions such as *'Were you poor when you grew up*?', which could yield unspecific and ungeneralisable replies. Second, I looked for inconsistencies in the storytelling, and when opportunity emerged attempted to ask questions that would provide clarification. Third, information provided in the interviews was crosschecked with secondary sources such as old newspapers. Lastly, I

held long talks with two research assistants after each interview to discuss content and inconsistencies and to provide required contextual knowledge.

Informants were not randomly selected from a general population of workers, but were instead purposively sampled to obtain variations in factors such as age and work experience. A non-random sample introduces bias when drawing conclusions that go beyond the sample. It is for these reasons that the qualitative results were combined with quantitative findings.

Panel data

Papers 3 and 4 applied a quantitative randomly sampled household survey collected by the Tegemeo Institute of Agricultural Policy and Development (hereinafter 'Tegemeo'), Egerton University, and Michigan State University. Households were sampled to represent the underlying population at the agro-regional level (Olwande 2008). The data—spanning five waves, namely 1997, 2000, 2004, 2007, and 2010—were specifically designed to capture trends in rural livelihoods including income diversification. The data are available from Tegemeo upon request.

The Tegemeo survey data are rich in coverage yet have their limitations. Because the survey was conducted among rural households, it is not well suited to capturing rural landless peoples or squatters, who might be the poorest of the poor and therefore more dependent on wage labour for subsistence.

Another concern is the time period. Although more than ten years is a notable length for an African rural survey, it is too short a period to capture rural development paths, and I can only point to likely trajectories. It would have been ideal to include a more recent wave, yet unfortunately; no follow-up visit has been made since 2010.

Finally, limitations exist that are related to survey data, including field- and data-related errors such as missing entries and outliers. For instance, in more than 200 cases, an individual was reported as having an off-farm activity yet no corresponding income was listed. In the data-cleaning process, an economist from Tegemeo was consulted, which led to the discovery that these were case where the respondent (typically the household head) did not possess information on the other household members' income. To implement a solution, the median income for a specific activity was assigned whenever data were missing. Such data-cleaning steps are of course an approximation that either will over- or underestimate true results.

Summary of papers

Paper 1 was co-authored with Erik Green. I was responsible for the review of previous literature and the empirical section and contributed to framing the paper, while Erik Green assisted in reviewing literature and developing the framing and the ideas of the paper.

Paper 1: Labour Control and the Establishment of Profitable Settler Agriculture in Colonial Kenya, c. 1920–45

Paper 1 takes its' point of departure at the macro-level. By zooming in on the emergence of settler commercial agriculture that relied on hired African farm labour, Paper 1 explores the colonial origins of one important form of rural income diversification, namely employment on large-scale farms.

Ongoing scholarly debate cites extractive colonial institutions as the root cause of Africa's comparatively low economic development (Acemoglu, Johnson, and Robinson 2001; Acemoglu and Robinson 2010; Austin 2008; Bowden, Chiripanhura, and Mosley 2008; Frankema and van Waijenburg 2012). The role of institutions is emphasised particularly in historical research on settler colonialism. It is held that in settler colonies such as Kenya, Zimbabwe, and South Africa, rural living standards declined as the state intervened in land and labour markets to ensure a steady supply of cheap labour to settlers (Arrighi 1970; Bundy 1979; Palmer and Parsons 1977). Land alienation and the subsequent relocation of Africans to remote native reserves with relatively poor soil quality caused African rural agricultural yields to decline. Combined with rising taxation, this forced farming households' to diversify towards wage labour, creating an unlimited supply of labour at a low wage. The outcome was a rural economy characterised by persistent high levels of inequality and stunted economic development.

Yet, the empirical evidence underpinning this conventional view is not overwhelming and scholars have questioned whether political mechanisms were as widely used as was previously assumed (Bolt and Green 2015; Mosley 1983).

To engage in the debate, the paper explores the economic and political factors underlying the rise in African farmers' diversification towards rural wage labour in Africa's settler economies. More specifically, the paper asks whether an African labour supply was ensured due to repressive colonial policies. To answer the question, the paper narrows in on the period 1920–1945 during which settler agriculture shifted from being a financial weakness to being a lucrative business.

To better understand the link between settlement and African living standards, real wages for unskilled large-scale farm workers expressed as welfare ratios are constructed (Figure 9). Contrastingly to the rise in settler earnings, the figure reveals a declining and then sticky wage level close to subsistence.

Figure 9: Welfare ratio – based on the annual income of an adult male agricultural worker, 1912-1945
Authors' own calculations.
Source: wages are taken from the Blue Books 1912-1930, from Native Affairs Department 1930-1945, and from Mosley (1983). Rural commodity prices are taken from the Central/Kikuyu and Nyanza Province annual reports 1912-1945. Prices for imported are taken from the Blue Books and Trade Reports 1912-1945.
Note 1: Standard methods are used to calculate the welfare ratio (see Frankema and Waijenburg (2012), Allen (2013) and de Haas (2017)).
Note 2: Caloric content is taken from Latham (1997).
Note 3: Similar to de Haas (2017), we include beans and we allow the family to choose the cheapest grains variety (maize, millet or sorghum). Following Frankema and van Waijenburg (2012), we add 10% to the cost of the basket to take into account firewood/charcoal and candles, as data for these items is missing. In addition, a 5% mark-up is also added to account for the cost of maintaining a rural dwelling.

However, the rise in settler earnings and the decline in African real wages do not appear to be correlated with regressed African agriculture nor with increased taxation. Using detailed information collected from annual district reports, a different picture of development in areas that supplied the bulk of labour emerges. The areas that had the highest share of labour supply appears to have fared better in terms of agricultural commercialisation compared with areas with lower rates. Average African agricultural earnings in labour-supplying areas rose during the period, as did agricultural commercialisation. This suggests a complex income diversification pattern where wages might have been reinvested in agriculture. Furthermore, the number of days a worker would need to work to pay annual taxes declined during the period.

Still, Kenya's labour supply dynamics did not constitute a mutually beneficial scenario either. Due to the increased commercialisation of African agriculture, it became important for the settlers to control the mobility of African workers. An emerging labour control regime enabled European settlers to reduce both upward pressures on real wages and the transaction costs of finding and retaining workers.

Paper 2: Working Poor? A Study of Rural Workers' Economic Welfare in Kenya

The economic welfare of workers could not be directly examined in Paper 1, due to data limitations. In Paper 2, in an endeavour to study rural workers' welfare, the analysis is extended to the post-independence period. Similar to Paper 1 the focus is on large-scale farm employment, however, to better understand changes in farm workers' economic welfare, the study takes the 'micro' level as its' point of departure.

For several reasons, the large-scale farming sector is of particular relevance to study from a contemporary rural employment perspective. First, historically, in eastern and southern Africa, large-scale agriculture has employed more workers than those employed in mining and manufacturing. Second, the post-2008 rise in commodity prices has sparked new investments in commercial agriculture and employment has risen. Third, the sector is often characterised as labour-intensive, and thus has a good potential for absorbing parts of the growing rural population (Dolan 2005; Humphrey 1938; McCulloch and Masako 2002). Despite this, the existing studies on the poverty reduction potential of the sector are scarce. Recently however, and in contrast to the historical studies, scarce contemporary literature has maintained that employment on large farms may serve as a route out of poverty often benefitting the poorest of the poor (Cramer, Oya, and Sender 2008; Humphrey, McCulloch, and Masako 2004;

McCulloch and Masako 2002; Sender 2002; Sender, Oya, and Cramer 2006; Van Den Broeck, Swinnen, and Maertens 2017).

To contribute to the scarce contemporary academic work on large-scale farm employment in Africa, the article asks whether diversification towards rural wage labour can serve as a route out of poverty. To approach an answer, a longitudinal study of Kenyan farm workers' economic welfare is performed. A long-term perspective is required, as paths of poverty/accumulation are unlikely to manifest themselves within a short time.

Newly collected data on prices and nominal wages are used to construct a time series of real wages expressed as welfare ratios. Welfare ratios are calculated using three types of wages: the statutory minimum wage for unskilled farm workers, the union wage that is negotiated on behalf of unionised workers in collective bargaining agreements, and finally the minimum wage for skilled farm workers. The welfare ratios show a low minimum real wage barely able to cover the subsistence needs of a small family (Figure 10).

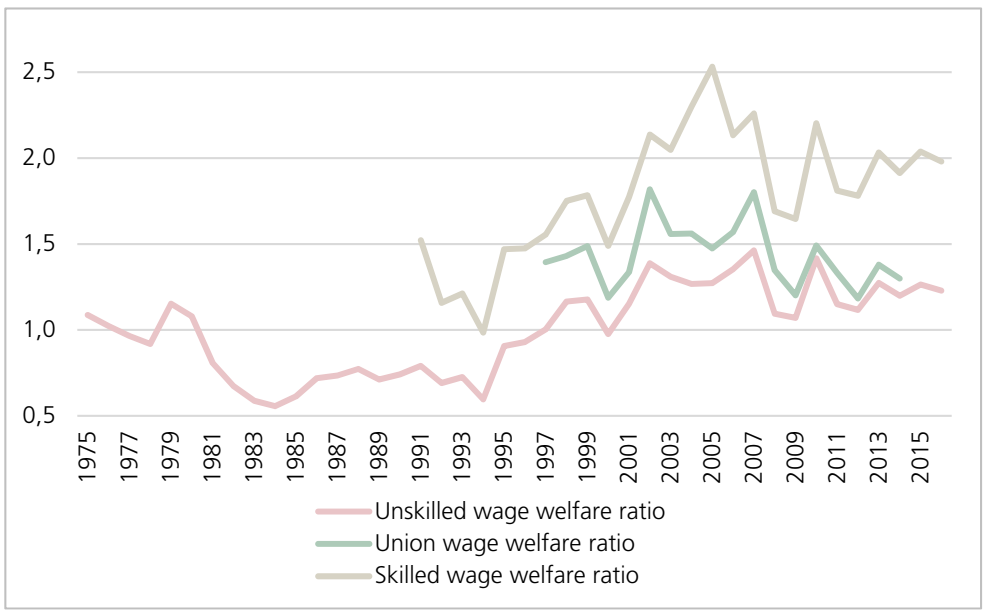

Figure 10: Welfare ratios 1975-2016 - Small Household
Source: see Appendix I and II for a detailed description of data sources.
Note 1: the welfare ratios are calculated using the statutory minimum wage, the minimum wage paid to foremen/clerks, and the negotiated Collective Bargaining Agreement (CBA) wage.
Note 2: the assumed daily intake of calories used to calculate small family welfare ratios is 8,400.

To complement the quantitative findings, a qualitative analysis of poverty dynamics among a group of farm workers using collected life story interviews is performed. Although the historical literature on large-scale farm employment has described an impoverished and homogenous class of workers, two distinct groups of workers with varying trajectories are identified. The first is workers who rely solely on their wage income and do not move out of poverty. This group of workers fits the typical description of a 'proletariat'. Over generations, these workers have been employed on large farms. Despite this, they are often landless, poor, and use wage employment as a survival strategy. However, the data revealed another group of workers—the 'asset accumulators'—who have been able to slowly climb out of deep poverty. To move out of poverty, the asset accumulators have used employment as a base from which they have accumulated productive assets. Initially, the workers were landless, but wage employment has allowed them to access economic capital (e.g., savings and loans), which they have used to buy land. Having land makes it possible to creatively combine wages and farm incomes to move out of deep poverty over time. The difference between success and failure appears to be rooted in initial life resources, where especially the level of formal education differentiates the workers.

Combined, the findings offer insights that can enrich discussions on rural development in contemporary Africa. An expansion in commercial agriculture might be important for wider rural development, but a mutually beneficial scenario where farm workers also gain in the form of poverty reduction only arises when wages are high due to high levels of labour productivity and/or when wages can be successfully reinvested in other productive activities. Such complex combinations of livelihoods require a certain level of skills and formal education, demonstrating the need for a skills upgrade in rural areas.

Paper 3: Are Women-Headed Households Moving Out of Poverty? Income Diversification and Gender in Rural Kenya

Papers 1 and 2 explored men's diversification towards agricultural wage labour; however, to add a gender component to income diversification, Paper 3 looks at women-headed households and income diversification more broadly.

Since the turn of the century, a trend in rural Africa has been the 'feminisation of agriculture'. Prior to Boserup (1970)'s seminal work, little had been written on women in agriculture in developing countries, and women's role was assumed to be 'passive', limited to that of assisting the male farmer. However, in the past decades, women have

increased their involvement in smallholder agriculture as a large number of men have out-migrated in the search for non-agricultural activities (Bryceson 2018). Despite women's increased role in agriculture, longitudinal studies on women and income diversification are scarce (Alobo Loison 2015).

Using a longitudinal dataset from Kenya, this paper explores nationwide and regional patterns in women-headed households' income diversification. As numerous studies have concentrated on gender differences in incomes (see e.g., Andersson Djurfeldt, Djurfeldt, and Bergman Lodin [2013], Doss and Morris [2000], and Quisumbing and Pandolfelli [2010]), this paper narrows in on a topic less studied: regional differentiation among women heads.

The article's empirical analysis is two-layered. First, national trends in women-headed households' diversification are presented, and next to deepen the analysis; regional variations in women-headed households' diversification are discussed. The analysis conducted at national levels shows that, on average, while women heads have increased their share of off-farm income, the diversification towards off-farm activities is most likely a result of increased distress as inflation-adjusted farm incomes have declined in the period. Moreover, both per-capita incomes and women heads' productive capital declined in the period, placing future farm income streams at risk.

Still, women heads are not a homogenous group and there is widespread regional differentiation among women-headed households. A minority of women heads, residing close to the capital, have been able to combine off-farm income with commercial agriculture. This group of women heads have high per-capita incomes and poverty rates below the national average. Meanwhile, the majority of women heads in low potential areas have become highly dependent on off-farm incomes.

Although a ten-year survey is insufficient for drawing a conclusion on the wider rural change associated with women-headed households' diversification, a few tentative trajectories can be drawn. Women heads who have diversified towards commercial agriculture might in the future continue to derive fairly high incomes from agriculture combined with a few off-farm sources. As the women have followed a path of intensification (applying more fertiliser and labour to small plots) they are less threatened by the witnessed decline in farm sizes. For women who have diversified towards off-farm activities the associated rural development trajectory is less positive. Due to a lack of well-paid off-farm activities, a shift away from agriculture is not associated with poverty reduction. Hence, for a majority of women-headed households, rural welfare is largely contingent on better opportunities created in the off-farm sector.

Secondly, against conventional wisdom, the paper shows that social cleavages aside from gender influence rural inequality. In the majority of regions (five out of eight),

gender-income gaps are small and statistically not different from each other. In these regions, the rural change associated with women's diversification follows a similar trend as the general population. Thus, while there is a need to focus on gender-income gaps, conventional rural development theories will need to consider the social factors besides gender that leads to smallholder stratification. A failure to incorporate differentiation into theories and policies will have implications for the smallholder-led rural development model that rests on the assumption that most rural households can benefit from policies that link them with markets.

Paper 4: Rural Differentiation and Rural Change: Micro-Level Evidence from Kenya

Having noticed that other social factors besides gender lead to smallholder differentiation, paper 4 examines differentiation and its effect on wider rural development. The paper asks how differentiation among rural smallholders can be reconciled with ongoing processes of rural development. To do so, it uses a longitudinal rural dataset from Kenya.

Analyses of inequality in Africa have tended to avoid the rural smallholder sector. Although several studies of inequality in contemporary sub-Saharan Africa have been published, inspired by Lipton's (1977) influential urban-bias hypothesis,[41] the focus has overwhelmingly been on rural–urban inequalities (Bezemer and Headey 2008; Sahn and Stifel 2003; Young 2013). The few available studies of rural inequality have focused on the inequality between the small- and large-scale farming sectors and the consequences thereof (Alesina and Rodrik 1994; Deininger and Binswanger 1995; Deininger and Feder 2001; Deininger and Squire 1998; Griffin, Khan, and Ickowitz 2002); meanwhile, the smallholder farming sector is often described as egalitarian and made up of largely homogenous family farmers. Because African farmers are perceived as poor small-scale producers, the inequality that exists between them is often deemed insignificant.

However, the narrow conceptualisation of rural households has been challenged by a growing field of rural livelihood studies that point to the complex nature of rural societies. A consensus has emerged within the field that the smallholder farming sector is heterogeneous; rural households sell and hire labour and many rural people do not rely on farming as their main livelihood. Instead, rural households derive income from

[41] Urban bias refers to the perceived extraction of surplus from the rural areas by the urban classes through taxation, pricing, and an unequal distribution of political power.

a multitude of activities such as petty trade or food processing, a process that has been referred to as rural income or livelihood diversification (Barrett, Reardon, and Webb 2001; Bryceson 2000a; Chambers and Conway 1992; Ellis 1998; Reardon 1997). Differentiation within the rural sector arises, as some household are able to use income diversification as a means to accumulate assets, while other households are forced to diversify incomes for survival. Still, livelihood studies have not been able to tie livelihood changes to emerging rural development trajectories (Bernstein 2010; Mueller 2011; Pontara 2010; Scoones 2009; Toner 2003; Whitehead 2002).

To contribute to the debate on rural inequality and its role in wider rural development, rural households are stratified into income classes, and next, accumulation patterns among each income class are examined to explore whether any capitalist tendencies appear to be emerging.

The findings from the paper offer insights that can enrich discussions on rural inequality in contemporary Africa. Contrasting with mainstream rural development theories, the study finds signs of differentiation among smallholder farmers. However, smallholder differentiation does not seem to correlate with the dynamic rural development described in the differentiation thesis envisioned by the agrarian political economy scholars. Profit possibilities in agriculture are low as evidenced by a decline in real farm incomes among all income classes, including richer farmers. Instead of accumulating through farming, richer households have increased their income diversification towards off-farm opportunities such as wage employment.

Concluding remarks

The original idea behind this thesis was to uncover rural development in the colonial era through selecting Kenya, a former settler economy, as a case study. At the time the thesis work was initiated, detailed African economic history studies had begun to uncover the black box that was rural living standards and development in colonial Africa.[42]

However, while working on the thesis, I soon discovered a fascinating divide in the historical literature vis-à-vis contemporary rural development theories. Having trained as a development economist focused on rural development issues, I was surprised to find historical studies on rural labour markets, progressive farmers, and rural capitalism. In the rural development field, I had grown accustomed to sharing a common understanding of rural households as largely homogenous producers who rarely sell or hire labour. When households do diversify towards the off-farm sector, it is through self-employment activities. Therefore, the differentiation that arises between rural households is often deemed insignificant. However, it became obvious to me that such a narrow and often ahistorical conceptualisation of rural realities is at best inadequate.

A wrong conceptualisation of rural households has implications for theory as well as policy. Resting on the aforementioned stylised facts, the outcome of conventional rural development thinking has since the 1970s led to a widely accepted claim that a smallholder-led rural development model is both viable and desirable. To accelerate development, conventional theories have advocated for policies that provide small-scale producers with access to incentives and markets. Provided access, poor farmers are able to move out of poverty by producing goods for the domestic and global markets. Such a smallholder-led rural development model has the advantage of simultaneously reducing rural poverty and raising agricultural output.

Yet, a concern arises when the rural realties of many past and present developing countries differ from the stylised facts used to justify the model. Rural households are not merely smallholder farming households, but they also raise income from a myriad

[42] See Bolt and Green (2015); Bolt and Hillbom (2016); de Haas (2017); de Zwart (2011); Moradi (2008); Moradi, Austin, and Baten (2013).

of economic activities, of which rural employment is one. Not only do they raise income from many sources, but they also do so in a dissimilar manner. Some households have diversified towards commercial agriculture, whereas others predominantly sell their labour (sometimes to the former) to meet subsistence needs. Such processes cause increased socioeconomic differentiation. This tendency is exacerbated by increased land concentration within the smallholder sector (Jayne, Chamberlin, and Headey 2014; Jayne *et al.* 2003). Implementing a smallholder-led rural development model under such conditions is likely to affect the success of the model. The poverty reduction objective might not be achieved, as commercially oriented farmers will gain from assistance while households primarily devoted to off-farm wage labour will lose out, intensifying existing rural inequality and poverty levels. Moreover, if only a minority of households are engaged full-time in farming, then the objective of raised agricultural production may also be jeopardised.

Although, studies have begun to uncover income diversification and the differentiation that exists among smallholders, implications for wider rural change are seldom discussed. Consequently, to contribute to conventional rural development theory, this thesis conducted a contextual analysis of rural development focusing on the processes of rural income diversification, with particular attention paid to employment on large farms, and socioeconomic differentiation. The empirical findings were used to engage with debates about long-term shifts in rural economies and questions of rural change. To provide sufficient context and understanding, a detailed case study of Kenya was conducted. I selected Kenya because it has a documented history of income diversification and differentiation among rural households dating back to the colonial era.[43]

The contribution of the thesis lies in elucidating areas where revisions of existing theory are required. More specifically, the thesis demonstrates a need to amend existing theories by considering heterogeneity among rural people and the associated implications for rural change. Consequently, three main conclusions that refer back to the research questions posed previously can be made.

First, the poverty/wealth outcome of rural households' income diversification is shaped by socioeconomic and historical structures that govern households' access to farm- and off-farm incomes and, more importantly, their ability to successfully combine the two. Throughout the thesis, evidence is presented that wage work combined with smallholder agriculture is a beneficial income diversification strategy because the former

[43] See Collier and Lal (1986, 1980); Cowen (1975, 1972); Kitching (1980); Leys (1975); Orvis (1993); Orvis (1997); and Swainson (1980, 1977).

can be reinvested into the latter, the process known as straddling, and thereby households may move out of poverty.

The colonial era saw the emergence of large-scale agriculture providing employment opportunities for rural households. It appears that the regions that supplied the bulk of rural wage labour had a high uptake rate of cash crops, suggesting that wages have been used to reinvest in commercial agriculture. Still, colonial policies prevented rural peoples from reaping the full benefits, as wages were kept artificially low.

Focusing on rural employment in the post-independence period, where coercive colonial policies had been abandoned, the scope for successful straddling nonetheless appears limited. Similar to the colonial era, wages on large-scale farms are low and offer nothing more than survival for a small family at the barebones subsistence level. Still, a proportion of workers have been able to use their employment to access savings and loan schemes. Thus, they have made smaller investments in smallholder agriculture by, for instance, buying small parcels of land and a few livestock. This combination allows workers to gradually move out of deep poverty. However, the lack of affordable land and the high costs of sending children to school keeps the accumulation potential modest.

The abovementioned finding has implications for contemporary rural development theory, where the focus has been on optimal farming size. By pointing to the ability to straddle using farm wage incomes, the thesis shows that it is critical to revise debates. Instead of debating optimal farm size (small versus large-scale), it is critical to focus on how farming models can co-exist and how rural people may benefit from such co-existence.

Second, gender conceptualised as the sex of the household head does not necessarily affect the poverty/wealth outcome of income diversification. Against conventional theories, the thesis finds social cleavages aside from gender affect diversification patterns and rural incomes. In the majority of regions (five out of eight), gender-income gaps are small and do not differ statistically from one another. In these regions, the rural change associated with women-headed households' diversification follows a similar trend to that of the general population. It follows that conventional literature that has largely studied smallholder differentiation through the lens of gender will require revisions that allow such studies to more effectively incorporate other social cleavages, and 'class' might become one of them.

Connected to the abovementioned conclusion, the thesis also shows differentiation within the smallholder sector. Although richer and poor households seem to have followed similar livelihood strategies—for instance, both sell and hire agricultural wage labour, invest in children's education, and have diversified their incomes towards off-

farm activities—poorer households are disadvantaged. Wealthier households cultivate three times as many acres as do poor households; and spend nearly eight times more on fertiliser and three times more on hired labour. Consequently, richer households have per-capita farm incomes 15 times larger than those of poorer households. Moreover, due to richer households privileged access to well-paid non-agricultural wage labour (66% of richer households versus just 21% of poorer households have access to non-agricultural wage income); richer households' per-capita off-farm incomes are 20 times higher than those of poorer households.

Third, by having elucidated the processes of income diversification and differentiation, a few tentative rural development trajectories can be described. Despite the conventional belief in African historiography, the diversification towards rural wage labour in settler economies does not appear to have caused widespread rural poverty during the colonial era. Contrarily, regions that supplied the bulk of agricultural wage labour also had rising rural incomes and high uptake rates of cash crops.

Since independence, households have continued to derive a high share of income from off-farm activities. However, the associated rural change is ambivalent. Off-farm activities have low returns and the majority of households that have become highly dependent on access to off-farm income appear to be on a path similar to the de-agrarianisation thesis, where diversification away from the farm is associated with high poverty rates. Yet, a minority of households (including women-headed ones) are able to follow a more successful agricultural-based path where off-farm incomes are combined with commercial agriculture. This minority have followed a path of intensification (i.e., by applying more fertiliser and labour to small farms) and are thus less threatened by declining farm sizes.

Hence, a polarised rural society seems to best describe contemporary rural Kenya. However, differentiation does not seem to correlate with a dynamic rural development. Profit opportunities in agriculture are low as evidenced by a decline in real farm incomes among all income classes including rich farmers. Instead of accumulating through farming, richer households have increased their income diversification towards better-paid off-farm activities. Consequently, the richer income classes do not seem capable of driving future rural development. What we instead seem to witness in Kenya is a differentiation among smallholder farmers that mainly results in the impoverishment of a large proportion of households without a parallel expansion of commercially oriented and dynamic middle and rich classes emerging from the smallholder sector.

While this thesis' findings may appear to have policy implications, I generally avoided creating a long list of policy recommendations. Too frequently and in an ad hoc

manner, such lists have been created, often with conflicting aims of promoting both egalitarian smallholder agriculture *and* rural wage employment, while ignoring the fact that the latter is often a by-product of increased differentiation among smallholders.[44] Instead, I argue that we need to relate complex and locale-specific micro-studies to 'macro-level' debates and questions of agrarian change before developing policies. Only when we have sufficient knowledge of emerging rural livelihood trajectories can we begin to generate suitable policy interventions.

Several areas are open for future research on these important themes. First, a need exists for more studies on rural labour markets in Africa focusing on the casually employed labour force. This thesis attempted to address formal employment in the commercial agricultural sector, yet, due to the paucity of data in this area, rural casual workers have remained understudied. This is unfortunate because a large share of the rural population, especially women, rely on such labour; hence, informal rural labour markets are likely to play a crucial role in rural development.

Second, the rural–urban income diversification link deserves more attention. Bernstein (2010) described how 'footloose' workers, who move between rural and urban sectors in search of casual jobs, often with no or limited access to land, are becoming prevalent in African countries. This blurs the rural–urban divide and challenges us both empirically and theoretically. Large-scale rural surveys such as the Tegemeo survey data used in this thesis might not capture this growing portion of the rural poor, especially as their whereabouts are difficult to trace over time. Hence, surveys specifically designed to trace (perhaps a smaller group) of these people would be useful. Moreover, as urban–rural concepts are blurred, new theories on (rural) development building on a strong empirical foundation will be required.

Finally, studies on socioeconomic differentiation and related themes are scarce. This is true for both the colonial and post-independence periods. Quantitative data are insufficient for capturing the emergence and persistence of wealthy rural farmers over time. Future research could therefore combine longitudinal quantitative data with, for instance, life stories to elucidate accumulation patterns among wealthy segments of rural society. Studying the constraints and opportunities they face would help us reach a conclusion on the likelihood that rural development through smallholder differentiation can occur in African rural settings and through which mechanisms.

[44] For an example, see the 2008 World Development Report (World Bank 2008).

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Paper I

LABOUR CONTROL AND THE ESTABLISHMENT OF PROFITABLE SETTLER AGRICULTURE IN COLONIAL KENYA, c. 1920–45

OPEN ACCESS

Maria Fibaek & Erik Green[1]

ABSTRACT

This article contributes to the growing literature on the impact of colonial legacies on long-run development. We focus on Kenya, where it is previously argued that land tenure and taxation policies created an impoverished class of wage workers leading to lower living standards, high inequality, and stunted economic development. We take issue with this interpretation. Using archival sources, we map the rise of profitable settler agriculture. Next, we correlate settler profitability with taxation and the development of African agriculture. Contrary to previous studies, we find that labour came from areas that became increasingly more commercialized. Thus, a decline in African livelihoods was not a necessary pre-condition for the establishment of successful European settler agriculture. Instead a restructuring of the settler agricultural sector coinciding with tightened labour control policies can explain the increased profitability. An increased cultivation of high-value crops raised the value of labour. Reductions of African mobility lowered both the wage and transaction costs of finding and retraining workers enabling the settlers to raise their profit share. Our finding calls for a revision of the colonial legacy of European settler agriculture for long-term economic and social development in Kenya.

1 We wish to thank Gareth Austin, Ellen Hillbom, Jutta Bolt, and Michiel de Haas; three anonymous reviewers, and attendees at the 2017 Swedish Economic History Meeting, 2017 African Economic History Network Conference, the 2018 European Social Science History Conference, and the 2017 British Institute in Eastern Africa Graduate Conference for their invaluable feedback at various stages.

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KEYWORDS: settler economies, colonial institutions, Kenya, labour, rural development

INTRODUCTION

It is widely agreed in the literature on Africa's development that much of the continent's past and present poverty can be explained by colonial institutions. The role of extractive institutions is particularly evident in the historical research on settler colonialism in Africa. Going through the literature, a consensus emerges that African living standards declined with the arrival and expansion of European settlement (see e.g. Arrighi 1970 on Southern Rhodesia, van Zwanenberg 1975 on Kenya, and Bundy 1979 on South Africa). Living standards declined as the colonial state intervened in the land and labour markets to ensure a steady supply of cheap labour. Land alienation and the subsequent relocation of Africans to remote native reserves with poor soil quality and limited opportunities for successful cash crop cultivation led to the regression of African agriculture. With increased taxation, Africans were left with no alternative but to work for European settlers for low wages. A few scholars have questioned this interpretation arguing that access to migrant labour from neighbouring countries played a more important role than colonial policies (Mosley 1983; Bolt & Green 2015). For two decades the debate on labour in settler economies went almost silent. Recently, however, the 'consensus' interpretation of labour supply in settler economies has resurfaced in the works of scholars examining the legacies of colonial rule in Africa. The attempts by the colonial state to ensure cheap labour supplies to settlers caused long-lasting negative impacts on human capital formation and economic development in former settler economies (Bowden et al. 2008; Acemoglu et al. 2001, 2010).

In this article, we revisit the historical debate on labour in Africa's settler economies by exploring the economic and political factors underlying the rise of settler agriculture, with a focus on Kenya. Kenya is typically classified as a settler economy as the Europeans had a share in government;[2] but differently from the colonies in southern Africa, the white population in Kenya did not have access to a vast pool of migrant labour. This makes Kenya a fascinating case to study, for how then did the settler farmers manage to become successful? Was it due to repressive colonial policies aimed to create a surplus of local labour? To answer the question, we focus on the decades in which settler agriculture shifted from being a financial weakness to being a lucrative business c. 1920–45. Differently from previous literature on white settlement and African living standards, we explicitly contrast settler profitability with the introduction of various labour policies. To explore the link between labour coercion and the expansion of settler agriculture we calculate settler farm

2 Mosley (1983: 5) defines a settler society as 'a country partly settled by European landowner-producers, who have a share in government, but who nonetheless remain a minority of the population and who in particular remain dependent, at least for labour, on the indigenous population'.

earnings and African real wages. We estimate the real wages using Allen's (2009, 2015) subsistence basket approach. In the past declining real wages have been equated with increased labour coercion (see Arrighi 1970; Frankema & van Waijenburg 2012); nevertheless, real wages could decline even when there is little or no labour coercion. For instance, declining wages can be attributed to both low labour productivity levels and contractions in the settler farm economy. We thus account for changes in the settler farm economy by combining the real wage series with an estimate of settler farm earnings. We calculate the earnings by deducting labour, production, transport, and transaction costs from the total value of settler agricultural production. Our findings from the measures of settler earnings and real wages confirm those in the literature: increased profitability coincided with declining African real wages; yet, despite the decrease in wages, labour supply to the European agricultural sector continued to increase.

At first glance, this finding reaffirms the consensus that the success of settler agriculture was a direct function of colonial policies that indirectly, albeit intentionally, caused a decline in African livelihoods leading to unlimited labour supplies at low wages. Analysing agrarian changes in the reserves we do, however, find that African labour came from reserves that became increasingly more commercialized. Despite the limitations imposed by colonial authorities on the Africans,[3] wage workers appear to have been in a better position to diversify their livelihood. In other words, there is no evidence that a labour surplus was politically created by increasing the opportunity costs of African commercial farming. Instead, it appears that a combination of seasonality in agriculture and a deeper integration of the African farmers into the cash economy ensured a steady labour supply.

This, nonetheless, does not portray a win-win situation for the African farmer and the settler. The reliance on labour from nearby relatively commercial areas created obstacles for the settlers. In agriculture more so than in industry, being able to adjust for fluctuations in annual output by mobilizing accurate amounts of labour on a short notice is key. The transaction costs of finding labour were high as the settlers had to rely on expensive and inefficient recruiters (Berman & Lonsdale 1980). Further, contract enforcement costs were high as workers would often desert (Green 2013). The emergence of a labour control regime in the late 1910s enabled the settlers to gain more control over tenants and local wage workers making it easier to raise the workload of tenants and to trace deserted workers. The tightened labour control not only lowered transaction costs but also reduced the competition among settlers, placing downward pressure on nominal wages. In the same years, the settler agricultural sector was restructured towards high-value cash crops such as coffee and tea, and with the decline in direct and indirect labour costs the settlers could raise their profit share.[4] Our empirical

3 For instance, Africans were prohibited from cultivating high-value cash crops (e.g. coffee, tea, and pyrethrum).

4 There is a rich literature on transaction costs and labour contracts in pre-industrial Europe; see for instance Acemoglu & Wolitzky 2011; Domar 1970; Fenoaltea 1984.

investigation offers an alternative explanation of the expansion of settler agriculture. We conquer with the 'classic' interpretation of labour supply in Kenya. In doing so, we also call for revisions to the literature on colonial legacies that claims that the expansion of settler agriculture can explain contemporary high poverty rates. We do not believe that these findings are unique for Kenya as similar measures were taken to reduce labour mobility in for instance South Africa and Southern Rhodesia (Rennie 1978; Nattrass 1991). Still, more research on labour control and settler profitability is needed to further our understanding of the political economy of settler farming in Africa but also to explore how European settlement affected the economic opportunities and freedoms of the African populations.

SETTLER AGRICULTURE AND ACCESS TO LABOUR

To establish profitable enterprises, settler farmers in colonial Africa needed access to fertile land and labourers willing to work on farms. While most of the land was occupied and therefore demanded 'negotiations' with the indigenous elites, it was the question of labour supply that posed the greatest challenge for the settler farmers. To understand how settler agriculture expanded, we have to examine how the settlers managed to solve the 'labour problem'. According to the first strand of literature on labour supply in settler Africa, it was combinations of market forces and seasonality that ensured a steady labour supply at low wages. Fluctuations in labour demand allowed Africans to increase total income by temporarily transferring labour to the European sector without threatening their own farming operations (Barber 1960). However, in the late 1960s–1970s, a 'radical' interpretation of the underlying mechanisms behind labour supply in the southern settler economies emerged. The seminal works by Arrighi (1966, 1970) inspired a new strain of literature arguing that not market forces but political mechanisms were behind the witnessed labour supply at low wages. Initially, African commercial farmers played a critical role in supplying food to the growing mining sector in Southern Rhodesia and South Africa, creating labour shortages. Legislative and administrative action was taken to create a class of impoverished wage workers. Taxation alone could not solve the labour problem as the African farmer could obtain cash by selling produce to the market. So to increase the supply of African labour, the settlers successfully lobbied for land tenure policies such as the establishment of labour reserves and a reduction in the size of land available to the Africans. Thereafter, Africans were gradually relocated to the so-called 'native reserves' (or 'homelands' as in the case of South Africa) located in less fertile areas where land was typically of lower quality. The aim of the policies were, to quote Austin (2016: 317–318), 'to restrict African land rights (whether owners, or even as tenants on European-owned land) in the hope of driving the majority of the population out of the produce markets and into the labour market'. These reserves soon became overpopulated and with the extensive nature of African agriculture this led to declining average agricultural yields. In other words, the combination of taxation and land

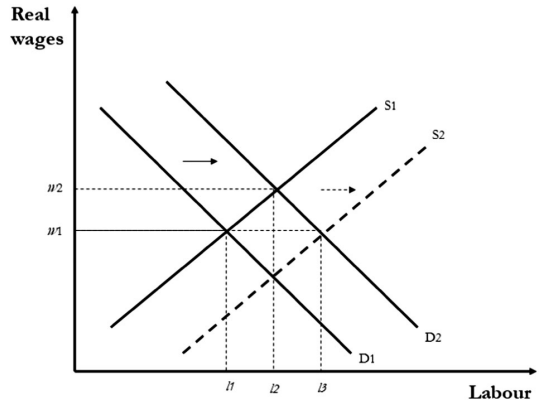

Figure 1: The impact of colonial policies on African labour supply and real wages
Note: Inspired by Frankema & van Waijenburg 2012.

tenure policies became a precondition for the establishment and expansion of settler agriculture (see also Cohen 1976; Bundy 1979; Phimister 1988). This classic interpretation of colonial institutions, labour supply, and real wages is depicted in Figure 1. The influx of settlers and the subsequent rise of large-scale farming shifted the demand curve outwards from D_1 to D_2 raising real wages from w_1 to w_2 and labour supply from l_1 to l_2. In settler economies (unlike the peasant economies), the colonial authorities intervened to lower the pressure on wages. The mentioned land tenure policies and the increase in taxation shifted the supply curve outwards from S_1 to S_2 leading to a higher labour supply l_3 at lower real wages w_1.

The early works on Southern Rhodesia and South Africa influenced the historiography of colonial Kenya and scholars noted the many similarities between the colonies.[5] Just as in the southern African colonies, so too did land tenure policies and taxation facilitate the creation of a labour surplus in Kenya. To quote Palmer and Parsons (1977: 243): 'Thus by the end of the 1930s, the agricultural economy of the Shona and the Ndebele, like that of the Kikuyu and most South African peoples, had been destroyed.' Despite a general agreement that extra-economic measures played an important role in solving the labour problem there is controversy on the degree of coercion applied by the state to solve the labour problem. On one end of the spectrum, Wasserman (1974) and van Zwanenberg (1975) maintain that illegal recruitment, forced labour, taxation, and land tenure policies were used in as late as 1950 to force Africans to work on settler farms. Other studies note that the use of forceful labour coercion declined in the 1920s. By then a deliberate neglect by the colonial administrators of African agriculture and a general favouritism of settler

5 Key works include Clayton & Savage 1975; van Zwanenberg 1975; Stichter 1982; Mosley 1983 ; Berman & Lonsdale 1992.

agriculture was enough to guarantee a labour supply (Brett 1973; Clayton & Savage 1975; Stichter 1982). Without making a distinct connection to the expansion of settler agriculture, few scholars note that forceful labour coercion was replaced by a labour control regime that made it easier to restrain and discipline workers (Berman & Lonsdale 1980; Anderson 2000). On the other end of the spectrum, a few 'liberal' scholars have sought to nuance the debate by emphasizing the role of non-political factors in ensuring sufficient amounts of labour. Mosley (1983) offered a detailed empirical account of the development of both African and settler agriculture in Southern Rhodesia and Kenya. The study concluded that labour coercion was used to the mid-1920s, but thereafter, the gap between labour demand and supply was filled by the private recruitment of workers from poorer parts of the colonies and by increasing the engagement of female and juvenile labour (see also Bolt & Green 2015, who reach a similar conclusion on settler agriculture in Nyasaland). According to Mosley, land tenure policies did not cause a regression of African agriculture. On the contrary, Mosley (1983) notes that certain African reserves experienced 'Boserupian' growth, with their yields and population densities reporting positive correlations. The debate on settler agriculture and labour went silent for almost two decades; however, recently, the 'radical' interpretation has resurfaced in the New Institutional Economics and African Economic History literature that tries to explain long-run developments in Africa. In the settler economies, the deliberate attempts by the colonial state to shift the labour supply-curve outward created 'dual economies' with persistent high levels of inequality and stunted economic development (Austin 2008; Bowden et al. 2008; Acemoglu et. al. 2001, 2010; Frankema & van Waijenburg 2012).

The contemporary literature reveals a need for re-examining the underlying mechanisms carefully before drawing conclusions on long-run development in settler societies. There are several weaknesses in the past research that has inspired this paper. Apart from Mosley (1983) none of the works mentioned explicitly study the development of the settler economy. By applying a narrow focus on labour supply, the studies are not able to convincingly tie the introduction of various labour policies to the expansion of settler agriculture. We do not know if the decline in African real wages that Arrighi (1966, 1970) finds is due to labour coercion or contractions of the settler economy. Further, while Arrighi convincingly demonstrated significant theoretical depth, he offered limited empirical evidence in support of his conclusions. To elaborate, Arrighi relied on maize figures to argue the decline of African agriculture. This is problematic as it hides any indigenous attempts to shift to cash crop farming. Mosley (1983) highlighted these concerns and offered alternative explanations for the development of settler agriculture, yet, his study suffers from shortcomings related to admittedly weak data. Two data points (1932, 1948) are used to support the hypothesis that African agricultural development followed a Boserupian path. Only a few of the districts included in his analysis (30% of the total sample) yields a positive relationship between population pressure and yields, as pointed out by Choate (1984). More severely, Mosley lacks data to support the key argument that recruited

labour could close the gap between supply and demand after the 1920s. The strength of the present study lies in its consideration of both settler and African agricultural development. Further, instead of limiting our analysis to one crop, we use newly collected district-level data on African agriculture.

In the following sections, we first analyse the development of settler agriculture and then discuss the role of labour coercion.

ESTABLISHMENT OF PROFITABLE SETTLER AGRICULTURE IN KENYA

The history of European settlement in Kenya began in the early 1890s with the construction of the Uganda Railway that connected Lake Victoria to the coast of Kenya. Due to the high maintenance costs of the railway, the British government began encouraging large-scale settler agriculture to increase earnings. The settler farming community comprised three fundamentally different groups: financially strong settlers often of aristocratic origins, smaller and capital-scarce families with farm holdings that accounted for the vast majority of farms, and a few capitalized European companies mainly cultivating plantation crops such as sisal.

Sector performance

In the first two decades of European settlement, Kenya heavily relied on the monocropping of cereal crops such as maize and wheat, leading to low export values. In the early 1920s, however, the sector was restructured such that more settlers began cultivating high-value crops (e.g. coffee and tea). In addition, increasing areas were cultivated during this period, which has been referred to as the 'Golden Age' of European agriculture.[6]

From 1920 to 1930, the sector more than tripled its export earnings with an increase from £669,028 to £2,763,707 (Kenya Colony 1920–30, 1930). To better understand the effect of expansion in acreage and export on profitability, we estimate the gross annual earnings for the entire sector. We calculate the settler farm earnings by deducting depreciation expenses of agricultural machinery and annual labour, fertilizer, transport, and other transaction costs from the annual agricultural production values (Figure 2). For further elaboration on data and methods, see Appendix 1, 2, 4, and 5. We consider estimating the annual wage bill to be the most challenging task because wages accounted for the largest share of production costs. To determine annual wage costs, we reference the Kenyan archival sources for detailed employment data on the three forms of agricultural labour: tenants, monthly paid workers, and casual labour. A majority of the wage data for tenant and monthly paid labour are available in the administrative

6 See Tignor 1976 and Mosley 1983.

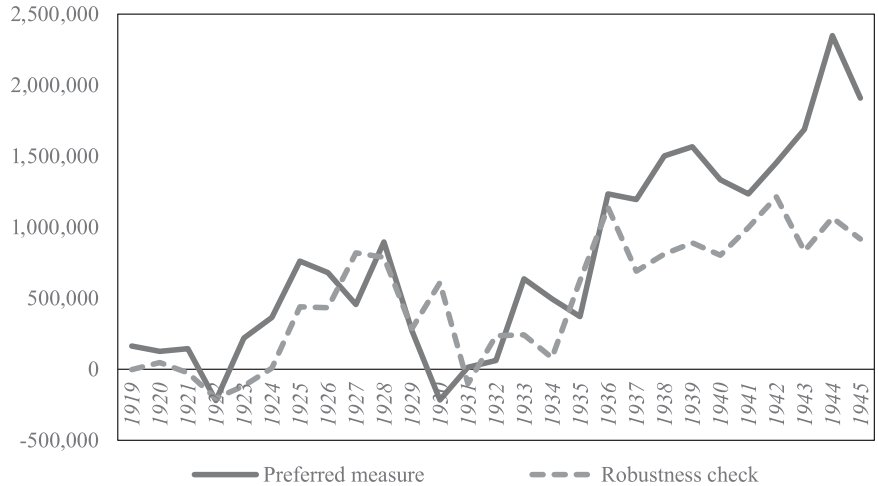

Figure 2: Earnings in the European agricultural sector in pounds, 1920–45
Sources: Authors' own calculations. Production and export values are taken from the Agricultural Department annual report 1920–45; Employment and wages are taken from the *Native Affairs Department, Labour Department annual reports* 1920–45 and from Mosley (1983); Import values are taken from the *Annual Trade Reports* 1920–45.
Notes: The preferred measure uses production values for coffee, maize, and wheat and export values (deducted by 15% to take into account transaction costs) for sisal, tea, sugar, potatoes, cotton, and coconuts to calculate revenue. Our robustness check use data on export values only deducted by 15% to take into account transaction costs. In both cases, we deduct curing charges from coffee values.

records. As is often the case with colonial statistics, the data points for female and juvenile labour are few. We interpolate data in the case of missing values. Assuming all workers received the stated minimum wage, we expect our wage bill to slightly overestimate the true labour costs, particularly since secondary sources have indicated that minimum wages were not always enforced (see Kenya Colony 1935; Kitching 1977).

To examine the validity of our measure, we searched for officially reported annual wage bills. The Statistical Abstract (SA) began reporting agricultural wage bills in the 1950s. If we extend our time series, the estimated wage bill comes fairly close to the reported bill, with a mean difference of 1% and a maximum difference of 10% (Kenya Colony 1957–60).[7] Another data limitation is that the total production values were inconsistently reported in the administrative records. The records indicate the production values for main crops including maize, coffee, and wheat (roughly 60% of the total production value) but only the export values for the remaining crops such as sugar and tea. To implement a solution,

7 For 1956, 1957, and 1958, our wage bills are £676,697, £873,118, and £402,521 greater than the SA-estimated £7,800,000, £8,400,000, and £8,700,000, respectively. On the other hand, for 1959 and 1960, our wage bills are £93,513 and £452,904 lower than the £8,600,000 and £10,000,000 estimated by SA.

we use production values where available. For the crops where we lack production values, we follow Bolt and Green (2015) and use export values to proxy production values. We deduct a mark-up of 15% from the export values based on the transaction costs of exporting coffee and sisal to arrive at production values.[8] In performing a robustness check, we calculate earnings using the deducted export values only. The robustness check shows that the use of export values slightly underestimates true earnings due to the inability to capture earnings from crops sold domestically. Our measure is therefore a conservative measure of true earnings. Figure 2 shows that the expansion in acreage and exports increased earnings. In the early 1920s, the sector transitioned from being a low-income sector to a profitable one. We observe an upward trend in profitability. The sector was, nonetheless, vulnerable to fluctuations in international demand and following the contraction of the global economy in 1920–21 and during the years of the Great Depression we see a decline in earnings mainly driven by lower coffee prices.

Labour and profitability

Having pinpointed the rise in profitable settler agriculture, in this section we explore the reasons underlying the expansion of earnings. First, we measure land and labour productivity in the years for which data are available. We estimate land productivity at the sectoral level for coffee and maize. Ideally, we would calculate labour productivity at sectoral level; however, the limited employment data available prevent us from doing so. Thus, instead, we calculate a 'rough' measure of the value of output per worker for the entire sector. To proxy real changes in labour productivity, we deflate our output series by the coffee price index as coffee was the main export commodity. As shown in Figure 3, land productivity marginally improved for coffee from 297lb of clean coffee per acre in 1920 to 314lb in 1946 (Figure 3). Maize yields per acre fluctuated around a mean of 1242lb per acre (approximately 6 bags) with no upward trend (Kenya Colony 1920–63).[9] Labour productivity, on the other hand, did increase in the period and Figure 4 shows that increased settler profitability was largely driven by higher output per worker.

The shift to high-value cash crops such as coffee increased output per worker, attracting greater settler investments in agriculture. Consequently, more land was put under cultivation: in particular, land for coffee plantation alone significantly increased from 33,813 acres in 1921 to 96,042 acres in 1930 (Kenya Colony 1920–30). This shift warranted a simultaneously large increase in the number of labourers employed. The Labour Commission (1927) estimated that a coffee estate of 100 acres needed 45 full-time workers (and 80 workers during the peak

8 The 15% mark-up is based on the sea freight and insurance costs of exporting coffee and sisal to London. The mark-up overestimates the costs of crops sold nationally or within the region.

9 Yields are calculated using data on the production of clean coffee by Europeans and the European coffee acreages.

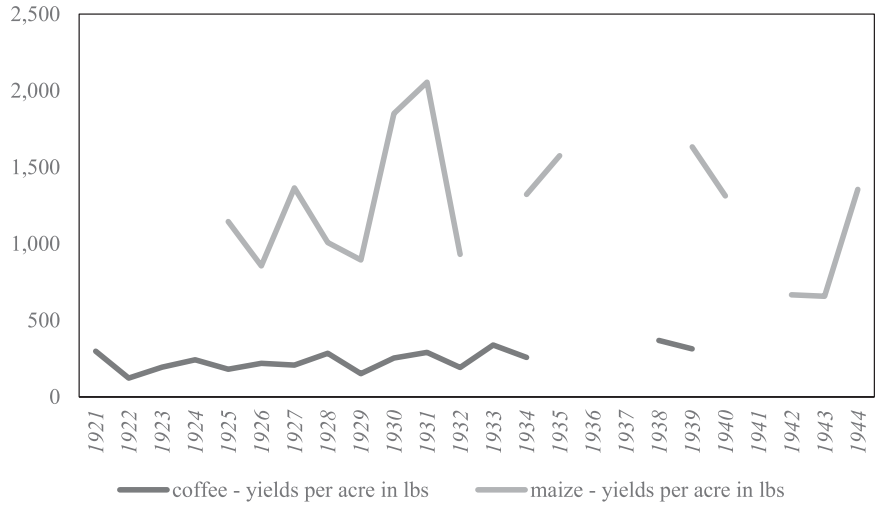

Figure 3: Land productivity for coffee and maize (measured as yields in lb per acre), 1921–44
Source: Authors' own calculations. Data is taken from the *Agricultural Department annual reports* 1921–44.
Note: Yields are calculated using data on European production of clean coffee and maize and European coffee and maize acreages.

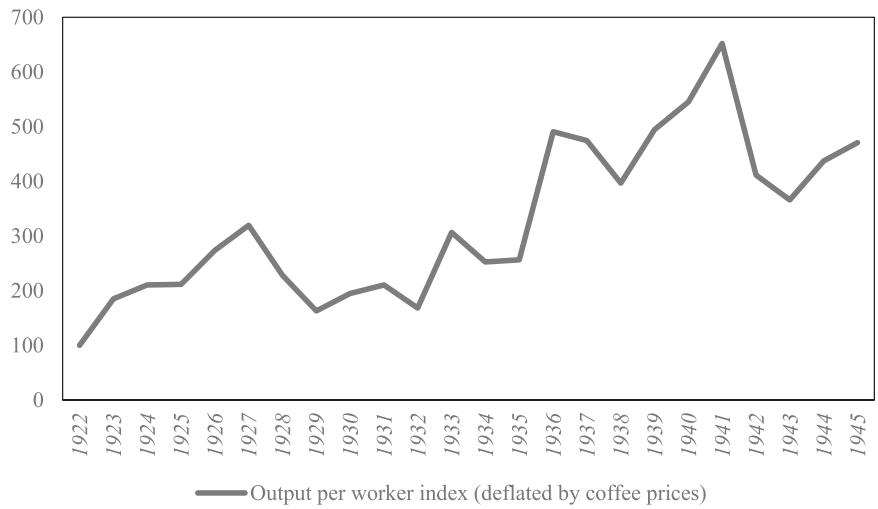

Figure 4: Labour productivity index measured as output per worker for the entire settler agricultural sector (deflated by coffee price index), 1920–45
Source: Production, export values, and coffee prices are taken from the *Agricultural Department annual report* 1920–45; Employment and wages are taken from the Native Affairs Department and Labour Department annual reports 1920–45 and from Mosley 1983.
Notes: Labour productivity is calculated by dividing an index of value of output (deflated by a coffee price index) by the index of total employment in agriculture. The total employment measure includes both wage workers and tenants.

season), whereas maize required only six workers per 100 acres (and an additional six during harvest). This clearly demonstrates the importance of labour access to the expansion of settler agriculture. In the case of coffee production, estimated labour demand increased from 15,216 permanent workers (and 27,050 additional workers during harvest) in 1921 to 43,510 permanent workers (and 77,351 additional workers during harvest) in 1930. Evidently, labour supply responded favourably to the increase in demand. From 1920 to 1945, the average number of monthly paid workers in agriculture considerably increased from 53,709 to 118,300 (Kenya Colony 1920–45a). It is likely that the actual number of workers employed was even higher because the employment statistics were based on labour returns submitted irregularly by employers (Tignor 1976; Mosley 1983).

ROLE OF LABOUR COERCION

African real wages

The increased output per worker should have, *ceteris paribus*, led to higher wages. When there is little or no government intervention in the labour market, we expect real wages to equal the marginal product of labour. In our first step to understanding the role of labour coercion in expanding the settler agricultural sector, we calculate African real wages using Allen's (2009, 2013) subsistence basket approach. The approach divides an adult worker's annual income by the costs of a family subsistence basket and expresses real wages as a welfare ratio. Prior to the consolidation of wages in the late 1950s, the value of free meals and housing constituted a large part of the total wage. To take this into account, we follow the literature, and include value of rations in the total income measure. Due to lack of data, we are not able to include the value of housing and our total income measure slightly underestimates true income. For further elaboration on welfare ratio, see Figure 5 and Appendix 3.

A welfare ratio of one indicates that the worker and his family are barely surviving, whereas a ratio greater than one suggests that the family lives above the subsistence level. Still, the measure is subject to an important caveat: it assumes that an agricultural worker was a full-time employee. By contrast, agricultural workers in Kenya were generally employed under contracts of 3–6 months (Economic & Finance Committee 1923). For that reason, we do not expect the measure to adequately estimate the actual living standards for wage workers and their families. Instead, we use the measure as a proxy of the development of the purchasing power of wages.

Real wages were the highest in the first decade of settler agriculture development, with a welfare ratio of 2.72 in 1914 (Figure 5). In fact, this ratio was relatively high at an international level and was almost at par with the urban welfare ratios of Ghana (Accra) and Sierra Leone (Freetown).[10] Yet, a general trend during the period was the stickiness of nominal wages and the rise in rural prices, which

10 See Frankema and van Waijenburg 2012.

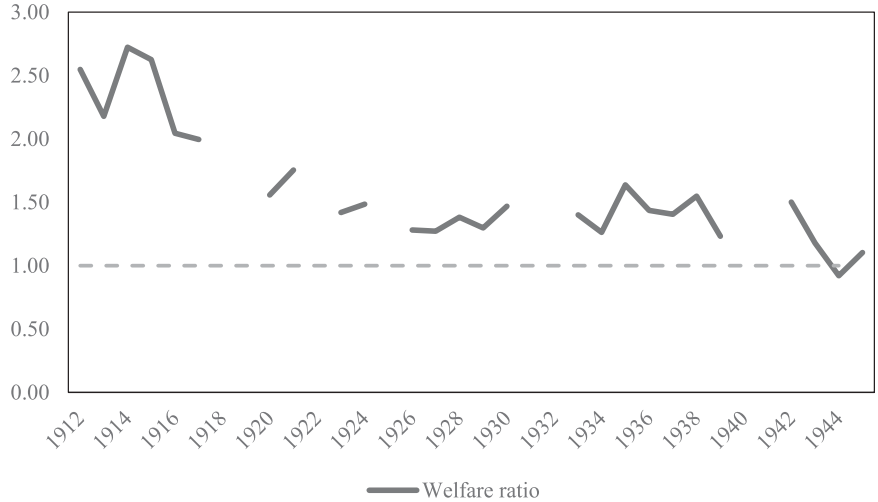

Figure 5: Welfare ratio – based on the annual income of an adult male agricultural worker, 1912–45
Source: Authors' own calculations. Wages are taken from the *Blue Books* 1912–30, Native Affairs Department 1930–45, and Mosley 1983. Rural commodity prices are taken from the Central/Kikuyu and Nyanza Province annual reports 1912–45. Prices for imported are taken from the *Blue Books* and *Trade Reports* 1912–45.
Notes: (1) Standard methods are used to calculate the welfare ratio (see Frankema & Waijenburg 2012; Allen 2013; de Haas 2017). (2) Caloric content is taken from Latham 1997. (3) Similar to de Haas (2017), we include beans and we allow the family to choose the cheapest grains variety (maize, millet or sorghum). Following Frankema and van Waijenburg (2012), we add 10% to the cost of the basket to take into account firewood/charcoal and candles, as data for these items is missing. In addition, a 5% mark-up is also added to account for the cost of maintaining a rural dwelling.

caused real wages to decline first and then remain stagnant. More specifically, during the period 1912–45 the welfare ratio of a worker and his family was marginally greater than one (the mean was 1.38), indicating limited welfare gains from employment. This trend could possibly indicate that policies aimed at increasing labour supply became more coercive over time, forcefully creating a labour surplus large enough to ensure unlimited supplies of labour at low wages.

Taxation

To investigate the level of coercion, we first analyse Kenya's taxation policies. In 1902, all African Kenyans were obligated to pay a hut tax, a uniform tax payable by the owner of a hut. If a male older than 16 years did not own a hut, he was required to pay a poll tax of the same amount instead. To determine the effect of taxation on labour supply, we calculate the per capita tax pressure for the benchmark years of 1915, 1920, and 1930 by dividing the annual direct tax by the daily wage of a rural male worker.[11] In 1915, a rural male worker was required

11 We adopt the direct tax level from Mosley 1983 and Berman and Lonsdale 1980 and calculate daily rural wages by dividing the official 30-day ticket wage by 30 days.

to work 11 days to incur annual taxes. In 1920, the required workdays remarkably increased to 60 days. In 1922, a few years before the development of the settler farming sector, colonial authorities decided to reduce the hut/poll tax from 16 to 12 Ksh., which was maintained throughout the inter-war period (Kenya Colony 1920–45b). As a result, in 1930, the tax pressure declined to 23 days.

Still, per capita tax pressure does not provide a complete overview of taxation for the following three reasons. First, the decline in tax pressure could have been offset by efforts to enhance the enforcement of tax payments. Second, differential local tax rates could have been used to increase tax pressure in labour-supplying areas. Finally, indirect taxes might have raised the overall tax burden. The colonial administration constantly debated ways to achieve more 'efficient' tax collection systems and methods, such as having chiefs or settler farmers collect taxes (van Zwanenberg 1975). In 1923, shortly before the expansion of settler agriculture, the total value of direct African taxation was £575,000, but by 1928, the value had dropped to £564,000 and further to £530,000 during the Great Depression in 1935 (ibid). This alludes to a population decline, widespread tax evasion, or a decline in the sales of produce making it harder to generate income. In general, the national tax rate applied to ethnic groups throughout the colony, although there were a few exemptions. The colonial officers initially believed the Masaai people to be wealthy; thus, they were required to pay a higher tax of 20 Ksh. Despite the higher taxes, the Masaai people generally did not work on settler farms (Stichter 1982). Few groups residing in less developed districts, mainly on the coast and in northern Kenya, paid a lower rate of 6–8 Ksh. A majority of the Africans, including ethnic groups that supplied labour paid a uniform rate of 12 Ksh. No indirect tax was levied on locally produced goods during this period. Custom tariffs did apply to goods imported into the colony, although we find no systematic trend for changes in the tariffs. In 1931, an increased duty was imposed on imported luxury goods such as vehicles, tea, ale, and beer, items which were mostly consumed by Europeans. Three years later, the tariff on textiles and bicycles increased, which may have impacted the African population. There was no further increase in the tariffs in the subsequent years (Kenya Colony 1920–45b). The decrease in tax level in 1921 may have caused a temporary drop in labour supply given the reported shortages in 1923 and 1924. Nevertheless, any effect on labour was short-lived and despite the increase in tariffs on textiles and bicycles, no shortage was reported in the remaining years (Kikuyu Province 1920–37), indicating a rather weak link between labour supply and taxation.

Type and origin of labour

As argued in previous research, taxation alone was insufficient to make Africans work for low wages. Produce sales supplied Africans with sufficient cash to pay taxes. In fact, it was the combination of taxes and a politically induced decline in African agriculture that facilitated the workforce expansion. This section explores the linkages between

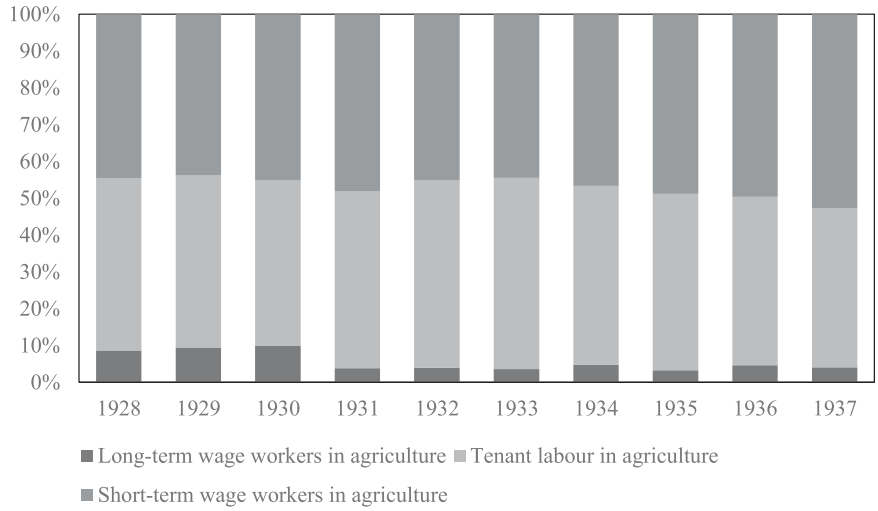

Figure 6: Labour composition on European farms, 1928–37
Sources: Data on tenant and short-term workers is taken from the *Agricultural census 1928-1937*. The number of long-term workers (referred to as 'contracted workers' in the colonial records) is taken from the *Native Affairs Department annual reports 1928-1934*: for 1931, 1935. For 1936 the source is Fearn 1961.
Notes: (1) For 1931, 1935, and 1936, we only have data on long-term workers from the Nyanza Province. This should not cause interfere with our results and conclusions, as the vast majority of long-term workers came from the Nyanza Province. (2) Due to lack of data, the number of tenant labourers is interpolated using a log-linear approach for the years 1930, 1931, 1935, and 1937. (3) Tenant workers are not reported separately from wage workers before 1927 (Mosley 1983). We are therefore not able to extend our time-series back. Another concern is the manner in which long-term workers are recorded: these are reported as 'contracted labour' but the administrative reports do not distinguish between contracted labour in industry and in agriculture. Thus, we might be overestimating the role of migrant labour slightly. This does not affect our conclusion, that short-term and tenant labourers were the most important sources of labour.

labour supply and the development of the African agricultural economy. We begin by examining the origin of workers employed on settler farms. According to Figure 6, short-term wage workers and tenants accounted for a majority of the labour force, although the share of migrant workers seemed to decline.[12]

A majority of the tenants were from the populous Kikuyu reserves;[13] for instance, roughly two-thirds of the tenants were from Kiambu and Fort Hall (Leys

12 The literature on labour in Kenya referred to short-term workers as 'casual labour', 'short-term migrant labour', and 'migrant labour' (see van Zwanenberg 1975; Stichter 1977, 1982). To avoid confusion, we define workers on 30-day ticket contracts as 'short-term wage workers', workers employed under long-term contracts of more than six months as 'long-term wage workers' or 'migrant labour', and workers hired on a daily basis (e.g. coffee pickers) as 'casual workers'. The colonial administration first began segregating tenants from wage workers in 1928; thus, accurate data are available for a few years.

13 Meru, Embu, and Nyeri were also a part of the Kikuyu reserves, although these regions provided fewer tenants.

1975; Tignor 1976; Stichter 1982; Kanogo 1987). Kikuyu tenants settled on European farms in the Central Province and farms in Nakuru and Laikipia in the Rift Valley Province. The remaining one-third belonged to the Kamba and Nandi ethnic groups that lived in close proximity to remote farms in Uasin Gishu and Trans Nzoia in the northern region of the Rift Valley (Stichter 1982). The other dominant labour pool comprised short-term workers who were employed on a monthly basis and would generally work 2–6 months a year. Similar to tenants, a majority of the wage workers were from Kikuyu reserves (see Kenya Colony 1928–45; Stichter 1982). Further, while short-term workers and tenants came from areas close to European farms, long-term workers were migrants from the Luo and Luhya ethnic groups in the Nyanza Province of western Kenya (Figure 7). Year-long labour requirements were higher for sisal and tea than for coffee; consequently, migrant workers would seek employment in these sectors (Fearn 1961).

Labour supply and the African agricultural economy

To further our discussion on labour coercion, we examine the trends in African agriculture. Unlike Tanganyika and Uganda, data on African agriculture in Kenya are rather scarce. Kenya's national administrative records contain almost no data on production prior to the 1930s, when colonial officers began reporting a few estimates on African production. The export values of African agriculture are available from 1922 and increased from £176,000 in 1922 to £447,495 in 1945 (Kenya Colony 1922–24; 1935–45).[14] Maize was mainly produced in the labour-supplying Nyanza and Kikuyu reserves and its export value increased from £73,000 in 1922 to £100,000 in 1925. However, the national records do not offer regional-level data. To capture regional-level trends, we carefully examine province- and district-level annual reports. In the remainder of this section, we calculate the average earnings from sales of produce per household. Positive earnings indicate that, on average, families produced more food items than needed for their own consumption. Further, we examine if earnings were sufficient to pay taxes (during this period, the tax level was 12 Ksh. per hut). Low and/or declining earnings will lend support to the standard interpretation of labour supply in settler economies. On the other hand, earnings greater than the tax level indicate that farmers worked for wages, not out of necessity, but to enhance the possibilities for household consumption. We first examine Nyanza Province, the area which supplied migrant workers.

In Nyanza, maize was the most important food and cash crop, followed by hide, groundnuts, and sesame. In 1922, income from agricultural produce sales was merely 4 Ksh. per household, which was a significantly low value to levy the annual tax. Nevertheless, we see an upward trend in earnings thereafter. In 1935,

14 Few scholars have referenced this increase in export values to argue that African agriculture did not decline in Kenya (see Berman & Lonsdale 1980; Mosley 1983).

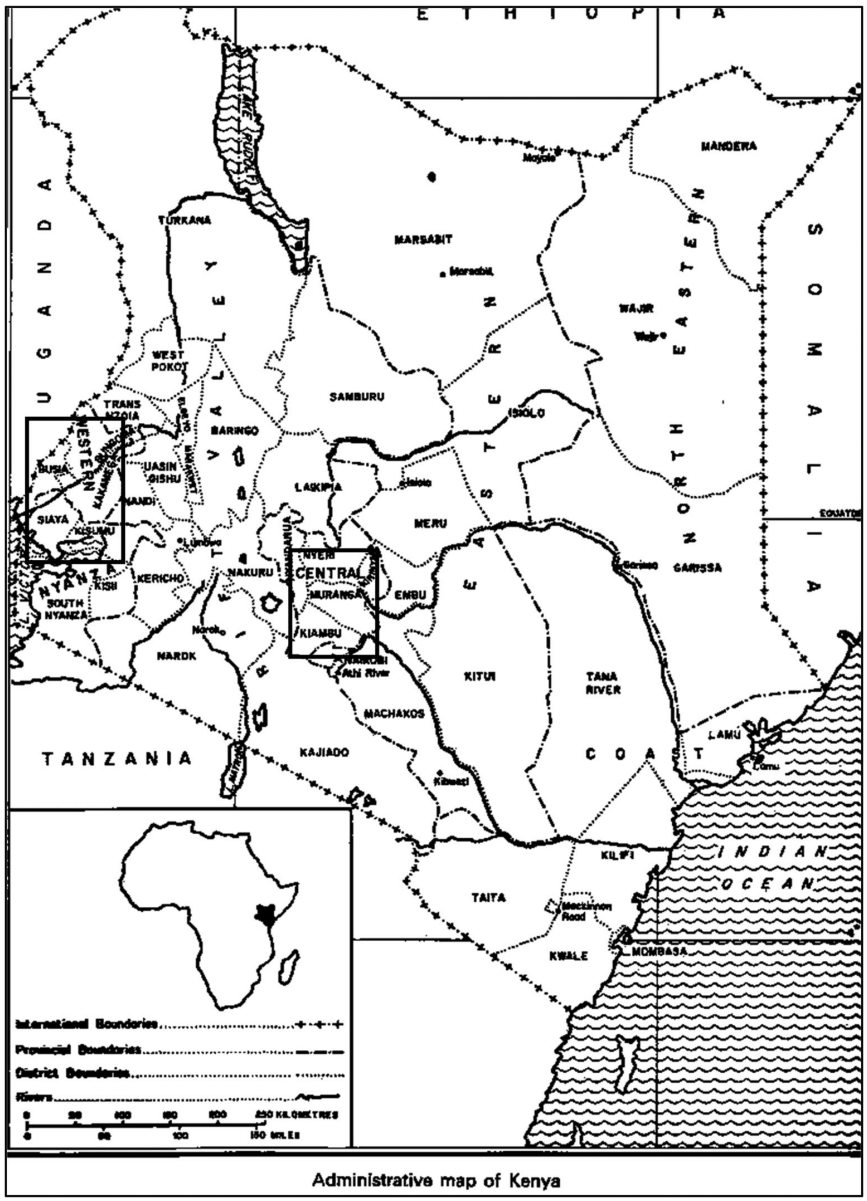

Figure 7: Administrative map of Kenya
Source: ILO (1972) 'Employment, incomes and equality'
Note: ▭ Main labour supplying area.

the average earnings per household increased to 7 Ksh. per household, further increasing to 19 Ksh. in 1940 and 21 Ksh. in 1945.[15] From 1936, on average, income was sufficient to pay taxes. Unfortunately, the data do not allow us to further disaggregate earnings. We note that the rise in income was driven by the sale of maize and hide, products which were also produced in labour-supplying areas in central and north Nyanza. Low agricultural earnings reported in the 1920s combined with the pressures to pay taxes could explain the migrant labour supply until the mid-1930s. Migrant workers, nevertheless, accounted for a small and declining fraction of the total labour supply (around 10%).

Next, we explore the agricultural economy of the Kikuyu reserves, which, by far, had supplied the largest share of labour. Initially, the main crops grown for consumption and sales in the reserves were maize, potatoes, and beans, of which maize was the dominant crop (Kikuyu Province 1929–30). The first consistent estimates of sales for food items were reported from 1927. Unfortunately, we lack total earnings from agricultural products sales. If we examine maize, in 1927,[16] 40,000 tons of maize was exported with high per capita earnings of 6.25 Ksh. Yet, if we examine the years leading up to the Great Depression, it is possible to paint a picture of a decline in Kikuyu agriculture. No sale of food items from the Kikuyu reserves was reported in 1929 and 1930. The literature (e.g. Brett 1973; Stichter 1982) has suggested that colonial policies that systematically favoured European over African producers or the outmigration of labour led to the decline in sales. By contrast, the administrative reports attributed the decline to unfavourable weather conditions and locust outbreaks (Kikuyu Province 1928–29). Available empirical evidence has indicated that the drop in sales was, in fact, transitory. In 1932, a detailed economic survey of the Kikuyu reserves was conducted by the District Commissionaire of Kiambu. According to Fazan (1932), maize production recovered total sales amounting to 36,905 tons and a corresponding value of 101,489 pounds. As Table 1 shows, contrary to assumptions made in the literature, household income from produce sales was higher in the labour-supplying areas (Kiambu and Fort Hall) and earnings were sufficient to pay the annual taxes.

The case of wattle bark production best illustrates agricultural development in Kikuyu. Today, wattle bark is considered a minor raw material in the leather industry.[17] However, at the time, households used it as firewood and building material and importantly, sold it as a cash crop for exports (Kikuyu Province 1932). Wattle bark production in the Kikuyu reserves reported a take-up rate of as high

15 These values are calculated using the population and agricultural sales data from the annual reports of Nyanza Province. African population data in the colonial era are subject to numerous limitations (Frankema & Jerven 2014); as a result, our estimates may also suffer the same biases. We use the official number of household members reported in the census data in Nyanza's annual reports (3.23 members on average).

16 See Kenya Colony (1927) (Kikuyu Province, 1934-48)

17 Extracts from wattle bark are used as a tanning agent to produce leather from skin and hide.

Table 1: Estimated average value of total produce per household in the Kikuyu Proper Native Reserves, 1932

	Value of produce per HH		
Per household in:	Consumed (Sh.)	Sold (Sh.)	Total (Sh.)
Kiambu	121	107	228
Fort Hall	139	52	191
Nyeri Native	160	28	188

Source: Kenya Land Commission 1934 – CAB/24/248

Table 2: Acreage under wattle bark and labour force participation rates in Kikuyu Province by district in 1930

Area	Wattle bark acreages in 1930	Labour force participation rate in 1930 (percentage of able-bodied males)
Kiambu	6,119	69.0%
Fort Hall	448	35.4%
Nyeri	120	36.6%
Embu and Meru	1	Embu: 15.7% and Meru: 25.9%

Source: Authors' own calculations. Wattle bark acreages are taken from the Agricultural Census 1930. Data on population and employment is taken from the *Native Affairs Department annual report* 1930.

as 75% of households in Kiambu, Fort Hall, and Nyeri (Cowen 1978). Similar to food production, a majority of wattle bark production was done in areas with high labour force participation rates (Table 2). This pattern of high participation rates in the labour market and investments in wattle bark production lasted throughout the colonial period. Data from the 1960 Sample Census of African Agriculture show that 30 years later, Kiambu continued to report the highest share of wattle-producing households (47.6% compared to Embu's 3.1%) (Kenya Colony 1960).[18]

To carefully analyse the importance of wattle bark to Kikuyu households, we estimate the earnings per household (Table 3) using the population data from wattle-producing districts in the Kikuyu reserves (i.e. Kiambu, Fort Hall, and Nyeri). We deduct associated labour costs because of the use of hired labour to strip the tree barks, as mentioned in Stichter (1982) and Cowen (1975). It is possible that the resultant true income is underestimated because we assume that all households produced wattle, whereas in reality, about two-thirds of the households did so. The estimates reveal rather low earnings from the wattle sales in the export

18 In the 1950s, the production of wattle bark was replaced with that of other cash crops such as coffee, tea, and pyrethrum.

Table 3: Estimated wattle bark earnings per household 1929–45

Year	African produced wattle bark in Kikuyu Province	Estimated wattle bark earnings per household	Nominal 30-day wage for a male worker in agriculture
	Export value in pounds	Value in shillings	Value in shillings
1929	35,000	6.5	8–12
1930	42,000	20.1	12
1931	72,521	14.1	13
1932	78,810	22.5	10
1933	46,600	12.2	6–10
1934	51,658	14.5	6–12
1935	44,570	11.5	9
1936	48,748	19.3	6–12
1937	45,483	13.3	11
1938	29,357	4.8	8–12
1939	72,846	14.6	8–12
1945	89,448	15.1	10–16

Source: Authors' own calculations. Wattle bark figures are taken from the *Native Affairs Department annual report 1938–1948*. Years 1936 and 1937 are taken from the *Central Province annual report*. Nominal wages 1929, 1930, 1933, 1934, 1936, 1938, and 1939 are taken from the Native Affairs Department annual reports. 1931, 1932, 1935, and 1937 are taken from Mosley (1983). Population data is taken from the Kikuyu Province annual reports except for years 1925, 1938, and 1939 where data is taken from the Native Affairs Department annual report.
Notes: (1) To calculate earnings per household we use the total population of the wattle bark producing districts Kiambu, Fort Hall, and Nyeri. We obtain estimates of household size from S.H. Fazan's 1932 economic survey of Kikuyu proper (CAB/24/248 Kenya Land Commission Evidence, I, 979) (2) To estimate the costs of hired labour, we assume that 10 trees could be stripped per day per household (see United Nations 1977). We further assume that a farmer would have a maximum of 100 trees. 100 trees per farmer seems reasonable, as Fazan (1932) estimates that households would plant between 0.11 to 0.37 acres of wattle and we know from colonial Natal, that one acre could have around 400–450 trees (Sherry 1971). It follows, that a household would need to hire labour for 10 days to strip bark. To calculate the costs of hired labour, we assign the lowest daily agricultural wage to the number of workdays. (3) Population figures are unusually high for 1931 causing a drop in earnings. The high population rate could be due to a mistake in the colonial recordings.

market.[19] Nevertheless, these earnings were sufficiently large to impact labour supply as, on average, households in labour-supplying areas earned sufficient income from produce sales to be able to pay taxes.

19 The export values for wattle bark remained fairly stable over the period, while the population size increased by 2%, creating downward pressure on household earnings from the crop (Kenya Colony 1920–45a).

Another indicator of increased commercialization in the labour-supplying areas is the growth in African-owned shops in the 1920s. In Fort Hall alone, the number of shops increased by almost 70% (from 144 to 208) during 1927–28 (Kikuyu Province 1928). The pattern of agricultural investments and commercialization in the Kikuyu reserves persisted for several decades. The cultivation of permanent crops is typically considered a suitable indicator for agricultural investments and thus, a sign of progress. In 1960, 12% of Kikuyu reserves were under cultivation for permanent crops in comparison to the limited 1.4% in Nyanza. These values highlight stark intra-reserve diversities: in Kiambu, the labour-supplying Kikuyu reserve, 38% of the land was under cultivation for permanent crops, whereas in Embu and Meru, areas which supplied less labour, the rate of land under cultivation was merely 5 and 7%, respectively (Kenya Colony 1960).

These findings pose an important question: if commercialization was on the rise, why did farmers work on European estates? Low earnings combined with the need to pay taxes could explain part of the labour supply for migrant workers. For the bulk of labour, however, the answer probably lies in a combination of seasonality and deeper integration in the cash economy. The agricultural calendar for crops grown in Kikuyu suggests that labour could be freed from smallholder agriculture during the peak coffee season from late October to January (Table 4).

TOWARDS AN ALTERNATIVE EXPLANATION

Policies to shift the labour supply-curve outward do not appear to have played a role in the expansion of settler agriculture in Kenya. Instead, we grant support to the previous literature noting that the ability to control available labour was more important. This section explains the role that tightened labour control played in lowering both wages and transaction costs allowing the settler to raise their profit share. Settler farmers were faced with numerous challenges. The cultivation of mono-cereal crops such as maize and wheat was not profitable because of the high transport costs (Tignor 1976; Mosley 1983). At the same time, capital was costly. Since settlers operated in a high-risk environment, they preferred labour-intensive production methods even for large estates (Mosley 1983). Initially, both wages and the transaction costs of seeking and retaining workers were high. Settlers had to pay high fees to costly and inefficient private recruiters (Berman & Lonsdale 1980). Further, contract enforcement costs were high as workers would often desert. These costs were brought down with the introduction of two new laws. In the late 1910s, shortly before the European sector expanded, two policies that limited African mobility and raised the workload of the tenants were introduced, that is, the Resident Native Labour Ordinance (RNLO) and the Registration of Natives Ordinance (also known as the ‘pass law’). These laws would make the shift to high-value cash crops even more profitable.

In 1919, the RNLO was passed and prohibited fixed-rent tenancy. The 1919 ordinance and those that followed drastically altered tenants’ rights. Prior to the

Table 4: Agricultural calendar for Kikuyu grown crops and coffee

Activity/month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Kikuyu grown - cereal crops	→ Harvest short rain crops (e.g. maize)				Long rains →				Harvest long rain crops →			
	Plant crops for long rains (e.g. maize, beans, potatoes)								Plant short rain crops			
									Oct: Circumcision			
Settler grown coffee	→ Prune										→ Coffee harvest	
Kikuyu grown wattle bark	→ Wattle bark stripping										→ Wattle bark stripping	

Sources: For Kikuyu grown crops see the Native Affairs Department annual report 1924: 49; Kenyatta 1938; Sticther 1982. For coffee and wattle bark see the Native Affairs Department annual report 1924: 49.

ordinance, the African tenants were able to negotiate fairly good conditions; some would work a limited number of days in return for tenancy, while others paid rent. The area of land for grazing and cultivation was at least 5 to 6 acres, and a family could own and maintain large herds of livestock (Furedi 1972; Stichter 1982). However, following the 1919 ordinance, tenants were no longer allowed to pay rent in cash and were instead turned into 'rent labourers'. A male tenant would have to give a minimum of 90 days' work per year and, in return, receive a low 30-day ticket wage.[20] Then, in the late 1930s, the 1919 ordinance was augmented to provide settlers with even greater control over the tenants. Consequently, the number of work days increased to 240–270 days per year. At the same time, the area of land for cultivation decreased to one acre and the number of livestock to a maximum of 10–15 sheep. Settlers' control over tenants was further strengthened by the decision to shift the responsibility of overseeing tenant ordinances from the colonial administration to settler-dominated district councils. Further, no compensation was offered to offset the income loss from the restricted cultivation and livestock.

An important question to explore here is why the tenants did not return to the reserves despite the worsening conditions. The tenants had after all voluntarily entered into contracts with the settlers and as we argue an increased commercialization was taking place in the Kikuyu reserves. First of all, tenants who could return did so. In 1928, the Agricultural Census presented for the first time the number of residents, of whom 32,969 were male tenants (Kenya Colony 1928). In 1936, due to the outmigration of tenants, this number declined to 24,872 (Kenya Colony 1936). However, not all tenants could return. One of the few studies on Kikuyu tenants is Furedi's (1989), which found that the Kikuyu land rights system was central to tenants' ability to return to the reserves. Some tenants lost their land rights, often to other family members, while they were away from the reserves. A large proportion had never owned land and lived as *ahoi* (labour tenant or serf, Kikuyu) on Kikuyu landowners' farms prior to migrating to European land. A smaller proportion cited bad relationships with the chiefs as a reason for not returning to the reserves.[21]

Due to the immobility of the remaining tenants, settlers could extract a higher number of work days. The ability to use tenants as semi-permanent labour ensured a timely supply of labour that could be called upon when needed drastically lowering the transaction costs of finding labour. Despite this, the supply of labour was still insufficient. This was particularly the case for the burgeoning coffee sector and during the harvest season, short-term workers from nearby reserves were hired to fill the gap. On the one hand, employing short-term labour during peak seasons allowed for easier monitoring since they were hired to perform specific

20 The 30-day ticket wage for tenants was, on average, half of the 30-day ticket wage for a wage worker.

21 See Furedi 1989 and Lonsdale 1992.

tasks. On the other, unlike migrant or tenant workers, local short-term labour could easily desert the farm, leading to high contract enforcement costs. As a result, strong penalties were enforced as part of the labour contracts under the pass laws implemented in 1921, which forbade Africans from leaving the reserves without a passport. The pass, commonly referred to as *kipande* (card, Kiswahili), listed personal details, previous employer, and the wage earned. The system enabled the settler community to better control the wage level and to retain workers more easily since deserters could be traced. We reference data on the number of deserters to illustrate the effectiveness of the law in reducing transaction costs. In 1921, when the law was implemented, 3595 deserters were reported. Of these, 77% were punished under the new law. However, in the year following the implementation, only 149 cases were reported (Leys 1924). Importantly, while the deserter problem did not disappear with the implementation of the law,[22] its levels did not increase to those prior to 1921.

The decrease in transaction costs was not the only 'advantage' of the restricted mobility of Africans. Lowered mobility also implied a reduction in the bargaining power of the African worker as settlers were faced with less competition to recruit and retain workers placing a downward pressure on nominal wages. The stabilization of the wage combined with the steady supply of cheap tenant labour lowered the wage bill. With the shift to high-value cash crops raising the value of the output per worker, settlers could capture a higher share of the surplus value.

CONCLUDING REMARKS

Literature on Africa's economic developments has cited the presence of settler agriculture to explain past and present low living standards and high inequality in Africa's former settler economies. In the 1970s, a consensus emerged among 'radical' scholars that to expand settler agriculture the colonial state intervened in the markets for land and labour to ensure the settlers a steady supply of cheap labour. More specifically, land tenure policies and taxation eroded earnings from the sales of African produce creating unlimited supplies of labour at low wages. This interpretation of labour supply in settler economies has influenced a new strain of literature that seeks to explain long-run poverty, inequality, and political instability in Africa. However, the 'radical' literature suffered from empirical shortcomings and failed to directly link the introduction of various labour policies to the performance of the settler agricultural sector. Consequently, we are not able to know whether declines in African wages can be attributed to colonial policies or to contractions in the settler farm economy. We contribute to the historical

22 Correspondence from the Chief Registrar of Natives revealed that, in the 1940s, the government remained active in tracing deserters and in issuing warrants of arrest (Kikuyu Province 1934–48)

literature on labour in settler economies by empirically investigating the underlying causes of the expansion of settler agriculture using Kenya as a case.

To examine whether colonial policies facilitated the expansion of settler agriculture, we calculate both settler farm earnings and African real wages. The two measures reveal a paradox: settler profitability and employment rose while African real wages declined. To examine the role of colonial policies, we correlate the two measures with taxation and developments in the local African agricultural economy. Doing so, we do not find support for the classic interpretation that declines in African agriculture and taxation can explain the steady supply of labour at low wages. On the contrary, we find that the bulk of labour came from native reserves becoming increasingly more commercialized in the period. A combination of seasonality and deeper integration with the cash economy seem to explain a majority of the labour supply.

The rise in settler profitability can instead be explained by a shift to high-value cash crop production coinciding with tightened labour control. The shift to coffee and tea raised the value of output per worker, yet this did not manifest itself in higher wages. This can be explained by the emergence of a labour control regime that placed downward pressures on both transaction costs and wages enabling the settler to capture a higher share of surplus value. Our results conquer with past and present literature that has linked poverty and declining living standards to the expansion of settler agriculture. Our findings need not be unique to Kenya. Similar measures were taken to reduce labour mobility in for instance South Africa and Southern Rhodesia (see e.g. Nattrass 1991; Rennie 1978) and we propose that these measures might have played a more important role than policies to raise labour supply. Still, more research on labour control and settler agriculture is needed to understand not only the political economy of settler farming in Africa but also to explore how white settlement affected the economic opportunities and freedoms of the indigenous African populations.

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APPENDIX 1

Data sources

European agricultural production and exports

Production and export values are taken from the *Department of Agriculture* annual reports 1920–45.

Wages

30-day ticket wage

Where possible, we refer to district wages and/or sector-specific wages as opposed to the more superficial wage data in the Blue Books. For the years for which we have district- or sector-specific data, we estimate the weighted (by employment share) average wages. District wage data is available in the Native Affairs Department's annual reports for years 1923–25, 1927, 1928, 1930, and 1936. For 1920, 1921, 1933, 1934, and 1937–39, we use nationwide data on agricultural wages also from the Native Affairs Department's annual report. We employ data from the *Blue Books* for 1926 and the Labour Department's annual report for 1944 and 1945.

Where we have reported minimum and maximum wages, we calculate averages using a log-normal distribution that assigns greater weight to the lower value. For missing values, we interpolate data using the log annual difference (growth/decline) and then add the percentage to each year: ln (y1/y0)/n. Years 1922–25 are interpolated using a log-linear formula. Note that female wages are unavailable at the district level. At the national level, nevertheless, we use data on female wages for 1927, 1928, 1938, and 1955 from the annual reports for the Native Affairs Department and the Labour Department. For the remaining years, we estimate the female wages, assuming a constant male–female wage ratio. Juvenile wages are available for 1901–02 from the *Blue Books* and for 1927, 1928, 1938, and 1955 from the annual reports of the Native Affairs Department and Labour Department. For the remaining years, we estimate the juvenile wages, assuming a constant male–juvenile wage ratio.

Tenant wage

Data on tenant male wages are taken from the Native Affairs Department's annual report for 1927–29, 1933–39, and 1944. For 1921–26, we extrapolate by assuming a constant ratio for male 30-day ticket wages to male tenant wages. We do not have a wage for female tenants and we estimate the wage using the male-to-female 30-day ticket wage ratio.

Daily wage

We lack data for daily paid (casual) wages. To solve, we estimate daily wages by dividing the lowest 30-day ticket wage (excluding ratios) by 30 days.

Food allowances

We include the value of food in our total wage measure. Food allowances are taken from Mosley (1983) for the years 1913, 1925–33 and 1945. Information for 1934 is taken from the Agricultural Department annual report. We assume that the value of food allowance was held constant for the years where no change is reported.

Employment

Data on male, female, and juvenile workers employed on 30-day tickets are taken from the *Agricultural Census* for 1921–34, 1936, 1938, 1941, 1942, 1944, and 1945. Data for 1937 are from the *Blue Books*. We interpolate data on male workers for 1935, 1939, and 1940; female workers for 1935–44; and juvenile workers for 1935–42.

Production costs: fertilizers and insecticides

We use import values for fertilizers and insecticides, the data for which are taken from the annual trade reports for 1921–45. A 20% mark-up is added to arrive at retail prices.

Agricultural machinery and tools

Data on agricultural tools and machinery are taken from the annual trade reports for 1921–45. A 20% mark-up is added to arrive at retail prices.

Transport costs

Railway rates and distance measures from the railhead to Mombasa are taken from the Kenya Railways Corporation' Administration Reports. The files are available at the Kenya National Archives. The railway rates for maize are taken from the Colonial Office's annual report for 1920, van Zwanenberg (1975) for 1927, and Mosley (1983) for 1933 and 1943.

Railway rates were generally reported when a rate decrease or increase was implemented; thus, the rates are not available for all years. Nevertheless, it seems fair to assume that the railway rates remained constant for the years in which no new rate was introduced.

Rural prices

The national colonial records provide only urban retail prices. To collect rural prices for the calculation of African real wages, we collect data from the provincial and district annual reports from the most populated regions (Kikuyu and Nyanza), which also supplied a majority of the labour. We lack the rural price data for imported goods (i.e. sugar, salt, soap, and kerosene) and are therefore

unable to calculate a rural–urban price difference for these goods. Nevertheless, data from Uganda (see de Haas 2017) have confirmed that the prices for imported goods were similar between the rural and urban areas. Consequently, we use the urban retail series for all imported goods: beef, cotton, sugar, salt, petroleum, and soap.

APPENDIX 2

Earnings calculation for the settler agricultural sector

To calculate settler agricultural earnings ('profitability'), we use the standard principles of a financial income statement:

Revenue	£
Expenses	
Wages	
Production costs	
Depreciation expense	
Transport costs	
Other transaction costs	
Total expenses	£
Gross earnings	£

Revenue

Total revenue is calculated by multiplying production values with producer prices. Production values are generally available for coffee, wheat, and maize, which constituted 60% of the production value. We rely on reported export values for the remaining crops. Depending on the crop, this could lead to both the under- and overestimation of true earnings. We overestimate the earnings for crops sold in the overseas markets. Further, our values for true earnings are underestimated for domestically sold and exported crops (e.g. sugar) because we are unable to account for domestic sales. We deduct a 15% mark-up from the export values. This mark-up is based on the calculated transaction costs (the difference between the sales price in Nairobi and London) for coffee and sisal which included storage in Mombasa, insurance, and sea freight to London. This measure is conservative as it overestimates the transaction costs for crops sold domestically or regionally. We use the production values of the following crops: coffee, maize, and wheat. We use export values for tea, sisal, sugar, pyrethrum, coconut, beans, and potatoes. In performing a robustness check, we calculate the earnings using only the export values.

Wages

To obtain the annual wage bill, we multiply wages by employment figures for all categories of agricultural workers. If data for minimum and maximum wages are reported, we calculate an average using lognormal distribution (biased towards the minimum).

We calculate the wage bills for the following categories of workers:

- male, female, and juvenile workers employed on 30-day ticket contracts;
- male, female, and juvenile workers employed on tenant contracts; and
- male, female, and juvenile workers employed as daily workers.

30-day ticket workers

We multiply the number of 30-day ticket workers employed each year by the stated 30-day ticket wage.

Tenants

For tenants, we lack information on the number of days worked per year. Thus, to assign an annual number of work days, we use the number of days that a tenant is required to work as per the Resident Native Labour Ordinances (RNLO): 90 days from 1921 to 1939 and 270 days thereafter. Secondary sources have suggested that the wives and children of male tenants would also work during the harvest and planting seasons. Thus, we assign 60 days of work per year for this group of workers (see the Labour Department's annual report 1945).

Daily workers

We multiply the number of daily labourers employed each year with the estimated daily wage.

Production costs

Apart from labour, production costs included those for fertilizers and insecticides. We deduct the total annual value of these costs.

Depreciation expense

Depreciation expenses are calculated from the total value of agricultural machinery and tools.

We deduct the cost of acquiring fixed agricultural assets by subtracting a depreciation rate. We use a straight line depreciation formula. The lifetime of agricultural machinery is set to four years, which is consistent with the contemporary lifespans used in accounting for African countries (see Ernst & Young 2017). See the following example:

Assuming the purchase cost of machinery is £50,000,
4 years of useful life = 25% depreciation rate per year
25% depreciation rate * £50,000 = £12,500 annual depreciation.

Transport costs

We calculate the costs of transporting goods from the railhead in a given district to Kilindini Harbour in Mombasa. We estimate transport costs for the following crops: coffee, maize, beans, cotton, sugar, tea, wheat, barley, oats, potatoes, sisal, and pyrethrum.

To account for the different locations of settler farms, we calculate transport costs as a weighted sum (by quantity in a given area). The transport costs are first calculated at the district level, as follows:

$$\text{Transport cost}_d = \text{railway rate}_c * \text{distance}_d * \text{production volume}_{cd},$$

where c = crop and d = district.

Next, we calibrate the district-level transport costs to arrive at a single transport cost for the entire sector. To calculate the weighted averages, for all years, we use data on European production by district, distance measure, and railway rate for each crop. Data on European production at the district level are available only for 1920, 1922, 1930, 1934, and 1936. We use three steps to estimate the production volumes per district for the missing years. First, we calculate crop shares by district for the years in which data are available. Second, we interpolate data for the missing years to determine the district-level crop shares for all years. Finally, we use the total production volume at the national level and the estimated crop shares at the district level to assign production volumes to each district. Owing to the lack of data, we are unable to calculate the costs of transporting from the farm gate to the railhead.

The total annual transport costs, on average, were 6% of the total production value, which is marginally lower than that in landlocked Nyasaland, where transport costs were 10%, a rate that has been said to be the highest in Southern Africa (Bolt & Green 2015).

Other transaction costs

Other transaction costs include grading, packing, and port charges. But the data on such costs are generally not available except for maize and coffee. For maize, these costs amounted to 0.5% of the total production value. For coffee, on the other hand, the transaction costs were substantially higher (5% of the production value). To implement a conservative measure, we deduct 5% from the production values.

For coffee, we also deduct curing charges which were 80 Ksh. per ton in 1920-34 and 55 Ksh. per ton in 1935–45.

APPENDIX 3

Welfare ratio estimation

Real wages or welfare ratios are calculated using Allen's (2009, 2015) method, which entails computing annual wages and dividing them by the annual costs of maintaining a family. Free food and housing was an important non-wage component. We include the value of food allowances in the total income measure but due to lack of data we are not able to include the value of housing. The omission of housing values implies a slight underestimation of the true income.

A welfare ratio of one indicates that the sole income earner earns just enough to keep his/her family alive. While a welfare ratio greater than one suggests that the family can afford luxury goods or a higher consumption of basic goods, a ratio of less than one means that the family cannot afford a decent living standard under the stated assumptions. The barebones consumption basket assigns 2100 calories per day to each household member as the recommended daily protein intake (see WHO 1985). We follow Allen (2015) and use a scaling factor of four to calculate a family subsistence basket. A factor of four provides sufficient calories for the survival of an adult working male, a female working in smallholder agriculture, and 2–3 young children. The basket includes minimal amounts of fuel, lightning, soap, and cloth. We collect data on food diet habits from the comprehensive *Oltersdorf Collection* (Raschke-Cheema et al. 2008; Raschke 2009). The Collection comprises more than 70 unique nutrition surveys conducted by the Max Planck Institute during 1930–60. The surveys showed that the average intake of calories per day in colonial Kenya was 2200–2300 calories, of which 60–80 g were from protein sources. Thus, our barebones basket of 2100 calories per day and 63–71 g of protein seems reasonable. We include the cheapest staple foods that still offered the minimum level of calories and protein. In the early colonial period, millet and sorghum were the main staple foods, although certain areas had shifted to maize. We use the 'cheapest of' method (see de Haas 2017) and thus allow households to substitute between the cheapest options of maize, millet, or sorghum. The Collections showed that households consumed a low level of animal protein (6–8 g) and obtained the rest of their proteins from legumes. Therefore, we include beans as a protein source and only a small amount of meat. We select coconut oil for cooking oil, candles for lightning, and kerosene for fuel. As we lack data on candles and firewood, we follow Frankema and van Waijenburg (2012) and raise the cost of the basket by 10%. We raise the basket by an additional 5% to account for the cost of maintaining a rural dwelling.

The contents of the basket are as follows:

	Unit	Quantity per person per year	Nutrients per pound (lb)		Nutrients per person per day	
Food items						
Cheapest of			Calories	Protein	Calories	Protein
Maize	lb	414	1601	42	1815	48
Millet	lb	424	1547	47	1815	55
Sorghum	lb	419	1565	49	1815	56
Beans	lb	44	1510	107	182	13
Beef	lb	6.6	522	100	9	2
Coconut oil	lb	6.6	4010	0	73	0
Sugar	lb	4.4	1814	0	22	0
Total					**2,101**	**63–71**
Essential non-food items						
Cotton	Yard	3.3				
Soap	lb	2.9				
Kerosene	l	1.3				
Candles	lb	2.9				
Firewood/ charcoal	BTU	2MBTU				

Sources: de Haas 2017; Frankema and van Waijenburg 2012. For nutrition values, we refer to Latham 1997 and WHO 1985.

APPENDIX 4

Wage data

	Wage rates						
Year	Male 30-day ticket (includes rations), log-normal	Female 30-day ticket (includes rations), log-normal	Juvenile 30-day ticket (excludes rations), log-normal	Male daily wage (excludes rations)	Female daily wage (excludes rations)	Juvenile daily wage (excludes rations)	Male resident 30-day ticket (excludes rations), log-normal
1901	11.5	6.8	9.5	0.3	0.1	0.2	3.0
1902	11.5	6.8	9.5	0.3	0.1	0.2	3.0
1903	9.0	7.0	9.5	0.2	0.1	0.2	3.2
1904	13.0	10.9	12.7	0.2	0.1	0.2	3.8
1905	13.0	11.8	12.7	0.2	0.2	0.2	4.5
1906	13.0	12.8	12.7	0.2	0.2	0.2	5.3
1907	13.0	12.8	12.8	0.2	0.2	0.2	5.3
1908	13.0	12.8	12.8	0.2	0.2	0.2	5.3
1909	13.0	12.6	12.8	0.2	0.2	0.2	5.2
1910	14.7	13.8	12.8	0.2	0.2	0.2	6.2
1911	14.3	13.5	12.9	0.2	0.2	0.2	6.0
1912	13.9	13.9	12.9	0.2	0.2	0.2	6.3
1913	16.4	13.9	12.9	0.2	0.2	0.2	6.3
1914	15.8	13.9	12.9	0.4	0.2	0.2	6.3
1915	15.9	14.0	13.0	0.4	0.2	0.2	6.3
1916	16.0	14.0	13.0	0.3	0.2	0.2	6.4
1917	15.0	13.5	13.0	0.2	0.2	0.2	6.0
1918	15.0	13.5	13.0	0.2	0.2	0.2	6.0
1919	15.0	13.5	13.1	0.3	0.2	0.2	6.0
1920	15.0	13.5	13.1	0.3	0.2	0.2	6.0
1921	17.0	14.5	13.1	0.3	0.2	0.2	6.8
1922	17.5	14.7	13.1	0.3	0.3	0.2	7.0
1923	18.0	15.0	13.2	0.4	0.3	0.2	7.2
1924	20.0	15.9	13.2	0.4	0.3	0.2	8.0
1925	21.4	14.2	10.8	0.4	0.3	0.2	8.5
1926	17.2	15.0	10.8	0.4	0.3	0.2	9.2
1927	17.2	15.0	10.9	0.4	0.3	0.2	9.8

(*Continued*)

(*Continued*)

Year	Wage rates						
	Male 30-day ticket (includes rations), log-normal	Female 30-day ticket (includes rations), log-normal	Juvenile 30-day ticket (excludes rations), log-normal	Male daily wage (excludes rations)	Female daily wage (excludes rations)	Juvenile daily wage (excludes rations)	Male resident 30-day ticket (excludes rations), log-normal
1928	17.2	15.0	10.9	0.4	0.3	0.2	8.5
1929	14.8	14.0	11.1	0.3	0.3	0.2	8.4
1930	20.5	14.0	11.4	0.4	0.3	0.2	7.7
1931	18.0	12.6	11.6	0.3	0.3	0.2	7.1
1932	15.0	11.1	11.9	0.3	0.2	0.2	6.5
1933	12.7	10.2	12.1	0.2	0.2	0.1	6.0
1934	12.5	9.9	11.6	0.2	0.2	0.2	5.5
1935	14.0	9.9	11.6	0.2	0.2	0.3	5.0
1936	12.5	9.9	11.6	0.2	0.2	0.3	5.3
1937	16.5	11.1	11.2	0.4	0.2	0.3	5.7
1938	13.8	10.9	11.6	0.3	0.2	0.3	5.7
1939	13.8	11.3	11.6	0.3	0.2	0.3	8.4
1940	13.9	11.6	11.1	0.3	0.3	0.4	8.2
1941	13.9	12.0	10.6	0.3	0.3	0.4	8.1
1942	14.0	12.3	10.2	0.3	0.3	0.4	8.0
1943	14.0	12.7	10.2	0.3	0.3	0.5	7.9
1944	16.6	13.6	14.4	0.3	0.3	0.5	7.7
1945	24.6	21.0	20.8	0.3	0.3	0.6	8.5
1946	23.0	22.9	18.0	0.3	0.4	0.6	7.7
1947	25.0	22.9	18.7	0.4	0.4	0.7	9.0
1948	28.0	22.9	29.1	0.9	0.4	0.7	14.0
1949	27.5	25.0	26.3	0.3	0.4	0.8	13.4
1950	26.9	27.4	20.0	0.5	0.5	0.9	14.6
1951	32.3	30.1	26.6	0.5	0.5	0.9	15.9
1952	38.8	33.3	37.5	0.6	0.6	1.0	17.3
1953	42.0	35.2	30.5	1.0	0.6	1.1	18.6
1954	51.4	35.9	42.9	1.3	0.6	1.2	19.5
1955	62.9	47.9	47.9	1.7	1.3	1.3	20.5
1956	62.9	47.9	47.9	1.7	1.3	1.3	21.5

(*Continued*)

(*Continued*)

Year	Wage rates						
	Male 30-day ticket (includes rations), log-normal	Female 30-day ticket (includes rations), log-normal	Juvenile 30-day ticket (excludes rations), log-normal	Male daily wage (excludes rations)	Female daily wage (excludes rations)	Juvenile daily wage (excludes rations)	Male resident 30-day ticket (excludes rations), log-normal
1957	67.3	47.9	50.6	1.9	1.3	1.3	22.6
1958	61.9	56.7	57.5	1.9	1.4	1.3	23.8
1959	57.0	50.8	58.0	1.9	1.4	1.4	25.0
1960	60.6	53.0	51.8	1.6	1.5	1.4	26.3
1961	60.3	52.8	46.5	1.4	1.5	1.5	27.6
1962	60.0	52.6	42.0	1.2	1.5	1.5	29.0
1963	62.5	55.6	38.1	1.0	1.6	1.5	30.5

APPENDIX 5

Employment data

Employment											
Year	Total monthly employed in agriculture	Monthly employed in agriculture (male)	Monthly employed in agriculture (female)	Monthly employed in agriculture (juvenile)	Tenant labour in agriculture	Male tenant labour in agriculture	Female tenant labour in agriculture	Juvenile tenant labour in agriculture	Male daily labour in agriculture	Female daily labour in agriculture	Juvenile daily labour in agriculture
1919	58,709										
1920	53,709	45,005	3,917	4,787	111,150	39,098	35,491	36,561			
1921	67,388	55,938	4,911	6,539	110,891	38,274	35,213	37,405			
1922	61,949	51,753	4,261	5,935	110,672	37,467	34,938	38,268			
1923	70,957	54,406	6,609	9,942	110,492	36,677	34,664	39,151			
1924	87,093	66,993	8,316	11,784	110,351	35,903	34,393	40,055			
1925	78,527	61,735	5,477	11,315	110,250	35,146	34,124	40,980			
1926	94,611	74,873	6,021	13,717	110,188	34,405	33,857	41,926			
1927	97,068	76,838	5,000	15,000	110,165	33,679	33,592	42,894	5,006		
1928	104,949	83,000	4,654	17,295	110,182	32,969	33,329	43,884	9,371		
1929	105,040	85,082	4,654	15,304	112,000	32,032	32,928	47,040	6,092		
1930	112,728	90,633	3,971	18,124	119,849	34,378	35,230	50,241	13,157		
1931	112,636	89,856	3,387	19,393	110,413	30,906	32,550	46,957	7,574		
1932	98,194	79,604	3,260	15,330	110,570	30,247	32,294	48,029	5,926		
1933	97,865	79,749	3,506	14,610	114,440	30,933	33,383	50,124	7,160		
1934	100,190	81,883	3,536	14,771	104,372	28,939	31,035	44,398	6,685		
1935	100,544	84,549	3,699	16,487	98,647	26,829	28,898	42,920	15,449		
1936	100,900	87,302	3,869	18,401	93,112	24,872	26,908	41,492	11,178	10,904	8,786
1937	106,300	90,145	4,047	20,539	85,860	24,555	25,008	36,297	12,316	11,835	9,214
1938	111,500	93,081	4,234	22,924	79,237	24,241	23,243	31,753	13,570	12,845	9,663

(*Continued*)

(*Continued*)

Employment											
Year	Total monthly employed in agriculture	Monthly employed in agriculture (male)	Monthly employed in agriculture (female)	Monthly employed in agriculture (juvenile)	Tenant labour in agriculture	Male tenant labour in agriculture	Female tenant labour in agriculture	Juvenile tenant labour in agriculture	Male daily labour in agriculture	Female daily labour in agriculture	Juvenile daily labour in agriculture
1939	107,741	96,112	4,429	25,586	73,311	23,932	21,602	27,778	14,952	13,941	10,134
1940	104,109	99,241	4,633	28,558	68,003	23,627	20,077	24,300	16,474	15,131	10,627
1941	100,600	102,473	4,846	31,875	63,242	23,325	18,660	21,258	18,151	16,422	11,145
1942	122,500	106,249	5,069	35,577	59,641	23,702	17,342	18,596	2,036	13,737	5,366
1943	120,229	98,010	5,302	35,408	59,143	26,757	16,118	16,268	1,913	9,924	3,310
1944	118,000	98,169	5,547	36,201	65,852	34,656	15,981	15,215	1,738	9,377	2,876
1945	118,300	99,924	5,802	34,487	34,188	31,930	13,542	13,144	2,133	6,593	2,525
1946	137,821	90,541	8,932	38,348	31,930	27,746	14,045	7,754	3,288	9,296	3,268
1947	139,116	93,439	9,193	36,484	37,000	16,625	9,087	7,888	4,983	13,015	4,399
1948	136,854	94,539	10,728	31,587	40,795	25,359	8,739	6,697	3,944	8,324	2,633
1949	140,775	100,358	12,516	27,901	43,480	27,916	9,470	6,094	2,478	8,365	1,816
1950	143,432	100,510	14,228	28,694	48,075	27,690	9,960	10,425	8,492	6,730	3,655
1951	149,094	105,045	14,449	29,600	41,953	25,522	9,633	6,798	7,196	14,074	4,699
1952	149,823	105,957	15,092	28,774	44,524	27,445	9,989	7,090	5,911	11,820	3,761
1953	165,157	112,719	23,280	29,158	42,963	26,951	8,582	7,430	4,418	13,973	4,219
1954	220,134	133,727	48,329	38,078	44,655	26,300	11,228	7,127			
1955	226,523	139,553	52,680	37,551	40,292	24,200	9,256	6,836			
1956	233,097	145,633	57,423	37,032	37,511	27,600	7,630	6,557			
1957	249,979	151,978	61,481	36,520	34,380	25,700	6,290	6,290			
1958	246,072	157,349	60,739	27,984	31,510	21,000	4,726	2,688			
1959	248,126	160,446	61,929	25,751	28,880	21,065	5,005	2,666			

Paper II

Working Poor? A Study of Rural Workers' Economic Welfare in Kenya*

Abstract

This study employs a mixed methods approach to investigate the poverty reduction potential of large-scale farm (LSF) employment in Kenya. A long-run time series of real agricultural wages is created. The quantitative data are supplemented by life story interviews of agricultural workers. The analysis suggests that LSF employment can when used in combination with other livelihood activities serve as a route out of deep poverty. However, to prevent wages from falling below the subsistence level, there is a need for a balanced rural development strategy whereby investments in smallholder agriculture and skills upgrades accompany the expansion of commercial agriculture.

Keywords: poverty; wages; employment; rural Africa; large-scale farming

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Introduction

Sub-Saharan Africa is witnessing a steady reduction in per capita arable land and a growing abundance of unskilled labour, which can no longer be absorbed full-time by smallholder agriculture. Therefore, rural peoples have become more dependent on off-farm activities for survival and asset accumulation (Bryceson, 1999; Ellis, 2000; Iiyama *et al.*, 2008; Krause, 2019).

The literature on diversification in rural Africa generally finds a positive correlation between off-farm income and welfare indicators such as income and nutrition (Loison, 2015; Barrett *et al.*, 2001; Ellis, 1998). However, a contrasting perspective exists: off-farm diversification leads to poverty. Diversification occurs as a response to increased distress and declining farm incomes in rural areas and serves merely as a survival strategy (Bryceson, 1996; Bryceson, 1999; Reardon, 1997).

Set against this backdrop, this study uses historical trends in real wages to explore whether one type of off-farm activity, employment on large-scale farms (LSFs), can serve as a route out of poverty.[1] Historically, in eastern and southern Africa, LSFs have employed more workers than those employed in mining and manufacturing. Moreover, the post-2008 rise in commodity prices has sparked new investments in commercial agriculture and employment has risen, making the sector relevant to study from a rural development perspective.

A growing body of rural livelihood diversification (RLD) literature (Barrett *et al.*, 2001; Bryceson, 2000; Chambers and Conway, 1992; Ellis, 2000; Scoones, 1998) has shed important light on rural peoples' attempts to diversify towards off-farm activities. However, concentrating on self-employment activities such as artisan work and petty trade, the RLD literature has neglected to study rural employment. To find substantial academic coverage of LSF employment in Africa, it becomes necessary to revisit the historical literature (Arrighi, 1970; Bundy, 1979; Mosley, 1983). By the late 1970s, a near consensus had emerged that the expansion of LSF in colonial Africa had led to the creation of an impoverished and often landless class of rural workers (Fibaek and Green, 2019). To ensure sufficient labour supply, coercive land and labour policies were introduced to force African farmers to seek work on commercial farms. Colonial policies indirectly, albeit intentionally, eroded smallholder earnings, and African

[1] The paper considers workers employed on large farms defined by the Kenyan Ministry of Agriculture as farms of more than 100 hectares. Recent literature suggests that in Kenya, 0.84 million hectares are controlled by so-called mid-size farmers who farm 5-100 hectare (see Jayne et al. 2016). Mid-sized farms are likely to rely on hired labour, however, due to paucity of data on wages, the study of farm workers employed on mid-sized farms is outside the scope of the study.

farmers were left with no other choice than to work for subsistence wages. The outcome was widespread rural poverty and inequality (Arrighi, 1970; Bundy, 1979; Palmer and Parsons, 1977; Wasserman, 1974). From the mid-1980s, the debate had ended and the literature on LSF employment in Africa has since been scarce.

Recently, however, a group of scholars based at the SOAS University of London have made impressive attempts to study rural wage employment in Africa (Cramer *et al.*, 2008; Mueller, 2011; Oya, 2010; Sender *et al.,* 2006).[2] Although concerning rural employment in general and not specifically LSF employment, a comprehensive study of rural labour markets by Sender *et al.*, (2006) concludes that *'an increase in the number of decently remunerated rural wage earning opportunities would be likely to have a dramatic effect in reducing poverty'* (p. 322). Further, the study suggests that larger farms pay higher nominal wages and have better working conditions than smaller farms. Although the expansion of commercial agriculture constitutes a 'messy' and non-linear process, a mutually beneficial scenario exists where workers benefit as commercial farming expands. Hence, although the historical literature has characterised LSF employment as exploitative, the recent analysis of LSF in post-colonial Africa suggests that rural employment, in fact, serves as a route out of poverty.

To contribute to the RLD literature and the scarce contemporary academic work on LSF employment in Africa, I perform a longitudinal study of Kenyan farm workers' economic welfare. A long-term perspective is needed as paths of poverty/accumulation are unlikely to manifest themselves within a short time. I selected Kenya as a case study as the country's long history of LSF allows us to uncover long-run trends.

Newly collected data on prices and wages are used to calculate welfare ratios that compare nominal wages with subsistence costs. By applying a food poverty line method, it is possible to determine under which conditions wages can lift farm workers out of absolute poverty. To the best of my knowledge, analysing trends in agricultural real wages is yet to be systematically explored for post-independence East African countries. To complement the quantitative findings, a qualitative analysis of poverty dynamics among a group of farm workers using collected life-story interviews is performed.

The findings offer insights that can enrich discussions on rural development in contemporary Africa. Although the historical literature on LSF employment has described an impoverished and homogenous class of workers, I find two distinct groups

[2] In addition to the SOAS studies, a handful of studies from the global value chain literature do explicitly consider employment on large farms and poverty reduction using survey data. The studies find a positive relationship between LSF employment and poverty reduction (Humphrey et al., 2004; McCulloch and Masako, 2002). However, as they rely on survey data collected in a single year, the studies are not able to detect long-run changes in poverty/wealth, which is a concern as the wider rural development path of wage employment remains uncertain.

of workers with varying trajectories. On the one hand, a class similar to that of workers described in the historical literature exists in post-independence Kenya: workers who rely solely on their wage income and do not move out of poverty. This group of workers fits the typical description of a 'proletariat'. Over generations, these workers have been employed on large farms. Despite this, they are often landless, poor, and use wage employment as a survival strategy. However, the data revealed another group of workers—the 'asset accumulators'—who have been able to slowly climb out of deep poverty. To move out of poverty, the asset accumulators have used employment as a base from which they have accumulated productive assets. Initially, the workers were landless, but wage employment has allowed them to access economic capital (e.g. savings and loans), which they have used to buy land. Having land makes it possible to creatively combine wages and farm incomes to move out of deep poverty over time.

Levels of formal education appears to differentiate the workers who merely survive versus those who move out of poverty. An expansion in commercial agriculture might be important for wider rural development, but a mutually beneficial scenario only arises when wages can be successfully re-invested in other productive activities. Such complex combinations of livelihoods require a certain level of skills and education, demonstrating the need for a skills upgrade in rural areas.

The rest of this article is organised as follows: Section 2 first presents an analytical framework. Section 3 provides a brief sketch of the history of LSF employment in Kenya. This is followed by methodological considerations in Section 4. In Section 5, a quantitative analysis of the purchasing power of wages is presented. This analysis is used to discuss the ability of LSF wage employment to lift households out of poverty. Section 6 uses qualitative data to examine the poverty dynamics of a small group of farm workers. Finally, Section 7 concludes.

Analytical framework

For an analysis of LSF employment and poverty reduction, an analytical framework that can link employment to economic welfare is needed. In Figure 1, I develop an analytical framework inspired by the sustainable livelihoods literature (Scoones, 1998). The analysis focuses on one activity: employment on large farms. The outcome variable of interest is economic welfare, which is measured both quantitatively and qualitatively.

The wages workers receive serve as a *direct* channel to economic welfare and are central to the framework. However, employment also has complex *indirect* links to economic welfare. Households seldom rely on one off-farm activity and instead attempt to

diversify livelihoods by combining several income sources, some combinations of which are more successful than others (Ellis, 1998). To use livelihood diversification to ensure better living standards, rural households need access to cash and assets so they can diversify across farm and off-farm activities (Ellis and Freeman, 2004).

The analysis begins by examining rural wage levels and the conditions that determine them. Scholars disagree on which factors affect rural wage levels. Neo-classical scholars cite uniform skills, simple technology, and limited government intervention in developing countries to argue that wages will be determined by market forces. Labour productivity in the LSF sector affects labour demand and when productivity rises, so does labour demand. Hence, wages will increase to fill the gaps between demand and supply (Rosenzweig, 1988). On the other end of the spectrum, scholars have argued that unfavourable land/labour ratios and low productivity in smallholder agriculture create a labour surplus. As smallholders lack options outside of subsistence agriculture, the modern sector (in this case, the LSF sector) can, by fixing the wage slightly above a subsistence level, attract an unlimited supply of labour. Only if smallholder productivity increases can wages rise above this level (Lewis, 1954).

In the second part of the analysis, *indirect* links between LSF employment and poverty reduction are explored. The ability to successfully combine incomes to move out of poverty is dependent on a worker's asset base, also referred to as 'livelihood resources' in the literature (Scoones, 1998). A two-way relationship exists between livelihood resources and wage employment. Initial resources determine both the ability to access salaried employment and the wage level. However, employment can also enhance or reduce workers' livelihood resources, thereby affecting their ability to pursue other economic activities. For instance, as a livelihood strategy, workers may rely solely on wage labour or may use wage labour to access cash and assets, which might enable them to conduct a combination of several economic activities. To analyse the link between employment, assets, and livelihood strategies, building on the work by Scoones (1998) and Ellis (1998; 2000) I distinguish between three types of assets/capital:

- Natural assets (e.g. land)
- Economic assets (e.g. cash/credit and savings)
- Human capital (e.g. education and skills).

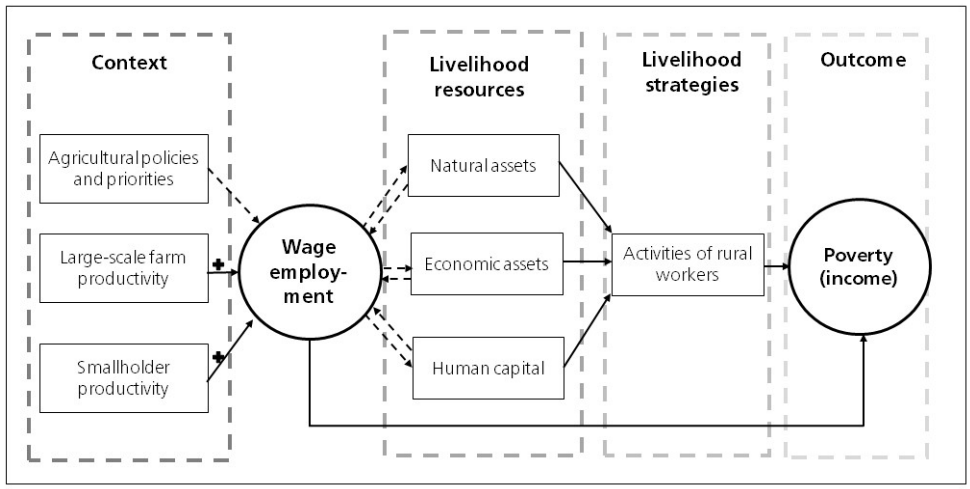

Figure 1: Analytical framework
Note 1: The model is adapted from Scoones (1998).

To contextualise the analysis, the next section offers a historical overview of employment on large farms.

LSF employment in Kenya

Households' ability to pursue employment as a livelihood strategy has been influenced by agricultural policies affecting the number of jobs available. In Kenya, as in other countries in eastern and southern Africa, employment on large farms has colonial roots. With the arrival of settlers and the decision by the British government to promote LSF, an increasing number of mostly men decided to migrate for shorter or longer periods, to seek employment. It has been disputed whether household members worked on large farms to pursue income diversification and thereby raise total incomes or if they were in fact forced to work on farms due to repressive colonial labour policies (Mosley, 1983; van Zwanenberg, 1975). Throughout the colonial period, wages were low and close to subsistence levels (Fibaek and Green, 2019). Despite this, there is evidence that a portion of workers were able to re-invest their wages in commercial agriculture, causing rural progress in labour-supplying areas (Fibaek and Green, 2019; Kitching, 1980; Orvis, 1997).

On the eve of independence in 1963, commercial agriculture was the largest private sector employer, engaging 219,661 workers compared with industry, which employed

139,324 workers (Kenya, 1963). After independence, the agricultural landscape changed and large farm production slowly lost its importance to a fast-growing smallholder sector, causing a decline in the number of agricultural wage workers (Figure 2).

Figure 2: The number of workers employed on large farms in Kenya, 1963-2017
Source: Employment data are taken from annual Statistical Abstract and Economic Survey available online at Kenya National Bureau of Statistics webpage (https://www.knbs.or.ke/) last accessed 08.10.2019.

The post-independence political elite had strong ties to the emerging African landed elite, and rural smallholder accumulation was encouraged and supported by the state. Through the subdivision of land, the so-called 'resettlement schemes', large farms were divided into smaller units and sold at favourable conditions. Still, it is estimated that the first phase of land resettlement led to the subdivision of only 20 percent of LSF land. The remaining land was sold intact to wealthy members of the political elite who continued to invest in large-scale agriculture (Bates, 1989; Holmquist and Ford, 1994; Masinde, 2000). Continued investment in LSF enabled the sector to continue employing the largest share of private sector workers, albeit at a declining trend. In 1971, 189,612 workers were employed on commercial farms versus 72,154 employed in manufacturing. In 1984, this had changed to 132,113 employed on large farms versus 101,191 employed in manufacturing (Kenya, 1984).

The oil crises of the 1970s and 1980s and the corresponding economic collapse affected the rural sector and agricultural growth rates fell. The crises profoundly altered commercial agriculture, impacting both the type and number of jobs available. Commodity prices plummeted, leading to a near collapse of traditional marketed export crops such as sisal and coffee, and many large farms were converted into residential plots. However, the World Bank supported the redirection of agriculture towards non-traditional exports such as flowers and vegetables, which prevented the total collapse of the sector (Poulton and Kanyinga, 2014). Initially, the emerging sub-sector relied on contract farming but, since the 1990s, sparked by a boost in European consumer demand, production shifted from out-grower schemes to large-scale production (Dolan, 2005). The expansion, especially of floriculture, is regarded as a success in Kenya's agricultural history. The sector accounts for a large share of agricultural exports and, employing approximately 43 percent of all farm workers, it is a key driver behind the post-1990s rise in employment (Figure 2).

Historically, male workers have constituted the largest share of farm workers but, as a response to increased global demands for timely supply of horticultural products, the sector increasingly employs women, often engaged on a casual basis (Dolan, 2005).

The recent expansion of the LSF sector has not been able to keep up with population growth in rural areas and, currently, the sector employs a much lower share of the rural population compared with the colonial era. Yet, the sector continues to constitute an important driver of private sector employment, employing roughly 30,000 more workers than manufacturing (KNBS, 2016). The next sections explore trends in economic welfare of farm workers.

Methodological considerations

This study's research questions are addressed using both quantitative and qualitative data.

Quantitative data and method

The study calculates long-run real wages expressed as welfare ratios. Welfare ratios have been used to analyse changes in welfare over time for different types of workers (see Allen, 2009; Frankema and van Waijenburg, 2012). An advantage of longitudinal wage studies is that the researcher is able to explore under which conditions workers' welfare improves/deteriorates.

To express real wages as welfare ratios, annual wage income (including housing allowance)[3] is divided by annual subsistence costs (Allen, 2009). A ratio higher than 1 indicates that there are welfare gains beyond subsistence, and this can be regarded as a move out of deep poverty. In contrast, a ratio below 1 suggests that the wage cannot afford someone a decent living standard under the stated assumptions. The welfare ratio can be formally expressed as:

$$\text{welfare ratio} = (\text{annual nominal wage})/(\text{annual subsistence costs})$$

To calculate subsistence costs, I follow Allen (2009) and calculate a Basic Needs Poverty Line (BNPL). The BNPL measure includes three categories: food, non-food items, and rural housing. The BNPL method is more advantageous than other poverty lines such as the global 'USD 1.90 per day' World Bank Poverty Line (WBPL), as it allows the use of regional prices, which often vary. For the sake of robustness, where data are available, I compare results using both the BNPL and WBPL. The two methods yield fairly similar results (see Appendix A, Figure 8).

To construct a BNPL, a suitable 'subsistence basket' has to be defined. To do this, I follow the model diet commonly used for African countries (Bolt and Hillbom, 2016; de Haas, 2017; Frankema and van Waijenburg, 2012) shown in Table 1. The diet provides 2,100 calories which is the US Department of Agriculture's standard for assessing food security, as well as the recommended daily intake of protein and fat (Allen, 2009). To price the basket, regional price data from Central Province, the area where most Kenyan workers are employed and where interviews were collected, are used.

[3] Non-wage benefits paid to farm workers have historically comprised of food and housing. In the last decade of colonial rule, the practice of providing food to workers was largely abandoned and wage and non-wage benefits were consolidated. However, housing has remained a common non-wage benefit and is provided in the form of staff houses on the estate premises (commonly referred to as 'labour camps') or as monetary housing allowances (see also Gibbon and Riisgaard, 2014).

Table 1:
The content of the subsistence basket of goods

	Unit	Quantity per person per year	Nutrients (per 0.5 KG)		Nutrients per person per day	
Food items:						
Cheapest of:			Calories	Protein	Calories	Protein
Maize	Kg	188	1,601	42	1,815	48
Millet	Kg	194	1,547	47	1,815	55
Sorghum	Kg	190	1,565	49	1,815	56
Beans	Kg	20	1,510	107	182	13
Beef	Kg	3	522	100	9	2
Cooking oil	Kg	3	4,010	0	73	0
Sugar	Kg	2	1,814	0	22	0
Total					**2,101**	**63-71**
Essential non-food items:						
Cotton	Meter	3				
Soap	Kg	1.3				
Kerosene	Ltr	1.3				
Candles	Kg	1.3				
Firewood/charcoal	BTU	2MBTU				

Source: de Haas (2017), Frankema and van Waijenburg (2012).
Note 1: For nutrition values, I use Latham (1997).

To calculate annual wage incomes, two types of wage data obtained from the Kenya National Bureau of Statistics are applied. The first type of data, available since 1975, is the statutory minimum wages for unskilled farm workers, which is used to construct an 'unskilled wage welfare ratio'. The second type is official minimum wages paid to the highest remunerated group of skilled manual workers (forepersons/clerks), available from 1990-2016. They are used to calculate a 'skilled wage welfare ratio'. Finally, I calculate a 'union wage welfare ratio' using negotiated union wages available from 1997-2015.[4] For further elaboration on the data sources, see Appendix A.

A critical decision when calculating welfare ratios is choosing the appropriate household size. The average household size in Kenya has declined from 5.3 persons in 1969 to 4 persons in 2014 (United Nations, 2017). The workers interviewed had on average five children and one spouse. Although, it is not possible to infer general trends from the sample of informants, it could indicate that farm workers have larger families than the national average. A larger family size will, all things equal, tend to lower economic welfare as there are more mouths to feed.

[4] Union wages, formally referred to as collective bargaining agreements (CBAs), are negotiated between the Kenya Plantations and Agricultural Workers Union, representing the employees, and the employer associations (or directly with the large farm). It is estimated that approximately 61 percent of farm workers are covered by a CBA; see Otieno (2016).

To take into account differences in household size among workers, welfare ratios for three types of households—single adult, small families of four members, and large families of seven members—are calculated. To be clear, it is not proposed that families consist of four to seven members, that families rely only on male members' wages, or that they always consume certain standard food items. In the present study, the goal is to understand how the wage compares with the price of primary consumer goods.

Two data limitations deserve attention. First, by relying on official minimum wages, it is not possible to take into account farm workers who are paid less than what is required by law. The interview data did not suggest that workers were paid below the minimum wage. Still, the measure should be treated as an upper-bound. Second, and related to the previous concern, casual wages are not reported. As mentioned, casual employees are often women and, therefore, the study refers predominantly to permanently employed male workers.[5] Under some circumstances, the findings may apply to permanently employed female workers.

Qualitative data and methods

To deepen the analysis of farm workers' economic welfare, the quantitative analysis is supplemented by life-story interviews of former and current farm workers. During November 2018, I conducted 22 interviews across two counties in central Kenya: Kiambu and Nakuru.

One interview did not fulfil the requirements of internal validity as the informant's answers were inconsistent; therefore, it was not included in the analysis. I conducted voice-recorded interviews lasting approximately one hour. All interviews were first transcribed into Kiswahili and subsequently into English by a bilingual translator. To protect the anonymity of informants, pseudonyms were used.

To capture long-run trajectories of wage employment, I decided to only interview workers who had been employed for a substantial amount of time. Thus, I did not analyse a representative sample of Kenyan workers but a purposively selected sample of workers who had had LSF employment as their major livelihood. To ensure that the quantitative and qualitative data were aligned, only male workers who had been or were

[5] Official data on the size of the casual/seasonally engaged work force in the LSF sector do not exist. According to Dolan and Sorby (2003) and Dolan (2005), employment on large farms in Kenya is becoming increasingly casualised and feminised. In contrast, Gibbon and Riisgaard (2014) find that 79.2 percent of workers employed on 11 cut flower farms in Kenya were permanently employed. According to the same study, men and women had an equal share of permanently employed workers. Ksoll et al. (2011), based on a survey of 74 large farms in Kenya, give a slightly higher mean share of permanent employment of 84.4 percent.

currently employed full-time on a farm were selected for interview. Further, respondents were selected so that their combined employment period would cover the same period as the wage data. Finally, workers were purposively sampled to obtain variations in age, work experience, and socio-economic background. A summarised profile of the informants is presented in Table 2. For a detailed profile including workers' employment period, see Appendix B.

Table 2:
Characteristics of the sample

Age, years:	**Total (n=21)**
40-50	3
51-60	11
61-70	5
71-80	0
81-90	2
Ethnicity	
Kamba	4
Kikuyu	5
Luo	7
Luhya	1
Kalenjin	1
Turkana	2
Other/missing	1
Education	
None	3
Some primary school	4
Primary school (Standard 7/8)	4
Some secondary school	6
Secondary school (Form 4)	3
Higher education	1
Employment status	
Currently employed	10
Left estate/plantation and work in other profession	1
Formally retired but work as casual labour	4
Retired	6

The interview data were analysed in several steps. First, I explored the life trajectories of workers. All interviews were summarised into a précis and a life trajectory pattern was drawn.6 In the second step, all interviews were re-read and coded using Nvivo software. A thematic analysis was conducted where the interview text was closely examined to identify commonalities and differences among the workers (Charmaz, 2006; Riessman, 2011; Smith, 2011). Codes were then developed in a partly structural manner, based on the study's research question, and a partly inductive manner, where codes were constructed as they arose from the raw data. Initial coding was developed where a vast number of codes were defined. Next, in an iterative process each code was placed under more narrow categories until a final coding scheme had been developed. For initial and final coding scheme, see Appendix C.

Can wages lift workers and their families out of poverty?

To explore trends in economic welfare, agricultural real wages are first examined. For a single adult, unskilled wages offer substantial welfare gains beyond subsistence as the unskilled minimum wage is, on average, three times higher than the subsistence cost (Figure 3). There is a rather large skills premium, as a single skilled worker receives wages almost 1.5 times higher than those of unskilled workers. For the few years for which data are available, the union welfare ratio is similar to the unskilled welfare ratio, perhaps indicating the limited bargaining power of the union.

[6] To conceptualise the life trajectory patterns, I follow Davis (2006) who has used a similar method to analyse chronic poverty among Bangladeshi households. In this case, 'trajectory' refers to one's life trajectory while working.

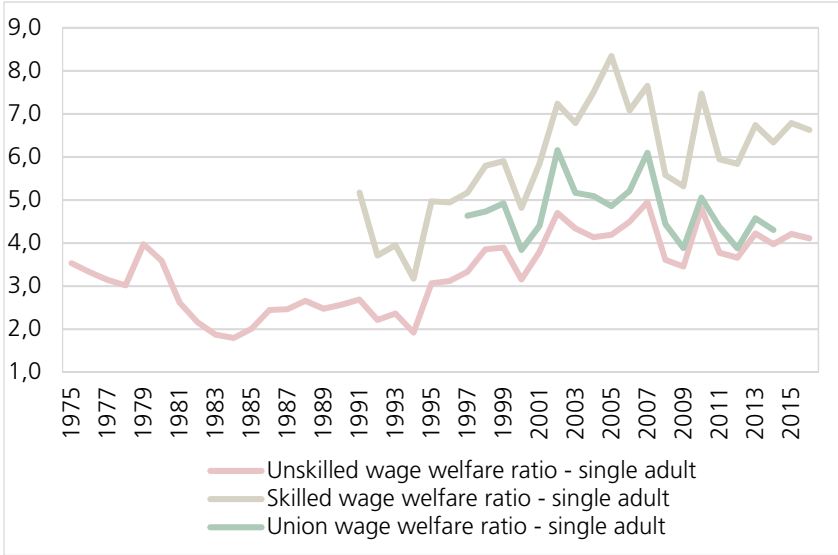

Figure 3: Welfare ratios 1975-2016 – Single Adult
Source: see Appendix I and II for a detailed description of data sources.
Note 1: the welfare ratios are calculated using the statutory minimum wage, the minimum wage paid to foremen/clerks, and the negotiated Collective Bargaining Agreement (CBA) wage.
Note 2: the assumed daily intake of calories used to calculate single adult welfare ratios is 2,780 (the recommended WHO intake for an adult male engaged in moderate work).

For small households, the unskilled welfare ratio is below or close to 1, implying that a worker is barely able to sustain a family at a bare-bones subsistence level (Figure 4). For large households, the unskilled wage is, for the most part, unable to cover a family's basic needs (Figure 5).

Yet, there are important cyclical patterns that deserve attention. In 1980–1996, the welfare ratios for small and large families fall below 1. This decline has serious implications as it implies that a worker can no longer sustain a family at a decent standard of living. After 1996, the ratio improves. For smaller households, the increase in wages is large enough to provide small welfare gains above subsistence. However, for large households, the improvement is generally insufficient to offer more than the ability to survive.[7]

[7] As previously stated, the welfare ratio does not take into account any income earned by the spouse. Hence, the true welfare of the household is not reflected in this measure. Instead the ratios should be treated as a comparison of nominal wages of one adult to the price of primary goods.

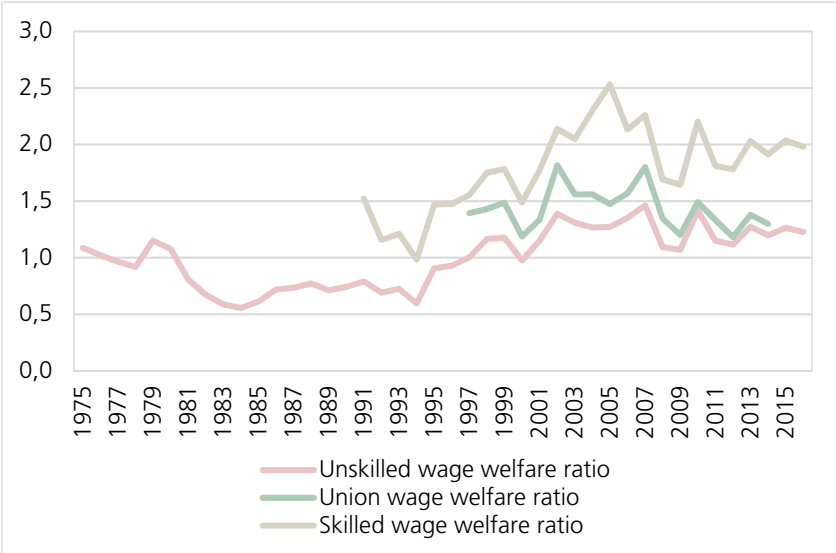

Figure 4: Welfare ratios 1975-2016 - Small Household
Source: see Appendix I and II for a detailed description of data sources.
Note 1: the welfare ratios are calculated using the statutory minimum wage, the minimum wage paid to foremen/clerks, and the negotiated Collective Bargaining Agreement (CBA) wage.
Note 2: the assumed daily intake of calories used to calculate small family welfare ratios is 8,400.

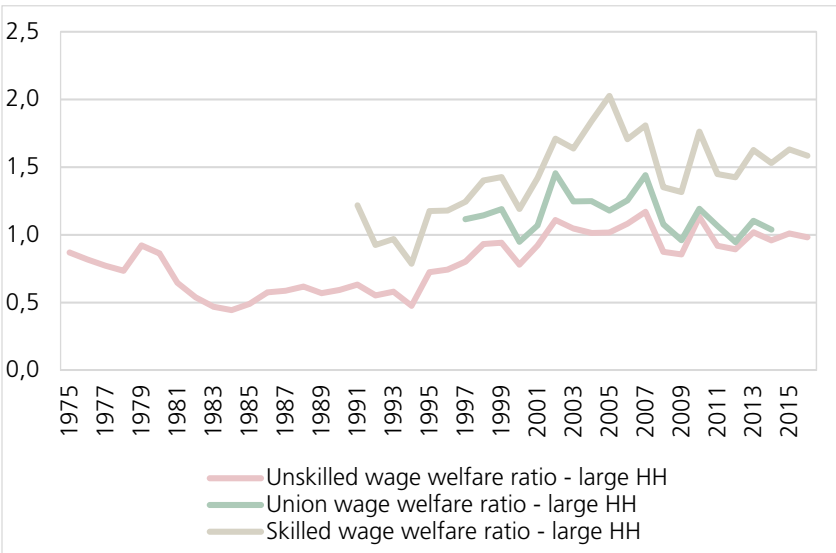

Figure 5: Welfare ratio 1975-2016 - Large Household
Source: see Appendix I and II for a detailed description of data sources.
Note 1: the welfare ratios are calculated using the statutory minimum wage, the minimum wage paid to foremen/clerks and the negotiated Collective Bargaining Agreement (CBA) wage.
Note 2: the assumed daily intake of calories used to calculate small family welfare ratios is 10,500.

The issue of low wages was expressed several times in the qualitative interview data. Amos, an unskilled coffee farm worker, reiterated the general grievance that wages were not enough to afford important family items such as school fees:

> 'So life right now is still tough. It is still tough! The cost of things is high but what I earn is little because, for instance, the amount of money [I earn] is like 300 shillings and something a day, or maybe 400 shillings. Now, if you consume breakfast, lunch, dinner, and other things like transport and clothing, we would probably say that kind of money is only enough for a single person. And if you have a family, school fees and other things have to be paid but you can't afford them'.

Families of skilled workers are better off. During 1991–2016, the average welfare ratio for skilled workers with small families was almost double the subsistence costs. For workers with large families, the ratio was 1.4, indicating modest welfare gains.

The wage is the overarching factor directly determining workers' economic welfare. It is therefore imperative to understand under which conditions wages rise/fall. To investigate wage movements, I return to the analytical model. According to neo-classical economic theory, the wage will be governed by movements in labour productivity in the LSF sector. However, if there is an abundance of unproductive labour in rural areas, the wage will be fixed at a level close to subsistence. In Figure 6, labour productivity for the entire LSF sector, proxied by the average value of inflation-adjusted output per worker, is compared with the real minimum wage.[8]

[8] The value of output for the entire sector comprises traditional LSF crops such as coffee and sisal and newer LSF crops such as flowers and vegetables.

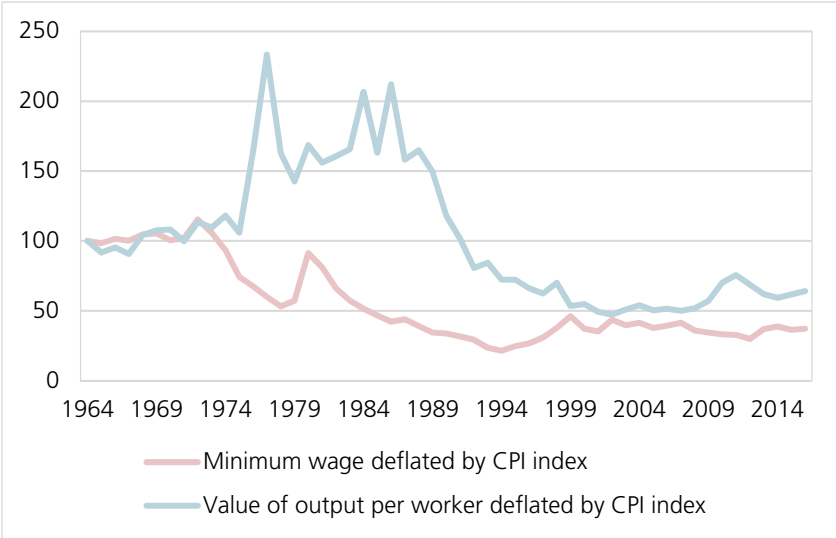

Figure 6: Value of output per worker on large farms and minimum wage indices, 1964-2016
Source: Employment data are taken from annual Statistical Abstract and Economic Survey. Value of large-scale farm production, which is based on data derived from marketing boards, is taken from Statistical Abstract. The annual reports are available online at Kenya National Bureau of Statistics webpage (https://www.knbs.or.ke/) last accessed 08.10.2019.
Note 1: To account for rapid inflation in the time period, both series are deflated by Consumer Price Index (CPI). The base year is 2009.

From the 1970s to the 1990s, the real output per worker was fairly high, but wages fell drastically to levels below subsistence, allowing large farm owners to raise their profit share. The divergence was likely caused by a worsening in smallholder earnings from the late 1970s (Karugia *et al.*, 2010; Nyoro *et al.*, 1999). As previously discussed, if average smallholder agricultural earnings fall, the labour surplus in rural areas rises, which puts a downward pressure on wages. This trend was likely exacerbated by political factors. A large urban-farm wage differential existed as the Industrial Court accepted that only a small farm wage increase was sufficient (Leys 1975).

From the late 1980s, value of output in the LSF sector fell. This fall can largely be attributed to price declines in traditional LSF produce—coffee and sisal (Figure 7). Sisal prices had started to fall from the 1960s as new synthetics were introduced. In addition, from the mid-1980s and onwards, coffee prices fell below the 1975-level. Horticulture production has risen in the period, yet the expansion does not appear to offset the losses suffered to traditional LSF crops.[9] However, the decline in the production of traditional export crops did not cause a collapse of the real wage; perhaps

[9] Horticulture production increased from 49.000 tons in 1990 to 304.000 tons in 2017. Data is retrieved from Economic Survey. The annual reports are available online at Kenya National Bureau of Statistics webpage (https://www.knbs.or.ke/) last accessed 08.04.2020.

due to the increased demand for labour in the horticulture sector, real wages increased slightly and the gap narrowed.

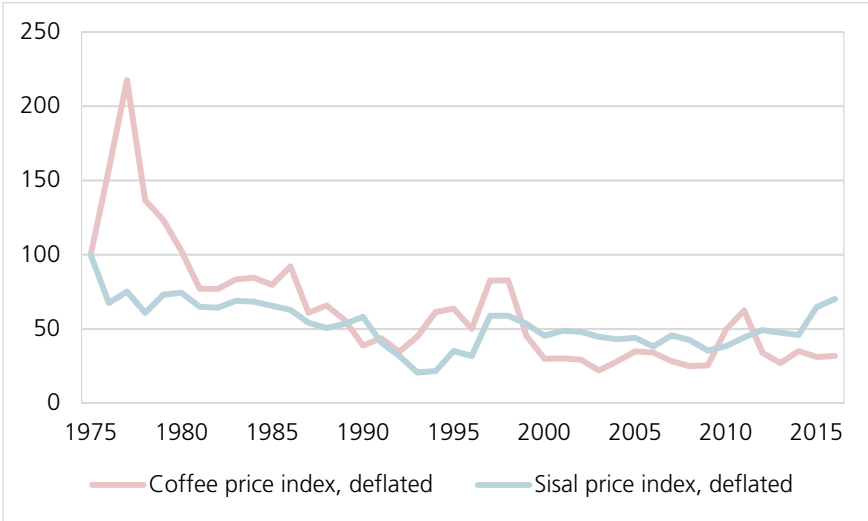

Figure 7: Coffee and sisal price indices, 1975-2016
Source: Sisal and coffee price data are taken from Economic Survey. The annual reports are available online at Kenya National Bureau of Statistics webpage (https://www.knbs.or.ke/) last accessed 08.04.2020.
Note 1: To account for rapid inflation in the time period, both series are deflated by Consumer Price Index (CPI). The base year is 2009.

To summarise, due to low productivity in the smallholder sector, the rural labour surplus was high, leading to low minimum wages. These wages were unable to offer unskilled workers and their families' welfare gains above subsistence. A drop in smallholder per capita earnings caused a severe decline in wages; they could no longer sustain a family at subsistence.

In the years for which data are available, skilled workers have been able to obtain substantial welfare gains from wages. It is likely that the skills premium has been caused by the shift to horticulture production, which has professionalised production, causing a rise in demands for semi-skilled and skilled workers (Dolan, 2005; Gibbon and Riisgaard, 2014).

Poverty dynamics in LSF employment

To complement the findings from the real wage analysis, I analyse the data collected in the life-story interviews.

Despite the heterogeneity among the workers interviewed, the workers exhibit certain commonalities. Except for two cases, all workers interviewed come from a poor background and are sons of either subsistence farmers or, as was the case of eight workers, former farm workers. All workers had families; however, in one case the worker had no surviving children.

Migration is a salient feature of many of the workers' life trajectories. Minimum wages paid to unskilled workers in Nairobi are much higher than those paid to unskilled agricultural workers.[10] One-third of the workers had been aware of the gap and had initially migrated to Nairobi to attempt to obtain a job with a better wage. However, life in Nairobi was described as hard due to difficulties finding a job and the high cost of living, and seeking work on a large farm had become a way to escape hardship.

Life trajectories

To elucidate the poverty dynamics in farm employment, I conceptualise each worker's life trajectory into direction and level. Trajectories are categorised into improving, stagnant, and declining directions at small, small-medium, or large levels, where the variable changing is economic welfare. To explain differences in trajectories, a second step is included in the analysis where factors which differentiate workers' life trajectories are considered. Farm workers are not a homogenous group and the analysis reveals four types of life trajectories: small improvements, small-medium improvements, large improvements, and stagnation. The predominant life trajectories are presented in Table 3.

[10] In 1991–2017, the wage gap was, on average, 59 percent.

Table 3:
Predominant life trajectories of the sample

Direction	Level	Description	Total (n= 21)
Improve	Small	Small increase in economic welfare due to e.g. a small salary increase, using the wage/employment to make small investments in housing (on parents'/borrowed land), and/or investments in children's education. The worker is dependent on a low wage income for subsistence.	6
	Small-medium	Small to medium increase in economic welfare due to e.g. a small salary increase, using the wage/employment to make small investments in land, livestock, or a small business, and/or investments in children's education. The worker is generally dependent on the wage for subsistence. However, the worker might be able to supplement the low wage with smaller incomes from one or few other income sources.	8
	Medium	Medium increase in economic welfare due to e.g. a small salary increase, using the wage/employment to make small investments in land, livestock, or a small business, and/or investments in children's education. The worker recieves a wage above the poverty line and/or derives a total income above the poverty line by combining several income sources.	0
	Large	Large increase in economic welfare either due to e.g. a large salary increase, large investments in land, livestock and/or other productive assets, and investments in children's education. The worker recieves a wage that corresponds to a managerial position and/or derives a total income that corresponds to a managerial wage by combining several income sources.	1
Stagnant		Employment has offered no overall change in economic welfare. Stagnantion is witnessed by e.g. an inability to invest in land, housing, livestock or children's education. The worker is highly dependent on a wage income for survival.	6
Decline		A decline in economic welfare due to for instance chronic illness or death. The worker is highly dependent on a wage income for survival.	0

None of the informants experienced an overall pattern of decline, tentatively confirming the findings in the wage analysis. The wage, generally offering a worker sufficient means to survive, may act as a buffer, preventing long-term declines, provided a worker is capable of working full-time. Most informants (14) experienced a small- to small-medium-sized improvement in economic welfare while working. Only one worker experienced a large improvement. A smaller number of workers (6) experienced a stagnant life trajectory and, in three of the six cases, both the parents and children of the worker had been employed on large farms, revealing an intergenerational pattern of farm employment and poverty. From a further examination of the life trajectories, two distinct types of workers emerge: asset-poor workers and asset accumulators.

Workers interviewed with stagnant trajectories fall into the typical description of a proletariat. This group of workers, which I call 'asset-poor workers', have not been able to acquire productive capital while working. Over generations, these workers have been employed on large farms. For this group, of which the majority (four out of six) are landless, wage work provides a means of survival, but not much more. The other group of workers—the asset accumulators—have all experienced some degree of improvement in economic wellbeing and have been able to slowly move out of deep poverty.

Factors associated with improvement/stagnation

Important factors that determine success/failure among workers in the sample include initial livelihood resources, salary increases, and asset accumulation. These factors are presented in Table 4 and explained in detail below. A worker is sometimes counted twice if he has, for instance, inherited land and also rents land.

Table 4:
Factors associated with improvement/stagnation

Factors:	Total (n=21)
Education (above primary school)	10
Salary increase:	5
Asset accumulation:	
Land:	
Buying land	10
Inherited/lives on parents land	7
No land	4
Rent-in land for farming	3
Building house	14
Livelihood strategies:	
Livestock (for sale and own consumption)	8
Sales of food crop	6
Other business	3
Loans	9

Initial livelihood resources

Workers' initial livelihood resources seem to condition their ability to use employment to move out of deep poverty. A way in which initial resources impact outcomes of the workers interviewed is rooted in human capital formation, measured by the level of education a worker received during childhood. For some workers, poverty during childhood resulted in their receiving none or only a few years of primary school. Workers with low education levels have all experienced stagnant trajectories, suggesting that education plays a large part in being able to take advantage of opportunities. The link between poverty and education appears to be intergenerational, as the six workers

with stagnant trajectories were unable to send their children to school beyond primary school (except for one case, where one son had studied to Form 4 (high school)).

Salary increase

As discussed in the analytical framework, assets/capital play a crucial role in successfully employing a given livelihood strategy.

Agricultural wages are not uniform, and the skills premium depicted in Figure 3 is also evident in the interviews. Receiving a higher wage is associated with moving out of poverty. All informants were initially employed as casual workers and, as required by law, all informants had, at one point, been promoted to permanent staff. Many of the workers currently have supervisory roles due to their years of experience. However, a promotion to permanent staff—or even to supervisor—does not drastically increase the wage and is not enough to ensure improvement in welfare. However, this is not the case for five workers who, due to their relatively higher level of education, had been promoted to positions above supervisor level and whose wage had doubled. Daniel, a flower farm worker with a high-school certificate, explains how a higher level of education can help in being promoted:

> '[The management] then began to ask me because they wanted someone who could scout. I asked, 'what is a scout?' They told me it is a person who can look after the flower and give us a daily report, from planting, to its growth, to when it was pinched, and till it reaches harvesting level. They said that they wanted an educated person. They didn't want to recruit someone from outside. I told them that I was educated. He then told me to go and bring my high-school certificates. So, I brought the certificate and gave it to them in 2014 and they [promoted me]'.

Asset accumulation

The life stories of the workers interviewed suggest that economic and natural assets also play a vital role in being able to transform LSF employment into a successful livelihood strategy.

Land: Land, especially, is an important enabler of asset accumulation. Land overlaps, to some extent, with other categories such as livestock and livelihood strategy. For the workers I interviewed, obtaining access to land was associated with improvement, except in two cases. Most stories of improvement (11) show employment being used as a means to acquire natural assets by renting and/or buying land. As explained by a former worker John, who obtained access to land, having land opens up possibilities that are not available when living in the staff houses on large farms:

> '[If you have land,] you can make developments there; it opens up your mind. You can build, keep poultry; you can buy a cow if you want. But at the [staff houses] you couldn't do any of that; there was no space for it'.

Alvin, a 68-year-old retired worker, explains how he rented a small parcel of land in the 1970s, which helped him acquire economic capital to start a process of accumulation:

> 'I used to hire a farm outside [the labour camp]. I grew maize, beans, and vegetables. The land enabled this. The money that I used to get from the estates I would keep in an account I had opened at the post office. Now, I would put money in the account at the post office. Food I would get from the farm [I hired], and we ate. So, the money I had put aside enabled me to educate the children and even to buy a plot of land, and to pay dowry for my wife'.

Land also serves as an important protective asset, which is why many workers have been motivated to acquire land. Workers with access to land have used their wage income to build small houses. This provides the worker with a place to retire, making him less dependent on employment for survival, whereas landless workers have to continue to work after retirement. Michael, a 55-year-old worker, when asked why he chose to return to wage work after having initially stopped working, he replied:

> 'Because of challenges. Because I don't have my own land to live on. Because I depend on the salary I get. I buy food and pay rent. But I am not renting now; the boss gives me a place to stay. He has helped me out'.

Access to land is associated with the ability to obtain economic capital in the form of credit and savings schemes. To buy land, some farm workers have used their wages to pay monthly contributions to Savings and Credit Cooperative Societies (SACCOs).

However, the historical context also conditions the ability to acquire land. The aforementioned resettlement schemes introduced in the 1960s and 1970s enabled workers to buy plots of one to two acres by paying relatively small fees to cover land surveying and titling. Yet, in recent years, the resettlement schemes have been discontinued and the ability to access land in the fertile regions of Kenya has become limited. To cite an example, George, a 44-year-old worker who is currently employed describes how he hopes to buy land through savings schemes provided at his workplace:

> 'Like right now, in our company we have a SACCO. In that SACCO, we normally save and you are given a loan three times your shares. Like right now, you see, I always tell myself that if I can get my shares to reach [KSh] 100,000, times three that would be [KSh] 300,000. I can look for a small plot of land; even if it is a quarter of an acre, I will buy it'.

George currently earns KSh 16,000 a month, a wage higher than the minimum wage, and he is able to save KSh 2,000 monthly. Still, it will take him a minimum of four years to reach the deposit required to obtain a loan, and several years afterwards to pay off the loan for a plot of one-quarter of an acre.

Although land is an important driver of change, it is not a sufficient factor. In the above-mentioned two cases where land did not lead to an improvement, the workers experienced stagnation despite having inherited land from their parents. Access to land did not enable them to start a process of accumulation, perhaps indicating the difference between actively investing in land versus gaining access to ancestral land, which is often of lower quality.

Livelihood strategy: A livelihood strategy is another important subcategory of asset accumulation. Asset accumulation expands a worker's livelihood resources. In doing so, possibilities for successfully combining several income sources into new livelihood strategies open up. None of the workers with stagnant life trajectories mentioned having had any alternative income sources while working. However, workers who have seen improvements combine several income streams. Eight of the workers who have bought land use family labour to run small rural enterprises selling farm produce and/or livestock. Other combinations of livelihood strategies include using wages to buy used clothes to sell, and producing manure to sell. In one case, employment enabled income diversification that, over time, caused large improvements. Martin, a former worker, was initially employed as a casual labourer on a flower farm. While working, he was able to use his wage, combined with skills he obtained, to source flowers from smallholders and sell them to large farms. Currently, Martin manages his own flower farm in Limuru, employing more than 100 workers. Still, this example is rare and interviewed workers' livelihood strategies typically lead to only small improvements.

The life stories seem to confirm the quantitative result that unskilled workers who rely solely on LSF employment do not move out of poverty. Among the workers sampled for interview, there is evidence that employment offers survival at a subsistence level, but not much beyond that. However, for a particular group of workers interviewed, employment offers an escape from deep poverty indirectly and over time, through a gradual expansion of livelihood resources and the combination of new livelihood

strategies. The difference between success and failure appears to be rooted in initial life resources, where especially the level of formal education is critical.

Concluding remarks

In sub-Saharan Africa, relying solely on smallholder agriculture no longer serves as a route out of poverty, and combinations of farm and off-farm income sources are becoming increasingly more important. One potentially pivotal off-farm income source is rural wages. In eastern and southern Africa, large farms have served as an important rural job creator since the colonial era, employing more workers than mining and manufacturing. With a recent surge in investments in commercial agriculture and a rise in employment, the sector has become even more relevant to study, from a rural development perspective. Despite this, academic studies on the poverty reduction potential of the sector remain scarce. To fill important gaps in the literature, the present study explores historical trends in farm workers' economic welfare. To achieve this, a time series of welfare ratios was constructed. Welfare ratios have poverty implications as they express the wage in comparison with subsistence costs. To complement the quantitative data, qualitative life-story interviews of current and former farm workers were conducted.

The findings offer insights that can enrich contemporary rural development debates. Employment on large farms by itself cannot lead to general poverty reduction. Minimum wages are low and barely cover subsistence needs for a farm worker and a family. This finding was confirmed by a smaller sample of life story interviews. The life stories suggested that workers who rely solely on wage income remain poor and, for them, wage work serves as a survival strategy. However, workers who could use LSF employment as a base to acquire productive assets, had been able to move out of deep poverty. One group of workers, whom I call asset accumulators, have used permanent employment as a route to accumulation. Having a steady wage enables workers to access economic capital, often in the form of loans or saving schemes. Capital is used to invest in land and thereby start a slow process of accumulation by combining farm and off-farm incomes. The asset accumulators, however, have not become members of a rural elite but have instead slowly rebuilt a subsistence fall back: a way to restore the means for survival. Workers with higher levels of education are most likely to have pursued this more complex diversification where wage income is combined with smallholder agriculture.

The historical trends in real wages and the life story interviews indicate that an expansion of the commercial sector has some potential to enable wider poverty

reduction for workers who are able to invest wage incomes in, for instance, smallholder agriculture. This finding has implications for the conventional small-versus large-scale farm debate as the question of interest should not be optimal farm size but instead how different farming models may co-exist.

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The data that support the findings of this study are available from the corresponding author upon reasonable request.

Appendix A: Data sources and methods

A concern when collecting and constructing time series is missing data. Where data is missing, a method commonly applied in economic history literature is used. Log-linear growth rates are calculated for the variable that contains missing information and then used to extrapolate missing data. Formally, the log-linear growth formula can be expressed as:

$$\log growth = ln\left(\frac{y_n}{y_1}\Big/_n\right)$$

Wages

Three types of wages are applied: minimum wages for unskilled workers, minimum wages for skilled workers, and Collective Bargaining Agreement (CBA) wages (also referred to as union wages in the paper). In the study, real wages are only calculated for years where data were available. Minimum wages for unskilled farm workers are available for the entire period 1975-2017. Minimum wages for skilled workers are available from 1990-2016 and union wages are available from 1997-2015.

The minimum wage paid to unskilled workers is set by the Agricultural Act. Data on 'unskilled' minimum wage are taken from Statistical Abstract 1975-91 and Economic Survey 1991-2017. Minimum wages paid to skilled workers are available from 1991-2017 and are reported in the Statistical Abstract.

The Economic Survey and Statistical Abstract are available online at the Kenya National Bureau of Statistics (KNBS) database retrieved from https://www.knbs.or.ke/ (last accessed 26 September 2019). CBA wages are taken from Anker and Anker (2017).

As mention in Section 4, housing allowances are included in the total wage income measure. Mandatory housing allowances paid to farm workers are taken from Statistical Abstract for the years 1975-1982, 1988-1990, and 1997-2003. Missing years 1982-1988, 1991-1996 are extrapolated using the log growth rate in housing allowances. Years 2003-2018 are extrapolated using the log growth rate in the minimum wage.

Rural prices

Rural retail prices are collected from the Economic Surveys, the Economic Indicators, and from a private archive at the KNBS. The private archive is accessible upon formal

request at the KNBS head quarter located in Nairobi, Kenya. The Economic Indicators are available online at https://www.knbs.or.ke/, last accessed April 9 2020.

All prices are retail prices from Central Province where the majority of farm workers are employed. For years where rural retail prices are missing, I extrapolate the series using the log growth trend in urban prices. Urban retail price data are available in the Statistical Abstract. The method relies on the assumption that the relationship between rural and urban prices is stable. A check was performed for the years where price data was available for rural and urban areas and the trend appeared stable.

Maize and beans

Rural price data for maize and beans are available for the years 1977-2017. Years 1977-1986 are taken from the KNBS private archive, years 1986-2011 are taken from the Economic Survey, and years 2011-2017 are taken from the Economic Indicators annual reports. To extrapolate rural prices from 1975-1977, I use log growth in urban prices.

Meat, sugar, cooking fat, kerosene

Rural price data for meat, sugar, cooking fat, and kerosene are taken from the KNBS private archive for the years 1977-1994. I use log growth in urban prices available in the Statistical Abstract to extrapolate rural prices from 1975-1977 and 1994-2016.

Charcoal & cotton cloth

Rural price data for charcoal and cotton cloth are not available. To implement a solution, I use urban price data available in the Statistical Abstract. A decision which might slightly underestimate true costs. For charcoal, years 1991-92 are extrapolated using a log-linear formula.

Soap

Rural price data for soap are taken from the NBS private archive. Data are missing for the years 1975-92. To extrapolate data, I use the average log growth rate for non-food items.

Candles

Rural and urban price data for candles are not available. To implement a solution, I follow the literature and raise the cost of the subsistence basket by 2.5 percent.

Comparing 'subsistence' levels

The method used to calculate subsistence level has influence on the assessment of workers' economic welfare. As a robustness check in Figure 8, the Basic Needs Poverty Line (BNPL) measure used to calculate welfare ratios is compared to the predominant '1.90 USD per day' World Bank Poverty Line (WBPL). Welfare ratios using both measures are calculated for small and large household sizes.

Purchasing Power Parity (PPP) exchanges rates are used to convert USD to Kenya Shillings. The PPP exchange rates are available from 1991 to 2016. The PPP data are retrieved from the World Bank database (data.worldbank.org) last accessed 7 April 2020.

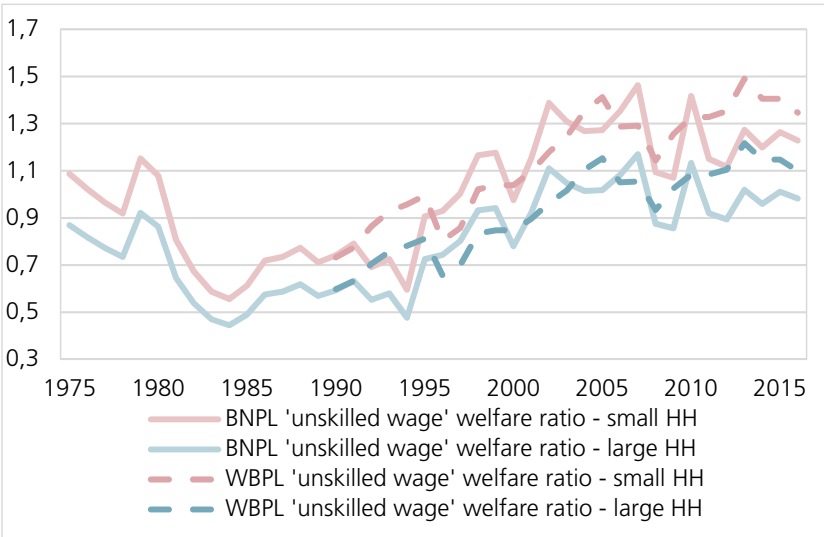

Figure 8: Comparing 'subsistence' level: welfare ratios using BNPL and WBPL
Note 1: the welfare ratios are calculated using the statutory minimum wage paid to unskilled workers.

Value of output large-scale farming sector

The value of output on large farms is calculated by dividing an index of inflation-adjusted value of large-scale farm production by an index of total number of workers in large-scale agriculture. Employment data, which is available for all years 1964-2017, is taken from annual Statistical Abstract and Economic Survey. Value of production in the large-scale farming sector, which is available for all years 1964-2017, is taken from annual Statistical Abstract. To account for rapid inflation in the time period, the series are deflated by Consumer Price Index (base year is 2009).

Appendix B: Overview of informants

Name	No	Age	Gender	Interview place	Sector	Main occupation	Local/Migrant	Employment period	Education	Life trajectory
'Jeff N'	1	53	M	Ol Banata area, Nakuru county	Coffee	Supervisor	Local	Early 1980s – today	Form 4	Small improvement
'Frederick N'	2	53	M	Ol Banata area, Nakuru county	Coffee	Supervisor	Local	Early 1980s-today	Standard 7	Small improvement
'Jeff K'	3	67	M	Solai, Nakuru county	Coffee	Retired farm worker	Short-distance migrant	1957 – 2008	Standard 4	Small-medium improvement
'Benson O'	4	65	M	Solai, Nakuru county	Coffee	Retired farm worker (but returned to work as casual labour).	Migrant	1970 – today	Standard 4	Stagnant
'John L'	5	50	M	Solai, Nakuru county	Coffee	Self-employed as a stonecutter (worked 7 years on coffee farms)	Migrant	1991-1998	Standard 8	Small improvement
'Michael C'	6	50+	M	'Kwa Nyayo', Nakuru county	Flower and coffee	Watchman on coffee farm	Migrant	1969-today	No education	Stagnant
'Meshack A'	7	90	M	Solai, Nakuru county	Coffee	Casual labour on coffee farms	Migrant	On and off since late 1960s	No education	Stagnant
'Mwalimu'	8	50	M	Yadini area, Kiambu county	Coffee	Watchman on coffee farm (started as a general worker)	Short-distance migrant	1980s – today	Standard 5	Small improvement
'David O'	9	55	M	Ruiru, Kiambu county	Coffee	Retired farm worker (but returned to work as casual labour).	Migrant	1986-today	Primary school	Small-medium improvement
'Alfred N'	10	50	M	Juju, Kiambu county	Coffee	Retrenched in 2002. Now runs a small nursery.	Short-distance migrant	1980s-today	Form 4	Small-medium improvement
'Shadrack K'	11	50	M	Ruiru, Kiambu county	Coffee and flower	Started as casual labour and was promoted to senior supervisor.	Short-distance migrant	1990-today	Form 6	Small-medium improvement
'Kelvin O'	12	63	M	Ruiru, Kiambu county	Coffee	Retired farm worker	Migrant	1990-2018	Standard 8	Stagnant

'Maina M'	13	80+	M	Murera, Kiambu county	Coffee	Retired farm worker	Short-distance migrant	Late 1950s	Secondary school	Small-medium improvement
'Amos M'	14	59	M	Ruiru town, Kiambu county	Coffee	Watchman on coffee farm	Short-distance migrant	2000-2018	Form 2	Small-medium improvement
'Daniel O'	15	42	M	Juja town, Kiambu county	Flower	Shop steward on flower farm	Migrant	2005- today	Form 4	Small-medium improvement
'Reagan K'	16	54	M	Naivasha town, Nakuru county	Flower	Supervisor on flower farm	Migrant	1998 –today	Form 4	Small-medium improvement
'George W'	17	45	M	Ruiru town, Kiambu county	Coffee, khat and vegetables	Supervisor of watchmen on coffee farm	Local	Early 2000s – today	Form 2	Small improvement
'Absalom M'	18	63	M	Karieta estate staff house, Kiambu county	Coffee	Retired farm worker (now casual work as a watchman in town).	Migrant	Early 1980s – 2015	No education	Stagnant
'Alvin A'	19	68	M	Karieta estate staff house, Kiambu county	Coffee	Retired farm worker (now casual work and farming).	Migrant	1986 – today	Standard 7	Small-mediumimprovement
'Collins M'	20	52	M	Juja town, Kiambu county	Flower	Irrigation worker on flower farm.	Local	Mid-1970s – today	Standard 3	Stagnant
'Martin O'	21	50+	M	Jason Garden's in Limuru, Kiambu county	Flower	Owns and manages flower farm (started as casual labour).	Migrant	1990 – today	Form 2	Large improvement

Paper III

Are Women-headed Households Moving out of Poverty? Income Diversification and Gender in Rural Kenya*

Abstract

Limited knowledge exists on how gender enables or disables income diversification and on the medium to long-run rural change associated with women's diversification. In light of this, the present article presents an analysis of women-headed households' income diversification. Using a longitudinal dataset from Kenya, the study finds widespread regional differentiation in diversification patterns and poverty rates among women. Women who combine high value-crop cultivation with off-farm income have seen poverty rates far below the national average. At the other end of the spectrum, women heads who rely heavily on maize cultivation or who derive large income shares from off-farm activities have high poverty rates. The difference between success and failure appears to be rooted in complex combinations of agro-ecological, socio-economic, and historical factors.

Keywords: gender, income diversification, rural development, Africa

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Introduction

A trend in sub-Saharan African countries since the turn of the Millennium has been the 'feminisation of agriculture'. Prior to Boserup's (1970) seminal work, little had been written on women in agriculture in developing countries, and literature assumed women's role to be 'passive', limited to assisting the male farmer.[1] Since the structural adjustment era, however, women have increased their engagement in smallholder agriculture as numerous men have out-migrated, leaving women as the de facto heads of household (Bryceson 2018).

Another striking feature of rural change in Africa is the growing prevalence of rural livelihood or income diversification.[2] To sustain or improve their livelihoods, rural peoples engage in numerous farm and off-farm activities. Despite the recognition that many rural women have become the sole breadwinners for their families, longitudinal studies of women and income diversification remain scarce (Alobo Loison 2015).

Liberal feminism and 'political economy'-inspired literature have, nonetheless, made impressive attempts to uncover the rural change associated with women's income diversification (see e.g., Bryceson [1995b]; Elson [1994]; Palmer [1988]; Razavi [2009]; Whitehead [2009]; Whitehead and Kabeer [2001]). Here, the prevailing interpretation of women's[3] diversification is pessimistic. It has been argued that women-headed households have a precarious foothold in agriculture, which is caused by their constrained access to agricultural resources such as land and labour. A vicious cycle has been described in which diversification leads to poverty, which then necessitates further diversification (Bryceson 1995a; Whitehead 2009; Whitehead and Kabeer 2001).

A concern with the abovementioned studies and gender and development literature in general is the tendency to portray women-headed households as a homogenous entity; they are often lumped together in one group said to represent the 'poorest of the poor'. Accordingly, while a growing body of literature has documented the existence of gender

[1] Exceptions include a few historical studies such as Roberts (1968), who described how women in the 19th century already increased their labour time in agriculture to replace the labour power lost as men migrated in search of work. Similarly, Robertson (1997a, 1997b) portrayed women's active role in short- and long-distance trade during the pre-colonial era.

[2] Income diversification can be defined as 'the process by which rural families construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standard of living' (Ellis 1998: page 4).

[3] Although women and women-headed households are not synonymous, for simplicity, the terms 'women-headed households', 'women heads', and 'women' are used interchangeably in the text to describe the situation of households headed by women.

income gaps (Appleton, Hoddinott, and Krishnan 1999; Baliamoune–Lutz and McGillivray 2015; Posil and Rogan 2009; Quisumbing and Pandolfelli 2010; Whitehead 2009; Whitehead and Kabeer 2001), less attention has been paid to differentiating among women-headed households.

A rare exception is the Policy for Equity in African Agriculture (AFRINT) research project led by Agnes Andersson Djurfeldt. It shows that women-headed households' income diversification and outcomes are highly context-specific and distinguished by regional characteristics (Andersson Djurfeldt 2017; Andersson Djurfeldt, Djurfeldt, and Bergman Lodin 2013). Yet, due to the large number of case studies and the stated desire to offer a vast empirical account, the project does not explore in detail the underlying factors leading to regional variation, and nor does it tie women's income diversification to wider rural development trajectories.

Using a longitudinal dataset from Kenya, the present article builds on the work by the AFRINT project and explores both national and regional trends in women-headed households' income diversification. The study makes two contributions. First, through explicitly relating micro-level evidence to debates about long-term shifts in rural economies, this study addresses a void in the livelihood literature, where micro-level studies are seldom connected to wider questions about agrarian change.[4] Second, drawing on a detailed case study, the present study elucidates the factors that underpin the witnessed regional variation among women.

The article's findings offer insights that challenge the predominant conceptualisations of rural livelihoods. First, women heads are not a homogenous group. Despite previous claims that women have a weak foothold in agriculture, the current study finds that a group of women have been able to orient their livelihoods towards agriculture and derive incomes far above the poverty line. They achieve this through intensive land use (i.e., applying more fertiliser and labour to smaller farms) and the marketing of high-value crops. Meanwhile, another group of women are dependent on maize cultivation; although they pursue an agriculturally based diversification strategy, their poverty rates are above the national average. Thus, it is questionable whether they will be able to remain in agriculture. A third group of women heads residing in low-potential agricultural areas have diversified to off-farm activities. The return on off-farm activities is low, and their shift away from agriculture is associated with high poverty rates. In summary, although some women heads have successfully diversified towards commercial agriculture, for the majority the rural change associated with increased

[4] For critiques of livelihood studies' inability to relate micro-level evidence with theories of agrarian change, see Fine (2002); Mueller (2011); Pontara (2010); Scoones (2009); Toner (2003); and Whitehead (2002).

income diversification seems likely to result in a shift away from smallholder agriculture and higher poverty rates.

Second, contrary to conventional wisdom, the present study finds that social cleavages aside from gender have an impact on rural inequality. Regional inequality levels are high. Despite this, in the majority of regions (five out of eight), gender-income gaps are small and not statistically different from one another. In these regions, the rural change associated with women-headed households' diversification follows a similar trend to that in the general population.

The findings have implications for the smallholder-based theories that dominate contemporary rural development thinking.[5] Aside from the differentiation that arises due to gender, rural households are typically conceptualised as fairly homogenous (for similar critiques, see Bernstein [2010a]; Cousins [2013]; Oya [2010, 2007]; Peters [2004]; Whitehead [2002]; and Wiggins [2000]).[6] By contrast, this study shows massive regional differentiation, which affects both men *and* women.

Consequently, while there is a need to focus on gender income gaps (because three out of eight regions show significant gaps), conventional smallholder theories must also consider the social factors besides gender that lead to smallholder differentiation. A failure to incorporate smallholder differentiation into theories and policies will have implications for the smallholder-led rural development model, which hinges on the assumption that most rural households can benefit from policies that link them with domestic and global markets.

Gender, diversification, and rural development

To conduct an analysis that can relate women's income diversification to wider rural change, an analytical framework is adapted from existing literature. Consequently, three different development paths are conceptualised (see Figure 1).

[5] Based on arguments that small-scale agriculture is both efficient and egalitarian (see Griffin, Khan, and Ickowitz (2002); Hazell et al. (2010); Larson et al. (2014); Lipton (2006, 2012)), scholars have advocated for a rural development based on small-scale family farming. Since the 1980s, such theories have merged with market-oriented thinking. By connecting smallholders with incentives and markets, it is envisaged that smallholder subsistence agriculture can be transformed into a commercial agriculture sector capable of driving economic growth.

[6] A few exceptions include recent studies by agricultural economists showing smallholder differentiation across a number of African countries (Jayne *et al.* 2019; Jayne *et al.* 2016; Jayne *et al.* 2003).

One strand of literature on income diversification identifies an agriculturally based path, denoted as Path 1, in which farm and off-farm income complement each other (Barrett, Reardon, and Webb 2001; Ellis 2000; Ellis and Bahiigwa 2003). As new opportunities in rural areas emerge, households diversify either to reduce risk or to raise income. Off-farm income obtained from income diversification is reinvested in agriculture, leading to increases in farm income and generating a virtuous cycle in which rural income continues to rise. Instead of movements from agriculture to the modern sector ala Lewis' (1954) two-sector model, an enrichment is occurring in the traditional sector, in which farm income and off-farm employment complement each other. In the short to medium term, this generates wealth. The positive link between off-farm income and agricultural improvement has frequently been described for Asian countries (Rigg 2006); however, studies confirm its existence in African countries (Clayton 1964; Collier and Lal 1986), and in Kenya in particular (Andersson Djurfeldt 2012; Lay, Mahmoud, and M'Mukaria 2008).

A contrasting perspective found in existing literature portrays how rural households in Africa, especially women-headed households, have been unable to diversify in a manner resembling Path 1. Instead, income diversification has led to increased rural poverty. Path 2, the 'too poor to farm'[7] scenario, demonstrates how farm and off-farm income are negatively correlated. An adverse shock to farm income causes households to diversify more out of necessity than out of choice. The period of structural adjustment in the 1980s and 1990s is often given as an example of a major negative shock. Structural adjustment policies made it difficult for rural households to sustain their livelihoods through farming. The removal of input subsidies coincided with a worsening of smallholders' global terms of trade, exacerbating the downward trend in farm earnings (Bryceson 1996). Due to limited access to land, labour and high-value cash crops, women heads are especially disfavoured as single or widowed women are prevented from using off-farm income to invest in agriculture. Because the return on their off-farm activities is low, it cannot compensate for the losses suffered to farm income (Whitehead 2009; Whitehead and Kabeer 2001). As there is a growing need to raise sufficient funds for basic necessities and school fees, a vicious cycle is generated in which farm incomes continue to decline as women are forced to diversify their labour away from the farm (Bryceson 1995b; Francis 1998; Razavi 2009; von Bülow and Sørensen 1992; Whitehead 2009; Whitehead and Kabeer 2001). The outcome of diversification is a process of 'de-agrarianisation',[8] a shift away from agriculture, as

[7] The concepts 'too poor to farm' versus 'too busy to farm' are referenced from Bernstein (2004, 2010b).

[8] Deborah Bryceson and co-authors define de-agrarianisation as 'a long-term process of occupational adjustment, income-earning reorientation, social identification and spatial relocation of rural dwellers away from strictly agricultural-based modes of livelihoods'(Bryceson 2002: page 726).

farmers (mostly women) can no longer use the smallholder sector to sustain their livelihoods (Bryceson 1996).

A modification found in the literature, denoted Path 3 in this study, or 'too busy to farm', describes how income diversification might lead to poverty reduction. In this scenario, and similarly to Path 2, a negative shock causes farm incomes to decline and households to diversify out of need. Especially the most vulnerable rural people, who are often single women or widows, are forced to diversify. However, the rural change associated with the process of income diversification can be positive. The period after structural adjustment has sparked a rise in commercial mid- and large-scale agriculture which creates new off-farm opportunities for rural people. An expansion of large-scale farming or rural industry, has the potential to deliver greater employment and income benefits to the poorest of the rural poor, who are often women. Hence, by diversifying away from male-dominated smallholder agriculture, women become better off (Cramer, Oya, and Sender 2008; Mueller 2011; Palmer 1988; Sender 2002; Sender, Oya, and Cramer 2006).

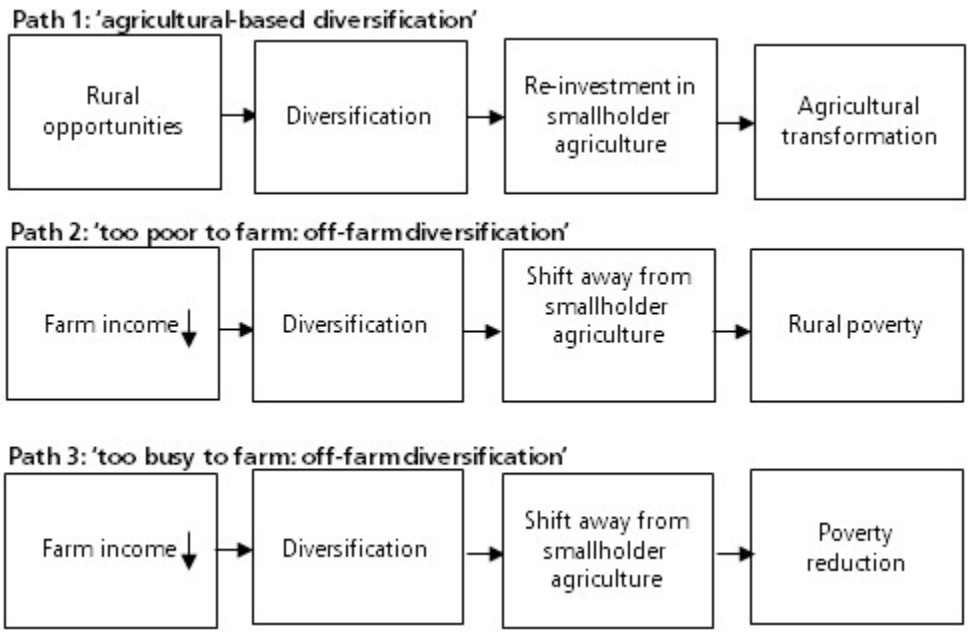

Figure 1:
Rural change paths associated with women's diversification

In the following sections, the analytical framework presented in Figure 1 is used to identify the potential long-run outcome of women's diversification at national and regional level.

Data and method

Data

To explore the relationships presented in Figure 1, longitudinal data is needed. Consequently, the paper makes use of a panel dataset constructed from a rural household survey conducted by Tegemeo Institute of Agricultural Policy and Development (hereafter referred to as 'Tegemeo'), Egerton University, and Michigan State University. The survey, designed to analyse trends in rural livelihoods and welfare, was undertaken in eight diverse agro-regional zones. Because the eight regions represent a cluster of areas with broadly similar climatic conditions, agricultural activities, and rural livelihood strategies, the Tegemeo data allows for detailed regional analysis.

Households were sampled to represent the population at the agro-regional zone level (Olwande 2008). The households sampled were first interviewed in 1997 and then revisited in 2000, 2004, 2007, and 2010. As the survey was intended to capture change among agricultural-based households, pastoral areas in northern Kenya were omitted. Table 1 shows the geographical distribution of the households.

Table 1:
Geographical distribution of sampled households in the Tegemeo survey

Agro-regional zone	Agro-ecological zone	District	Number of households sampled
Coastal lowlands	CL	Kilifi	27
	CL	Kwale	3
Eastern lowlands	CL	Taita Taveta	4
	LM 3-6	Kitui	18
	LM 3-6	Machakos	20
	LM 3-6	Makueni	51
	LM 3-6	Mwingi	32
Western lowlands	LM 3-6	Kisumu	89
	LM 3-6	Siaya	59
Western transitional	LM 1-2	Bungoma	44
	LM 1-2	Kakamega	100
High potential maize zone	UM 2-6	Bungoma	35
	UM 2-6	Kakamega	24
	LH	Bomet	34
	LH, UM 2-6	Nakuru	96
	LH	Narok	23
	UM 2-6	Trans Nzoia	55
	UH, LH	Uasin Gishu	94
Western highlands	UM 0-1	Kisii	82
	UM 0-1	Vihiga	51
Central highlands	UM 0-1, UM 2-6, LH, UM 2-6	Meru	73
		Murang'a	57
		Nyeri	81
Marginal Rain Shadow	L	Laikipia	35

Source: Olwande (2008).
Note 1: Agro-ecological zones (AEZ) were defined by FAO in 1978. The AEZ represent zones of potential land use based on temperature and rainfall.
Note 2: AEZs are abbreviated as follows: Lowland (L), Costal Lowlands (CL), Lower Midland (LM), Lower Highland (LH), Upper Midland (UM), and Upper Highland (UH).

Unfortunately, the 1997 wave collected incomplete information on income and is therefore excluded from the panel. Furthermore, one household had extreme income values which were deemed implausible and the household was also omitted from the analysis. The datasets consists of a final unbalanced panel of 1,479 households of which 1,242 are present in all the waves.

Off-farm income was collected at individual level, making it possible to study differentiation among women residing in both women and men-headed households. Unfortunately, that was not the case with farm income, which was collected at household level. Therefore, a narrower conceptualisation of gender is applied where gender is distinguished by the sex of the household head, although such a conceptualisation excludes an analysis of women residing in men-headed households.

Who are the women-headed households?

A household is classified as woman-headed if the adult woman self-reported being the household head (this is also known as 'de jure' woman-headedness). Furthermore, a household is coded woman-headed if no head is reported and the status of the husband is specified as 'left' or 'dead'. In these cases, the adult woman did not classify herself as the household head, although she is the 'de facto' head. With the data, it is not possible to capture household structures in which the male was away from the household for long stretches, which also left the woman as the 'de facto' head. Hence, the majority of women heads in the sample are 'de jure' heads (425 of 428). However, not being able to group 'de jure' women heads with women who have migrant husbands might have its advantages as the two groups are likely to live in very different conditions.

As with other African countries (see Bryceson [2018]), in Kenya there has been a rise in the proportion of households where women are the sole supporters of their families. The number of women-headed households increased from 175 in 2000 to 428 in 2010 (or roughly 28% of all households).

In total 123 women-headed households are present in all waves suggesting that a smaller number have dropped out of the survey. As a general rule, Tegemeo would replace households who had fewer than 20% of its original (year 1997) members present. Hence, many of the dropout cases can likely be attributed to migration or death.

An issue arises if there are systematic differences between women-headed households present in all waves and those that are only present in some waves. For instance, a woman who has recently become head of the household might struggle more or less financially compared to a woman who lost her spouse several years ago.[9]

In the present case, however, mean income is almost the same for the two groups of women (Figure 2).

[9] The literature on the effect of a loss of a spouse on welfare in Africa is inconclusive (Dercon 2008). For instance, one study from Ethiopia found the loss of a spouse to have insignificant effects on consumption levels (Dercon and Hoddinott 2005). Contrastingly, a study from Tanzania recorded a 7 % decline in consumption within the first five years after the death of an adult. Moreover, the shock had negative effects that were present for up to 13 years (Beegle, De Weerdt, and Dercon 2006).

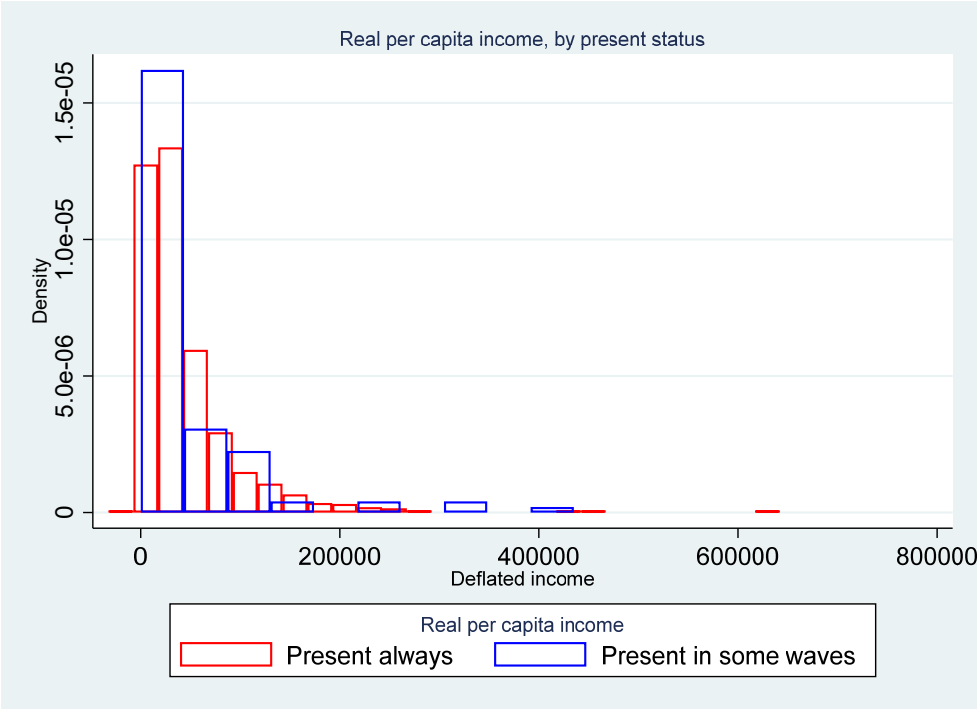

Figure 2: Per capita income (inflation adjusted), by present status
Source: Tegemeo data
Note: Women-headed households only.

In addition, a simple econometric model is fitted to see whether per capita income explains a households' status (present always/present in some waves) in the survey. Results suggest that the relationship is insignificant (see Appendix II Table 8). Still, there are some differences between households that were headed by a woman in all survey years and households that are only present in some waves. Not surprisingly, new and dropout women heads are more likely to have experienced the death of a family member. Women heads who are present in all four waves cultivate a larger number of different high-value crops and spend more on hired labour. Yet, other characteristics are fairly similar for the two groups (see Appendix V for a full comparison).

In the main analysis, it is assumed that observations are missing at random (MAR) and the unbalanced panel of women is used. Due to the small sample size of women-headed households it is not possible to re-estimate the models using the balanced sample of women-headed households. As a robustness check however and to increase the sample size, all models are re-estimated using the full panel which includes male-headed households. These results are presented in Appendix III and IV.

Data limitations

Two other data concerns deserve attention. First, the study traces households over a ten-year period, and the households in the survey will over time become older than the general population.[10] An overrepresentation of older household heads may overestimate poverty levels as age of the household has been tied to higher incidences of poverty (KNBS 2007). A simple regression analysis is performed to test the relationship. The results show a positive effect from age on income yet age squared has a negative effect indicating that above a certain threshold, having an older household head is associated with a decrease in income (see Appendix V Table 20). However, as Figure 8 in Appendix V shows the relationship is not very strong. Still, representativeness may be lost when creating a longitudinal dataset and extrapolation from the results should be done with care.

Second, the article is interested in the rural change arising from women heads' income diversification. Although a 10-year time period is impressive for an African rural survey, it is an insufficient period of time for drawing final conclusions on rural change, and one can only point to likely trajectories.

Measuring rural welfare

There is no consensus on the best way to measure poverty/wealth among rural households. Studies have suggested that asset wealth may be better at capturing poverty/wealth dimensions compared to income data, especially in cases where households rely more on physical assets such as land for their livelihood (see e.g. Barrett and Swallow [2006]; Carter and Barrett [2006]; Krishna *et al.* [2004]; and Muyanga, Jayne, and Burke [2010]). Nevertheless, using an asset wealth measure is not feasible in this case. The Tegemeo survey did not collect information on asset ownership in a steady manner across all waves, questioning whether changes in asset holding were due to measurement errors or to an underlying asset distribution (see Muyanga, Jayne, and Burke [2010] for a discussion of this).[11]

[10] In 2000, the average age of the household head was 53 years and in 2010 it had risen to 60 years. There is limited national data on the age of household heads in Kenya, available data from 2016 suggests that the majority of household heads (46 %) were aged between 35 and 59 years while 17.6 % were 60 years or above. Data is taken from the Kenya Open Data database which aims to make Government data available to the public. The data is available online at icta.go.ke/open-data (last accessed March 2020).

[11] According to Muyanga, Jayne, and Burke (2010), few items such as tractors and animals were consistently collected and valued across all survey waves and can be used to construct an asset wealth measure. Still, these assets are more prevalent among wealthier households, and their use will likely

Elsewhere it has been argued that poverty is multi-dimensional and non-monetary measures such as the capability approach have been suggested (Sen 1981; Sen 1988). However, non-monetary measures are typically recommended as complementary to income or consumption-based poverty measures (Atkinson 2017). For those reasons and due to paucity of data, the paper relies on an income-based measure of poverty.

To construct rural incomes, best practice standards developed in a joint project of the Food and Agriculture Organization, the World Bank, and the University of Washington titled 'Rural Income Generating Activities' are followed. Rural income is disaggregated into agricultural wages, non-agricultural wages, self-employment, crop and livestock production which includes the value of retained production (measured as harvest minus sold production)[12], transfers (which includes both private remittances and public transfers such as pension), and other income. For further elaboration on the method used to construct rural incomes, see Appendix I.

To compare incomes across households, inflation-adjusted per capita incomes in Kenyan Shillings (KSh) are calculated. A household's consumption need will vary based on gender and age composition of household members. To adjust household size accordingly, Tegemeo's recommended adult equivalent scale for rural Kenya is applied.[13] A household is characterised as poor if household-adjusted income falls below Kenya's national poverty line. Finally, the income data was applied to construct three income diversification measures commonly used in the diversification literature: inflation-adjusted off-farm income in KSh, number of income sources, and income shares.

Method

To tie micro-level evidence to wider questions of rural change, the analyses rely predominantly on descriptive analysis combined with secondary and historical research. However, to formally test the emergence of the pathways discussed in Figure 1, regression analysis is performed. With panel data, there are two popular methods: fixed effects (FE) and random effects (RE); each method has its own benefits and costs. The main drawback of the RE estimator is that it relies on the strong, assumption that the unobserved heterogeneity was uncorrelated with any of the observed independent

underestimate the welfare of poorer households who may possess other lower value items and/or derive income from selling their labour power.

[12] By including retained value, households who are self-subsistent can be included in the analysis.

[13] The adult equivalent scale developed by Tegemeo is documented in the survey design documents available online at tegemeo.org (last accessed January 2020).

variables. A more robust estimator is the FE estimator which relaxes this assumption. A Haussmann test suggested that the assumption that unobserved heterogeneity was uncorrelated with any of the independent variables was too strong and the more robust FE estimator is the preferred estimator in this study. Still, its use comes at the cost of not being able to include any time-constant covariates, such as gender and age of the household head and household size which have very little within variation. As a robustness check, a Mundlak-Chamberlain approach known as the correlated random effects (CRE) model is used. The CRE model essentially implies estimating within effects in an RE model and thus allows for a correlation between the unobserved term and the explanatory variables and. For further elaboration, see Appendix II.

National patterns in women heads' diversification

The empirical analysis is double-layered. First, to relate women's income diversification to the rural development trajectories described in Figure 1, trends at the national level are presented. However, as discussed in the introduction to this paper, women's diversification is likely to be influenced by regional characteristics. Consequently, to deepen the analysis, a regional analysis is next conducted.

As summarised in previous literature (see e.g. Posil and Rogan [2009]; Quisumbing and Pandolfelli [2010]; Whitehead [2009]; Whitehead and Kabeer [2001]), women-headed households in developing countries are often disadvantaged in terms of a range of characteristics. Table 2 confirms this common notion. In the table, a comparison is made between household characteristics of women-headed households vis-à-vis men-headed households. A simple t-test is applied to test whether differences are statistically significant. For a full description of the variables, see Appendix II Table 9.

Table 2:
Comparison table between women-headed households (WHH) and men-headed households (MHH)

	WHH				MHH				P-value for t-test
	Mean	Min	Max	St. dev	Mean	Min	Max	St. dev	WHH= MHH
Age of household (HH) head	59.6	20	94	13.2	56.5	18	110	13.8	0.0000
Fraction of HH members with secondary education, %	35.4	0	1	0.267	34.2	0	1	0.267	0.2039
HH size (adult equivalent scale)	5.4	0.74	22.6	22.6	6.9	0.74	23.6	2.852	0.0000
Share farm income/total income, %	65.7	0	100	67.0	57.2	0	100	21.9	0.0349
Share off-farm income/total income, %	34.3	0	100	68.5	42.8	0	100	21.9	0.0283
Share of crop sale income/total income, %	21.9	0	100	25.8	24.8	0	100	30.9	0.0017
Share livestock income/total income, %	9.6	0	100	42.2	11.5	0	100	11.7	0.3675
Share non-agr. wage income/total income, %	7.7	0	100	20.0	16.6	0	100	52.0	0.0000
Share agr. wage income/total income, %	4.4	0	100	12.9	3.8	0	100	14.4	0.2550
Share self-employment income/total income, %	10.6	0	100	21.1	12.9	0	100	21.9	0.0014
Share transfers/total income, %	7.3	0	100	20.7	3.1	0	100	10.5	0.0000
Off-farm income, in 1,000 KSh (inflation-adjusted)	73.6	0	1,957	166.5	153.4	0	6,556	282.1	0.0000
Value of crop sale income, in 1,000 KSh (inflation adjusted)	51.7	0	2,090	122.3	113.7	0	9,163	311.4	0.0000
Number of cultivated acres	3.5	0.05	45	3.581	4.9	0.01	265.7	8.583	0.0000
Number of different high-value crops cultivated	1.8	0	8	1.724	2.2	0	12	2.024	0.0000
HH labour share, %	76.5	12.5	100	22.2	73.4	14.2	100	22.3	0.0000
Hired labour expenditure (inflation adjusted), KSh	11.2	0	357.6	30.8	12.2	0	2,862	64.4	0.1196
Fertiliser expenditure (inflation adjusted), KSh	60.8	0	1,840	122.9	120.8	0	16,071	409.2	0.0000
HH received credit (1=yes), %	79.7	0	100	72.6	81.2	0	100	70.3	0.0171
Distance to fertiliser shop, KM	4.2	0	62	6.2	4.3	0	78	6.4	0.5627
Group/association membership (1=yes), %	69.3	0	100	46.1	76.2	0	100	42.5	0.0000
Death of HH member (1=yes), %	20.6	0	100	40.4	8.9	0	100	70.3	0.0000

Source: Tegemeo data.

Women heads are, on average, older and have smaller household sizes. They cultivate less land and fewer types of high-value crops, spend significantly smaller amounts on fertiliser, and fewer women heads have received credit. Women-headed households also differ in terms of their income diversification patterns. Despite having an equal amount of educated household members, women heads have lower income shares from non-agricultural wage labour. Women heads also derive less income from crop sales and self-employment activities, leaving women heads more dependent on agricultural wage labour and transfers.

To examine the rural change associated with women heads' income diversification, the relationship between diversification and potential rural development trajectories depicted in Figure 1 is explored. As mentioned, although a ten-year time period is insufficient when discussing wider rural change emerging trajectories may reveal themselves.

As shown in Figure 1, successful income diversification often entails a positive correlation between farm and off-farm income as the latter is reinvested in improved agriculture. To investigate whether women heads have been able to follow a Path 1-type diversification, the relationship between income diversification and improved agriculture is explored.

The outcome variable, improved agriculture, is proxied by inflation-adjusted value of crop sales (in 1,000 KSh). Hence, the underlying assumption is that households' main motivation for agricultural investments is to raise income from crop sales. Income diversification is estimated using the three mentioned diversification measures.

Household members' education, access to credit, market access (proxied by the distance to the fertiliser shop), experience of negative shock (proxied by the death of a family member), and social capital (proxied by group membership) are incorporated as control variables. Other factors which might influence commercial agriculture such as land, household labour share[14], hired labour, fertiliser, and number of different high-value crops grown are controlled for. To capture the aging of the panel, the RE and CRE models include age of household head (see Appendix III). [15] A description of control variables is presented in Table 9 in Appendix II.

[14] Household size is strongly correlated with household labour share. Because the latter is of more interest analytically household size is omitted from the regressions.

[15] Due to little within variation in age of household head the variable is not controlled for in the FE model. However, the RE and CRE models presented as robustness check in Appendix III do control for age. Results are similar across models.

Table 3:
Estimates of the impact of income diversification on crop sale (in 1,000 KSh) among women-headed households (unbalanced panel)

	FE		FE		FE	
Parameter	Estimate	SE	Estimate	SE	Estimate	SE
Fraction of HH members with secondary education	18.48	11.40	18.89*	11.37	20.22*	11.29
Off-farm income, in 1,000 KSh (inflation-adjusted)	0.0788*	0.047				
Number of income sources			4.918	6.412		
Share of off-farm income/total income, %					-0.026	0.021
Number of cultivated acres	8.200***	2.619	8.062***	2.538	8.130***	2.583
Number of different high-value crops cultivated	3.415	2.412	3.013	2.406	3.076	2.425
Fertiliser expenditure, in 100 KSh (inflation-adjusted)	0.253***	0.093	0.263***	0.093	0.261***	0.093
Hired labour expenditure, in 100 KSh (inflation-adjusted)	0.0105	0.105	0.0176	0.101	0.0212	0.100
HH received credit (1=yes)	-7.162	10.96	-6.771	11.30	-6.057	10.47
HH labour share, %	-26.78	18.34	-29.07	19.13	-28.35	18.74
Distance to fertiliser shop, in KM	0.475	0.943	0.358	0.926	0.412	0.924
Death of a family member (1=yes)	-7.354	8.407	-6.936	8.399	-7.241	8.401
Group/association membership (1= yes)	15.37**	7.524	15.62**	7.688	16.38**	7.577
Constant	29.62*	16.60	22.39	22.00	35.62**	15.96
Year dummies included	YES		YES		YES	
Observations	**1,123**		**1,123**		**1,123**	
Number of hhid	428		428		428	

Source: Tegemeo data
Note 1: Significance levels are denoted: *p<0.10; **p<0.05; ***p>0.01
Note 2: Women-headed households only.
Note 3: Incomes are deflated to 2009 Kenya Shillings (KSh) using the consumer price index.
Note 4: Fixed effects model.
Note 5: Robust standard errors.

As Table 3 shows, there is a small yet significant relationship between total off-farm income in KSh and agricultural commercialisation. A 1,000 KSh increase in off-farm income is associated with a relatively small increase of 78.8 KSh in crop sale income. The same is not true for the two other income diversification measures as the relationship is insignificant. Results are similar when the same models are re-estimated using either RE or CRE (see Table 10 and Table 11 in Appendix III).

Other factors that have a stronger influence on crop sale income are fertiliser expenditure and group membership. The latter is not surprising as groups in rural areas include women and farmer associations that may facilitate access to inputs and/or extension services. Another factor strongly correlated with crop sale income is number of acres cultivated. Women-headed households cultivate smaller farms (see Table 2).

Having a small farm might compel women heads to prioritise food security concerns, which may limit women in their attempts to engage in commercial agriculture.

Due to the small sample size of women heads it is not possible to estimate the relationship using the balanced panel. Instead as an extra robustness check, the full sample including male-headed households is applied and an interaction term between income diversification and gender is included. Results are presented in Table 12, 13, and 14 in Appendix III. Again a small effect from off-farm income on crop sale is detected. Differently however, number of income sources has a strong and positive effect on crop sale, yet, the relationship is most likely gendered as the sign of the interaction term is negative (although the coefficient is significant in the RE model only).

In conclusion, the relationship between income diversification and commercial agriculture (Path 1) is rather weak among women heads. However, income diversification can still constitute a positive trend towards lower rural poverty. In Path 3 depicted in Figure 1, it was recognised that a shift away from smallholder agriculture might provide new off-farm avenues for women. To explore the relationship, the impact of diversification on poverty status is estimated (Table 4)

Table 4:
Estimates of the impact of income diversification on poverty status (poor=1) among women-headed households (unbalanced panel)

	FE logit		FE logit		FE logit	
Parameter	Estimate	SE	Estimate	SE	Estimate	SE
Fraction of HH members with secondary education	0.105	0.521	-0.190	0.477	-0.249	0.458
Off-farm income, in 1,000 KSh (inflation-adjusted)	-0.0203***	0.003				
Number of income sources			-0.525***	0.124		
Share off-farm income/total income, %					-0.001	0.003
Number of cultivated acres	-0.136***	0.053	-0.0984**	0.048	-0.111**	0.047
Number of different high-value crops cultivated	-0.191*	0.105	-0.152	0.093	-0.142	0.090
Fertiliser expenditure, in 100 KSh (inflation-adjusted)	-0.002	0.002	-0.00325**	0.002	-0.00331**	0.002
Hired labour expenditure, in 100 KSh (inflation-adjusted)	0.001	0.004	0.0003	0.003	-0.0003	0.003
HH received credit (1=yes)	-0.213	0.226	-0.248	0.205	-0.338*	0.199
HH labour share, %	-0.326	0.757	0.096	0.683	0.112	0.652
Distance to fertiliser shop, in KM	0.029	0.022	0.0398*	0.022	0.0351*	0.021
Death of a family member (1=yes)	0.825**	0.368	0.470	0.294	0.451	0.289
Group/association membership (1= yes)	-0.194	0.319	-0.246	0.287	-0.296	0.277
Year dummies included	YES		YES		YES	
Observations	**557**		**557**		**557**	
Number of hhid	172		172		172	

Source: Tegemeo data
Note 1: Significance levels are denoted: *p<0.10; **p<0.05; ***p>0.01
Note 2: Women-headed households only.
Note 3: Incomes are deflated to 2009 Kenya Shillings (KSh) using the consumer price index.
Note 4: Fixed effects logistic regression.
Note 5: Robust standard errors.

Both total off-farm income and number of income sources have a significant and negative sign suggesting that more diversification is associated with lower levels of poverty among women heads (Table 4). Results are similar when the same models are re-estimated using either RE, CRE, or the full unbalanced panel (see Table 15-Table 18 in Appendix IV). It is worth noting, however, that the share of off-farm income to total income is not per se associated with lower poverty levels. In fact, women-headed households that are classified as poor have the highest *share* of off-farm income (Figure 3).

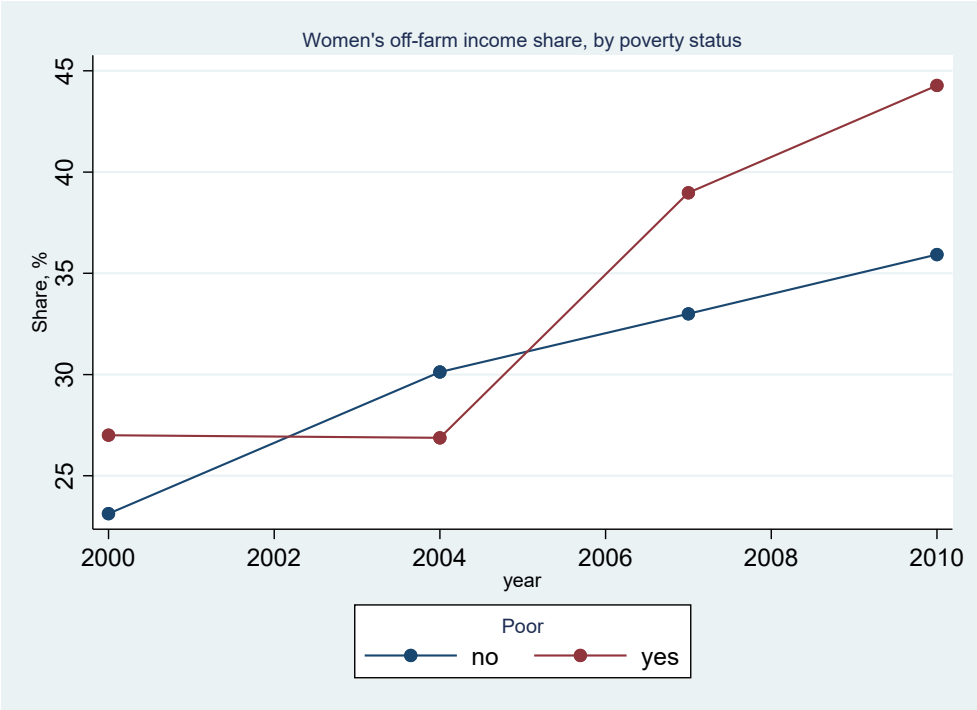

Figure 3: Off-farm income share in %, by present status
Source: Tegemeo data
Note: Women-headed households only.

To further investigate the link between diversification and poverty, Table 5 shows poverty rates among women.

Table 5:
Poverty and income indicators

	2000		2004		2007		2010	
Indicator	KSh	PPP adjusted USD	KSh	PPP adjusted USD	Ksh	PPP adjusted USD	KSh	PPP adjusted USD
Poverty headcount (WHH), %	54.8	n/a	57.4	n/a	58.7	n/a	58.2	n/a
Poverty headcount (all HHs), %	40.6	n/a	42.9	n/a	48.7	n/a	48.6	n/a
Tegemeo poverty headcount, % (all HHs; see Suri *et al.* 2009)[3]	42.3	n/a	41.7	n/a	37.6	n/a	n/a	n/a
Annual per capita income (WHH; inflation adjusted)	63,750	3,515	59,535	3,056	45,589	1,822	37,039	1,172
Annual per capita farm income (WHH; inflation adjusted)	49,640	2,737	43,962	2,256	30,362	1,213	22,317	706
Annual per capita off-farm income (WHH; inflation adjusted)	14,110	778	15,715	807	16,215	648	14,852	470
Value of household assets (WHH; inflation adjusted)	258,712	14,263	211,748	10,868	257,604	10,294	214,272	6,780
Share of off-farm income/total income, %	25.2	n/a	28.3	n/a	36.5	n/a	40.8	n/a

Source: Tegemeo data
Note 1: Kenya's official poverty line is available for years 1997, 2005/6, and 2015. Poverty lines for the remaining years have been constructed using a log-linear extrapolation.
Note 2: Incomes are deflated to 2009 Kenya Shillings (KSh) using the consumer price index.
Note 3: It should be noted that the 2004 measure of poverty among all households (42.9%) is slightly lower than Kenya's official 2004 poverty rate of 49.1%. This is probably because Kenya's National Bureau of Statistics measured poverty for the entire nation including the poorer and pastoralist Northern Kenyan regions that are excluded in this study. The findings are, however, fairly similar to Tegemeo's poverty rates for 2000 and 2004 calculated using the same data (see Suri et al. (2009)). Tegemeo does report a lower poverty rate in 2007. At the time of publishing, Tegemeo did not have the latest 2015 poverty line available and their forward extrapolation methods which are based on the 2005/6 official poverty line could have led to an underestimation of poverty. The official poverty line was adjusted upwards in 2015 due to inflation. Because the present study applies the log-growth rate between the 2005/6 and 2015 poverty lines to estimate a 2007 poverty line a higher poverty line is noted and subeseuqnetly the poverty rate increases compared to Suri et al. (2009). Tegemeo themselves notice that declining poverty rates are odd given their witnessed decline in real incomes between the 2000-2004 and the 2004-2007 waves (Suri et al. 2009).
Note 4: Purchasing power parity exchange rates are taken from the World Bank database (accessible online at data.worldbank.org; last accessed May 2020).

As Table 5 indicates, women heads' farm incomes have declined in the period under consideration. Although the development in off-farm income has been stable in the period, this income source has not been sufficient in offsetting the losses suffered to farm income and there has been an overall decline in inflation-adjusted household income and a rise in poverty from 2000 to 2004. Hereafter, poverty levels have been fairly constant at close to 58%.[16]

It needs mentioning that any conclusions drawn on poverty/wealth trajectory is sensitive to the choice of start year. By selecting year 2000 as start year, the harvest in 1999 is evaluated (the survey asked to harvested volumes in the past 12 months). In 1999, agriculture value added was high (close to 7%) compared to the years that followed (D'Alessandro *et al.* 2015). This might explain why a larger increase in poverty is detected between 2000 and 2004. Thus, the long-run trajectory needs not be an increase in poverty but instead a fairly stable yet high level of poverty.

In addition, women heads' productive capital also shrank during the period. Acres cultivated decreased from 4.36 in 2000 to 3.05 in 2010. Furthermore, livestock possession decreased from 1.9 to 1.7 tropical livestock units.[17] Keeping in mind that information on assets may not have been consistently collected, a decline in women heads' real value of assets from 258,712 KSh (14,236 USD) in 2000 to 214,272 KSh (6,780 USD) in 2010 was also noted. The decline in productive capital is likely to place future farm income streams at risk.

Although a 10-year survey period is insufficient to draw a final conclusion regarding the rural change associated with women heads' income diversification, a tentative picture emerges. Women heads have, on average, increased their share of off-farm income. Although, income diversification is not strongly correlated with commercial agriculture (Path 1), off-farm income and number of income sources are associated with reduced poverty. Yet, this effect masks the reality that both rich and poor women heads have diversified incomes; thus, a high *share* of off-farm income is not per se associated with increased rural welfare.

Hence, the findings at the national level lend support to the 'too poor to farm' hypothesis laid out in the analytical framework presented in Figure 1, where income diversification is a result of increased distress and vulnerability resulting in high poverty

[16] The findings are similar to those of Alobo Loison (2016), who applies a different panel dataset from Kenya for roughly the same time period and also finds declining farm incomes and a smallholder sector in crisis.

[17] Tegemeo data.

rates, as off-farm incomes are not able to lift households out of poverty (Path 2).[18] However, as mentioned in the introduction, women's incomes are likely to be context-specific. Consequently, the next section conducts a regional analysis of women's diversification.

Regional differentiation among women-headed households

Regional differences among women are explored by examining patterns in income diversification and poverty across the eight regions. The objective is not to tell a causal story but instead to elucidate the socio-economic factors that have enabled some women and not others to raise relatively high incomes. Consequently, the following analysis is based on descriptive statistics and secondary and historical literature.

The eight agro-regional zones mentioned in the data section can be subdivided into areas with high or low potential for agriculture. Regions with high potential for agriculture include the fertile highlands of central and western Kenya, where soils are good and rain is plentiful. Similarly, suitable areas include western transitional zone (Kakamega and Bungoma districts) and the high-potential maize zone (hereinafter referred to as 'the maize belt'), which stretches from Nakuru to Trans Nzoia in the northern Rift Valley. Regions with low potential for agriculture are the lowland areas in western, eastern, and coastal Kenya as well as the marginal rain shadow region (Laikipia) located on the Laikipia plateau in the rain shadow of Mount Kenya.

A natural differentiation among women is expected in terms of which women heads in high-potential areas will have oriented their livelihoods towards agriculture, while women heads residing in low-potential areas are expected to have high off-farm incomes. In Table 6, to explore income diversification patterns, it is shown whether women heads in a given region have higher or lower per capita incomes compared with the mean incomes for all women heads in the sample. The mean incomes for the entire survey period, from 2000 to 2010, are applied.

At first glance, the results are nearly as expected. Women-headed households in high-potential areas have the highest *share* of farm income to total income. Unexpectedly, however, only one high-potential region (central highlands) has above-mean per capita

[18] Off-farm incomes are classified as yielding high returns if the income is higher than the poverty level (Asfaw *et al.* 2015). Using the Tegemeo data for individual household members confirms that this is the case for just 4% of women (and 11% of men) in the survey (results are not shown). This could indicate that relying solely on off-farm incomes will, for the majority of households, not be able to lift them out of poverty.

farm *incomes*. In the other three high-potential areas, per capita farm incomes are lower than the average income for women heads.

Moreover, women heads in the central highlands and low-potential eastern lowlands are able to derive higher per capita farm and off-farm incomes. Women heads in the western transitional zone, the maize belt, the western lowlands, and Laikipia have higher per capita incomes from wages. By contrast, women in coastal areas derive higher incomes from self-employment, while women in the western highlands (although having a high share of farm income) receive higher incomes from transfers.

Table 6:
Women-headed households' income (2000–2010) by region compared with the average income of all sampled women

Higher/lower income	Agricultural potential	Share farm income, %	Farm income	Agriculture wage income	Non-agriculture wage income	Self-employment income	Transfer income
Central highlands	High	78.2	Higher	Lower	Lower	Higher	Higher
Western highlands	High	79.2	Lower	Lower	Lower	Lower	Higher
Western transitional zone	High	76.5	Lower	Higher	Lower	Lower	Lower
Maize belt	High	64.6	Lower	Higher	Higher	Lower	Lower
Coastal lowlands	Low	41.3	Lower	Lower	Lower	Higher	Lower
Eastern lowlands	Low	62.2	Higher	Lower	Higher	Higher	Higher
Western lowlands	Low	61.5	Lower	Lower	Higher	Lower	Higher
Laikipia	Low	57.4	Lower	Higher	Higher	Lower	Lower

Source: Tegemeo data.
Note 1: All incomes are adjusted for household adult equivalent size.
Note 2: Women-headed households only.

To correlate differences in income diversification patterns with poverty, Table 7 shows women heads' poverty rates by region. The table depicts the percentage of women-headed households that had, in one or more waves, per capita incomes below the poverty line (transitory poverty), the percentage of chronically poor,[19] and poverty trajectories.

[19] Defined as households that fall below the absolute poverty line in five or more years (da Corta 2008).

Table 7:
Women-headed households' average poverty rates by region (2000–2010)

Region	Mean % WHH below poverty line	Mean % WHH chronic poor	Trends in poverty level (2000 to 2010)
Central highlands	29.6	2.8	Increasing
Western highlands	63.6	7.4	Stagnant
Western transitional zone	61.7	14.8	Increasing
Maize belt	65.9	13.9	Increasing
Coastal lowlands	66.6	20.5	Increasing
Eastern lowlands	44.6	3.1	Increasing then declining
Western lowlands	68.3	24.7	Declining
Laikipia	68.7	12.5	Declining

Source: Tegemeo data
Note: Women-headed households only.

The lowest poverty rates are found among women heads in the central highlands and eastern lowlands. These women have in common the ability to raise relatively high farm incomes (Table 6). Furthermore, women heads in all other regions have fairly high poverty rates. In particular, women in coastal and western lowlands have a high degree of transitory and chronic poverty.

Hence, an inability to raise high farm incomes appears to be correlated with poverty irrespective of off-farm diversification strategy. As mentioned above, this finding is caused by low earnings from off-farm activities. This is also evident in a positive, statistically significant correlation between the shares of off-farm income and poverty.

However, having a high *share* of farm income does not automatically raise rural incomes, as is evident from the relatively high poverty rates among women heads in the western highlands and transitional zone. For poverty to be reduced, high shares of farm income will have to manifest themselves in high per capita farm *incomes*.

Such income is achievable through a large amount of retained farm production, which raises the subsistence level, and/or through marketing crops and livestock produce. As Figure 4 shows, women in the eastern lowlands have seen a relatively high—albeit declining—value of retained production, whereas women in the coastal lowlands and Laikipia had the lowest values in 2010. Throughout the period, women heads in the central highlands have had a fairly high and stable retained production. Figure 5 presents the per capita value of marketed crops and livestock produce.

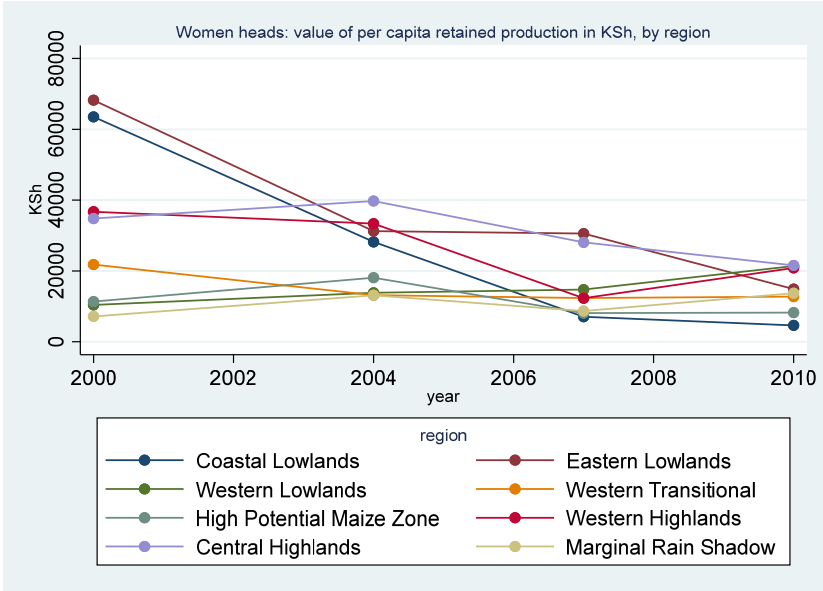

Figure 4: Per capita value of women-headed households' retained production, by region.
Source: Tegemeo data.
Note 1: Women-headed households only.
Note 2: All values are inflation adjusted.

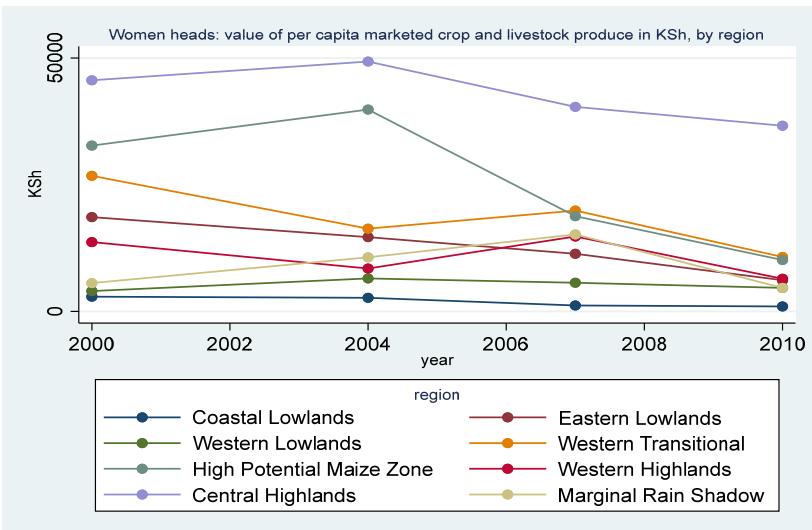

Figure 5: Per capita value of women-headed households' marketed crop and livestock production, by region.
Source: Tegemeo data.
Note 1: Women-headed households only.
Note 2: All values are inflation adjusted.

Despite conventional wisdom that women heads have been prevented from cultivating cash crops,[20] women in the central highlands are distinct in their ability to derive relatively high incomes from commercial agriculture. Although women heads in the other regions have a lower degree of commercialisation, those in coastal and western lowlands stand out because they consistently derive very low incomes from commercial agriculture (Figure 5).

High farm incomes are not determined by access to land. In fact, women heads in the central highlands cultivate fewer acres (2.6 acres) compared with women heads in the maize belt (3.9 acres) and western lowlands (2.9 acres). Despite smaller farm sizes, women-headed households in the central highlands spend more on hired labour and fertiliser; moreover, women heads there have smaller household sizes,[21] which can probably be explained by the fact that women in the central highlands exhibit greater use of contraceptive methods (Kimani, Njeru, and Ndirangu 2013).[22]

Not only do women heads in the central highlands have higher incomes but also more assets. Women heads in the central highlands had the highest inflation-adjusted value of assets in 2010 (411,697 KSh or 13,027 PPP adjusted USD), followed by women-headed households in the eastern lowlands (255,616 KSh or 8,088 PPP adjusted USD). The lowest value of assets is found among women heads in the western lowlands (98,874 KSh or 3,128 PPP adjusted USD).[23]

Although the survey period is too short to uncover wider regional rural change, some suggested trajectories can be pointed out. Women heads in the central highlands (and to some extent the eastern lowlands) have been able to follow an agricultural-based diversification path associated with lower (albeit increasing) poverty rates. Meanwhile, women heads in the western highlands and western transitional zone, who have high *shares* of farm income but low per capita farm *incomes*, remain poor because they have not been able to successfully market their produce. Although this group of women heads have not oriented their livelihood away from smallholder farming—that is, they

[20] Numerous contemporary and historical studies have suggested that women have been prevented from engaging in commercial agriculture. While food crops are seen as women's crops, men have for decades controlled cash crop production (Bryceson 1995b; Francis 1995, 1998; Lilja et al. 1996; Negin et al. 2009; Silberschmidt 1992; von Braun and Webb 1989).

[21] Average household sizes among women-headed households are distributed as follows: coastal lowlands (8.7 members), eastern lowlands (6 members), western lowlands (5.2 members), western transitional zones (6.5 members), maize belt (6.1 members), western highlands (5.8 members), central highlands (4 members), and Laikipia (4.7 members).

[22] 70% of women in the central highlands have used contraceptive methods compared with just 37% of women in coastal areas.

[23] Asset values are calculated as a mean for the 10-year period.

have not followed a Path 2 type of diversification—time will tell whether the agricultural sector will be able to sustain their livelihoods. Finally, women heads in western and coastal lowlands and Laikipia who derive high shares of income from off-farm sources seem to have diversified in manners similar to a Path 2 type of diversification, where a shift away from agriculture is associated with high poverty rates. These results beg a crucial question: Why have only a few women heads been able to successfully diversify towards commercial agriculture? The next section suggests an answer to this question.

Rural inequality: gendered and geographical

To place women-headed households' income in a wider story of rural inequality, Figure 6 portrays rural per capita income by gender and region. This is done to separate gender effects from other regional disparities. In some regions, women heads are able to raise their income to be on par with that of men, whereas gender income gaps are evident in other regions. Regional structures therefore determine differentiation not only among women-headed households but also among all households in the survey.

One could speculate that a household that has recently become headed by a woman is likely to follow the same path that it was on before the male head left or died. This would make it difficult to separate out 'pure' gender differences. As a robustness check, male heads' incomes are compared with the incomes of women who were household heads throughout the full survey period. The pattern is fairly similar to the results shown in Figure 6 (see Figure 9 in Appendix V for the full results). This result suggests that regional disparities can be separated from the differences in household heads' gender.

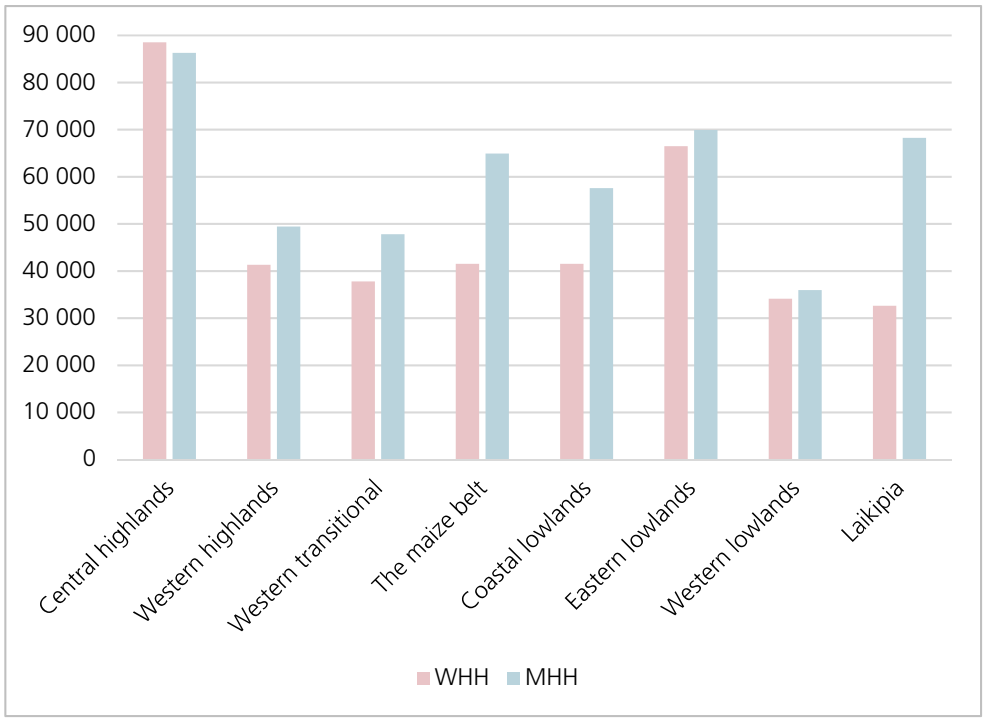

Figure 6: Real per capita income by region and gender
Source: Tegemeo data.

In three regions (the maize belt, Laikipia, and the western transitional zone),[24] male heads' per capita incomes are statistically higher than those of women heads. Table 22 in Appendix VI shows gender income gaps in farm and off-farm incomes. In Laikipia, the gap is caused by differences in both farm and off-farm earnings.[25] In the maize belt, women heads' farm income is two-thirds that of male heads.[26] In the western

[24] At first glance, it would appear that the coastal lowlands also have a large gender income gap; however, the difference between the incomes of men and women is statistically nonsignificant. In the eastern lowlands, women's off-farm income is significantly lower than that of men; however, farm incomes in the region have a mediating effect on gender-income inequality.

[25] The data show that women heads have a strikingly low share of income from self-employment activities (0.2% versus 13% for men) and from nonagricultural wage labour (12% versus 24% for men).

[26] The Tegemeo data show that lower farm income can be explained by women heads' limited access to agricultural resources, including a significantly lower number of acres and livestock. Although women heads have a slightly higher share of family labour, they spend five times less on hired labour (results not shown). The constraints on land and labour may explain why, compared with men, women heads have a lower share of crop income from high-value crops. Moreover, women heads' per capita off-farm income is almost half the size of that of men in the maize belt.

transitional zone, where the gender income gap is smaller, it is caused by differences in per capita off-farm earnings.[27]

An in-depth study of gender relations in the three regions where gender income gaps prevail is of critical importance, yet it is beyond the scope of this study. Moreover, in the majority of regions (five out of eight), gender income gaps are small and not statistically different from one another. In fact, in the central highlands, the gender income gap seems to be in women heads' favour (although the difference in incomes is not statistically significant). However, regional disparities are large and rural incomes in the central highlands are twice as high as those in the western highlands and almost three times higher than those in the western lowlands.

Hence, to understand a large part of the differentiation among women-headed households, regional structures must be examined. Contemporary variations in rural inequality are not 'natural' but rather the outcome of specific geographical, historical, and socio-economic factors.

Factors underpinning regional inequality

It is beyond the scope of this study to examine opportunities and constraints in all eight regions. Instead, developments in the relatively prosperous central highlands are contrasted with those in two other macro-regions: western and coastal Kenya. The regions are highlighted in the map below (Figure 7). As Table 7 and Figure 6 demonstrated, these three regions are home to the wealthiest (the central highlands) and poorest households (the western and coastal lowlands). Moreover, the three macro-regions are home to more than half of Kenya's population (KNBS 2019). The regions are also of interest from an income diversification perspective as they include the least and most diversified households. In the central highlands, farm income shares are the highest among all households (71% of total household income); this is followed by the western lowlands and highlands, where households combined have a share of 62%. For coastal lowlands, the share is the lowest among all households (42%).

[27] Similar to the maize belt and Laikipia, the difference in off-farm earnings is caused by men's higher share of income from nonagricultural wage labour (results not shown).

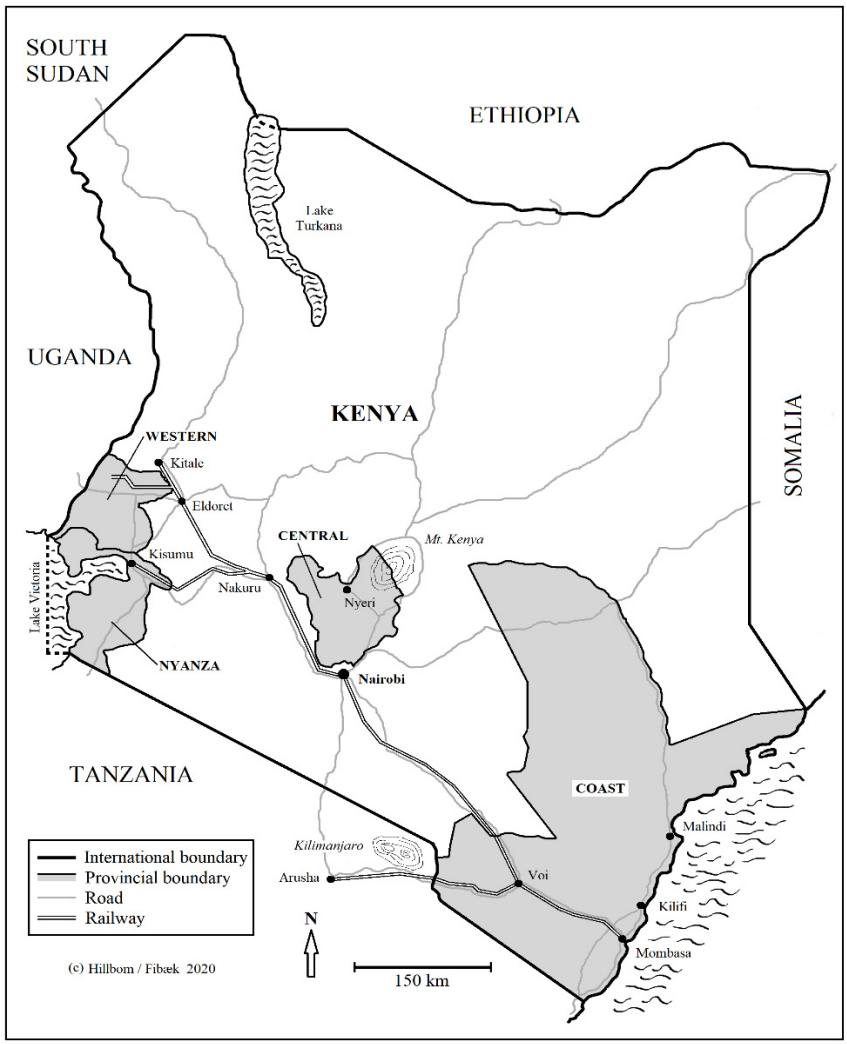

Figure 7: Map of Kenya highlighting the three macro regions: western, central, and coastal Kenya.
Source: Designed by Niklas Hillbom and Maria Fibaek.

The central highlands, which border Mount Kenya, have favourable agro-ecological conditions, and a large range of high-value crops can be grown there (Jaetzold and Schmidt 1983). Although land sizes are small, developments have generally been good compared with western and coastal Kenya (Killick 1976). During the cash crop boom of the 1960s and 70s, the reinvestment of off-farm income in smallholder agriculture is likely to have facilitated the rise of a central highland rural elite (Carlsen 1980; Collier

and Lal 1986; Cowen 1972, 1975). A perennial debate exists as to whether producers in the central highlands became wealthy because of good soils, their proximity to Nairobi, the main market, or because of a strong tie to the state apparatus (Bates 1989; Carlsen 1980; Collier and Lal 1986; Heyer, Ireri, and Moris 1971; Leys 1975; Njonjo 1981).

Furthermore, limited opportunities in relation to the ability to cultivate high-value crops and poor off-farm alternatives have made it difficult for rural households in the two other regions to raise incomes similar to those of central highlands.

Western Kenya

Western Kenya includes the western highlands, transitional zone, and lowlands. As Figure 7 shows, the region borders Lake Victoria and Uganda to the west and the Rift Valley to the north and east. Despite the high potential for agriculture, the area has been less fortunate compared with the central highlands.

According to Francis (1995), the region has not been able to raise incomes by combining off-farm income with commercial agriculture. This is because fewer options exist for raising off-farm incomes and the relatively lower spread of cash crop cultivation. Early colonial attempts were made to build a cotton industry, and in 1908 the first cotton ginnery opened in Kisumu, the only large town. However, as maize prices were more favourable than cotton prices, production did not expand and maize became the most dominant food and cash crop (Fearn 1961).

During the state-led rural development era of the 1960s and 70s, rural development planning programmes sought to promote cash crops by revitalising the cotton and sugar industries. Cotton production was never a success, although the sugar industry did well initially as it was protected by high tariff barriers; however, in the wake of structural adjustment and the removal of trade barriers, the local industry could not compete with imported sugar (Mboya 2002).

As discussed in Path 2 of the analytical framework, economic crises and liberalisation policies might have had disproportionately negative effects on women because they are more likely to grow food crops. However, it appears that the limited development of suitable cash crops left both men- and women-headed households more dependent on maize production. The share of the value of maize production to value of total production is high: 35% for women heads and 31% for men heads. In the central highlands, the figure is 12.5% for women heads and 10.5% for men heads. Moreover, all households in western Kenya are heavily dependent on maize for sales. Almost 29%

of the crop income of men and women is derived from the sale of maize; in the central highlands, the figure is 10% for women and less than 4% for men.[28]

Off-farm income opportunities have not been able to off-set the lack of agricultural development. Moreover, Kisumu has suffered massive neglect, which during the colonial era played a crucial role as a rail head and lake port; however, the city's status declined with the collapse of the East Africa Community in 1977. Since the 1970s, there has been limited industrialisation, and Kisumu offers little in terms of employment (Francis 1995, 1998; Francis and Hoddinott 1993; Silberschmidt 1992). In fact, the lowest opportunities in rural formal employment are found in western Kenya. In 1980, the region had less than 7% of all formal jobs. The bulk of rural formal jobs were in the Rift Valley and central highlands, where 24% and 15% of all formal jobs were located, respectively, followed by coastal Kenya with 13% (KNBS 1980). From 1980 to 2010, the distribution of formal jobs remained unchanged (KNBS 2010).

The Coast

The coastal region stretches from Lamu in the far north bordering Somalia to Kwale district in the south bordering Tanzania (Figure 7). The region is populous and, after central and western Kenya, home to the largest proportion of Kenya's population (KNBS 2019). Poverty rates are similar to those in the western highlands (52%),[29] although the region is slightly better off than the lowland areas in western Kenya.

As shown in Table 1, the Tegemeo survey covers the coastal lowlands, which include the southern district of Kwale and Kilifi district to the north. Agricultural potential is limited in the lowlands although it varies across smaller agro-ecological zones.[30] Climatic conditions and frequent droughts have exacerbated the low agricultural potential of the region (Foeken, Hoorweg, and Obudho 2000).

Disadvantages in relation to the climate are intensified by a lack of rural development initiatives. Rural households were given access to land through resettlement schemes introduced in the 1960s and 70s, where smallholder farmers were settled on former large-scale farmland. However, distinct from the central highlands, the resettlement schemes in coastal Kenya did not have scheduled production, implying that farmers who bought land were not obliged to grow cash crops. Therefore, resettled farmers did

[28] Tegemeo data.

[29] Tegemeo data.

[30] In the humid 'coconut zone', a variety of food and cash crops can be grown; the 'cashew-sisal-cassava zone' is drier and less suitable for crop production; and, finally, in the 'ranching zone', no rain-fed agriculture is possible (Jaetzold and Schmidt 1983).

not receive the same special agricultural assistance offered to resettled farmers in the central highlands (Hoorweg *et al.* 1991). Scholars have argued that the differential settlement strategy indicates a deliberate neglect of agriculture in coastal Kenya (Heyer and Waweru 1976; Leys 1975).

Due to low agricultural potential, households have turned to wage employment; however, slow industrial development relative to the central highlands limits opportunities. Nevertheless, the region serves as a major hub for tourism in Kenya. Mombasa, the regional capital, receives over one third of international tourist arrivals to Kenya. Tourism offers off-farm opportunities not available in western Kenya, and all households—including those headed by women—derive more than half of their income from off-farm activities, of which a high share comes from self-employment and wage income. However, political instability combined with frequent terrorist threats have caused a downturn in tourism. Following the Al-Qaida attacks in Kenya in 1998 and 2002, income from the tourism sector fell. The 2007 post-election violence also caused a severe shock to tourism and the loss of 120,000 jobs (Porhel 2008). The negative impact on off-farm earnings is also evident in the Tegemeo data: women heads' real off-farm incomes rose from 71,113 KSh (3,920 PPP adjusted USD) in 2000 to 259,958 KSh (13,342 PPP adjusted USD) in 2004; however, in 2007, incomes declined to 147,618 KSh (5,899 PPP adjusted USD) and again in 2010 to 122,383 KSh (3,872 PPP adjusted USD). Men heads' off-farm earnings have followed a similar pattern.

The historical patterns in rural inequality in the three macro-regions were most likely intensified by the structural adjustment and pro-poor growth policies. As Elson (1995) noted, the structural adjustment reforms created 'winners' and 'losers'. In Kenya, the winners were cash crop producers in the central highlands, who were in a better position to benefit from pro-poor market-oriented policies. The 'losers' in relation to the economic reforms were the grain producers, the great majority of whom are located in western Kenya, who saw large declines in grain prices after the reforms (Nyoro, Kiiru, and Jayne 1999). Furthermore, households that rely on off-farm incomes as opportunities outside of central Kenya have been few in number.

Concluding remarks

A concern with the existing literature on gender and development is its tendency to lump women together into one group, which then represents the 'poorest of the poor'. However, since 2013, a few studies have begun to document the regional variation that

exists among women. This article contributes to the emerging literature on differentiation among women.

This study found widespread regional variation among women heads, and consequently, the rural development trajectories arising from women heads' income diversification are ambiguous. Against conventional belief, a group of women have been able to benefit from commercial agriculture. These women might continue to derive fairly high incomes from agriculture combined with a few off-farm sources. As these women heads have followed a path of intensification (i.e., by applying more fertiliser and labour to small farms), they are less threatened by the witnessed decline in farm sizes. By contrast, another group of women who depend on grain cultivation are less likely to remain in agriculture. The decline in farm sizes makes it difficult to raise sufficient income from the production of low-value crops such as maize. Unless a shift to higher value crops occurs, this group of women might have to diversify their labour power to off-farm activities. For a group of women heads residing in low-potential areas, this process has already begun. Unfortunately, because of a lack of decent off-farm employment, a shift away from agriculture is not associated with poverty reduction.

Although some women have been able to use the smallholder sector to sustain or improve their livelihoods, this study's findings echoed a concern raised in the de-agrarianisation thesis that income diversification is associated with increased vulnerability and poverty. For the majority of women heads, rural welfare is thus largely dependent on opportunities created in the off-farm sector.

A second contribution lies in the discovery that, against conventional wisdom, social cleavages aside from gender impact on rural inequality. In the majority of regions (five out of eight), gender income gaps are small and not statistically different from one another. In these regions, the agrarian change associated with women-headed households' diversification follows a similar trend to that of the general population.

The findings have implications for the smallholder-based theories that dominate contemporary rural development thinking. Aside from the differentiation that arises due to gender, it is commonly assumed that rural households are fairly homogenous. By contrast, however, this study demonstrated that in a majority of regions, households are differentiated as both genders have been prevented from reaping the benefits of commercial agriculture.

The results call for the revision of conventional rural development theories and policies. The narrow idea that smallholder differentiation largely arises due to gender differences in incomes must be revised to enable other forms of smallholder differentiation to be incorporated into theories and policies. Although a need exists to focus on gender

income gaps, conventional theories need to consider the social factors in addition to gender that lead to smallholder differentiation. Accordingly, in the wake of widespread differentiation and diversification away from the farm, the smallholder-based rural development model requires rethinking. Policies aimed at raising smallholder agricultural production and subsequently rural welfare, such as fertiliser supply or extension services, may not benefit a majority of households, intensifying existing inequalities among them.

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Appendix I: constructing rural incomes

To construct rural incomes, best practice standards developed by a joint FAO, World Bank, and University of Washington project titled Rural Income Generating Activities were followed. Rural income is disaggregated into agricultural wage, non-agricultural wage, self-employment, crop production, livestock production, transfers, and other income. This measure of rural income has several advantages over standard measures, such as cash income. First, all costs associated with generating incomes to arrive at net incomes are deducted. In some cases, the deduction of costs results in negative incomes, which is a good reflection of the high level of risk rural households' face. Second, due to the detailed manner in which data on crop production has been collected, the value of retained production can be included in the crop income measure. This represents an advantage over other livelihood studies as the welfare of households who depend on subsistence agriculture can be considered.

Recall patterns are a great concern when collecting survey data as it is difficult for households to remember income in the past. To overcome this, Tegemeo followed best practice recall patterns developed by Food and Agriculture Organization (FAO). For instance, self-employment activities were collected on a monthly basis. Data on crop production was collected by harvest/season, which is also recommended by FAO for recall purposes. Finally, to minimise errors in the field, where possible, Tegemeo opted to use the same enumerators for all waves.

To be able to compare incomes across studies, rural incomes are constructed in the following manner:

- All income sources are annualised
- All income estimates are net of costs
- Income aggregates are reported in Kenyan shillings (KSh), the local currency unit

To compare income across waves, incomes are deflated by the official Kenyan consumer price index.

Rural income is disaggregated into agricultural wages, non-agricultural wages, self-employment, crop production, livestock production, transfers (private transfers such as remittances and public transfers such as pension), and other income. Self-employment is often used as a 'catch-all' category and includes casual wage labour activities, petty trade, and handicraft making. This broad classification pattern has led to a gross underreporting of rural labour markets in Africa as casual labour in agriculture is often

unreported in rural surveys (Oya 2010). In an attempt to correct such bias, all the data is carefully coded so that activities that clearly included the exchange of labour time for a wage is categorised as either agricultural or non-agricultural wages. Total income at household level can be formally expressed as:

$$\text{Totinc} = \text{agwage}+\text{nonagwage}+\text{selfemp}+\text{crop}+\text{livestock}+\text{transfer}+\text{other}$$

Each income category is explained in detail below.

Wage income

For agricultural and non-agricultural wage income, the United Nations International Standards Industrial Classification of All Economic Activities is applied. Industries are grouped into 10 principal categories: 1) agriculture, forestry, and fishing; 2) mining; 3) manufacturing; 4) utilities; 5) construction; 6) commerce; 7) transportation, communications, and storage; 8) finance and real estate; 9) services; and 10) miscellaneous. Using this industrial classification, total wage employment income is separated into two aggregate categories: agricultural wages (industry 1) and non-agricultural wages (industries 2 to 10). In a few cases, a broad category, 'casual labour' or 'manual labour', was coded and the classification into either agriculture or non-agriculture wage income is not possible. To be consistent, such observations are coded as 'wage, not specified'.

Crop income

Crop income is calculated net of costs including hired labour, seed costs, and fertiliser. In 2000, seed costs were not collected. To implement a solution for this, an estimate of average seed costs to total crop production is calculated for the three subsequent waves (2004, 2007, and 2010) and next the estimate is used to calibrate estimated seed costs for 2000. The value of retained production (measured as harvest production minus sold production) is included in total crop income.

Livestock

Livestock income is calculated net of costs such as labour, fodder, and veterinary costs. The livestock income measure includes retained livestock production and income from sales of livestock and livestock produce.

Self-employment

Self-employment income includes all in cash and in kind earnings from non-farm and non-wage enterprises obtained within a 12-month period. All expenditures for equipment and machinery purchases and other investment expenses are deducted from the aggregate. Based on location, the measure distinguishes between on-farm and off-farm self-employment activities. An activity is classified as 'on-farm' if there is a direct link to agricultural production, such as selling vegetables from one's own farm.

Transfers

This category refers to private (e.g. remittances) and public transfers, such as the pension received by the household, both in cash and in kind.

Other sources

All other non-labour income components that do not fall into the previous five categories is accounted for in this last grouping. Examples of other income include income from farmland rentals and income from the rental of non-farm real estate and/or of owned assets.

Appendix II: empirical strategy

Data cleaning

Collecting survey data is an extremely daunting and labour-intense task and errors are bound to occur in the field and during data entry. One error found in the data is missing values, such as prices, for important items. Where missing values occurred, and it appeared as though they should not have been missing, the median of the non-missing observations is inserted. This procedure rarely affected more than a handful of observations for each wave and was preferable to not doing so, for two reasons: 1. leaving the gap in the data would exclude the observations from future analyses, and 2. it may falsely lead to an assumption of a value of zero once the data is collapsed to the appropriate level. Another common concern with survey data is outliers, as these can severely effect estimates. An outlier is defined as an observation with a value outside the range of possibility. All potential outliers were flagged and then evaluated on a case-by-

cases basis; only if a value was truly impossible was the observation omitted from the analysis.

Attrition

An attrition analysis was performed to see whether there is a systematic relationship between being present in the survey and per capita incomes. To achieve this, a simple regression analysis was performed. As Table 8 shows the relationship between per capita income and being present/not present in all waves appears to be insignificant suggesting that whether one is present in all waves will not affect poverty/wealth outcomes.

Table 8:
Estimates of the impact of per capita income (in 1,000 KSh) on present status (women-headed households only)

	RE	
Parameter	Estimate	SE
Per capita income in 1,000 KSh (inflation-adjusted)	-0.0006	0.005
Age of HH head	0.029	0.0240
Household size	-0.004	0.109
Constant	17.92***	1.687
Year dummies included	NO	
Zone dummies included	NO	
Observations	**1,129**	
Number of hhid	428	

Source: Tegemeo data.
Note: Random effects model.

Empirical analysis

The analyses rely predominantly on descriptive analysis. However, to formally test Paths 1 and 2, regression analysis is used. Panel data is used to estimate an unobserved characteristics model that takes the following form:

$$y_{it} = \alpha_i + X_{it}\beta + u_{it}$$

Here X is a vector of time-varying and time-constant variables; α_i represents the unobserved and time-constant individual heterogeneity affecting the dependent variable, y_{it}, and u_{it} is the error term.

With panel data, there are two popular methods of estimating the model specified: fixed effects (FE) and random effects (RE); each method has its own benefits and costs. The main drawback of the RE estimator is that it relies on the strong assumption that the unobserved heterogeneity was uncorrelated with any of the observed independent

variables. The FE estimator relaxes the assumption that the unobserved heterogeneity is uncorrelated with the independent variables and is therefore a more robust estimator. For that reason, FE is the preferred estimator in the present study, yet, its use comes at the cost of not being able to include any time-constant covariates, such as the gender of household head. As a robustness check, a Mundlak-Chamberlain approach known as the correlated random effects (CRE) model is applied. The CRE model implies estimating within effects in an RE model and thus allows for a correlation between the unobserved term and the explanatory variables. The correlated random effects estimator has been found to have good properties in an unbalanced panel and is neither better nor worse than a FE approach; however, it has the advantage of being able to estimate time-invariant variables (Woolridge 2019). The control variables included in the analyses are listed in Table 9 below.

Table 9:
Description of control variables

Variable name	Description
Age of HH head	A continuous variable that measures the age of head of household
Gender of HH head	A binary variable that takes the value 1 if the household head is female.
Fraction of HH members with secondary education	A continues variable that measures the share of household members with secondary education divided by total household size. The variable ranges from 0 to 1.
Off-farm income, in 1,000 KSh	A continuous variable that measures a household's total off-farm income in KSh.
Number of income sources	A categorical variable that measures the number of income sources a household has.
Share of off-farm income/total income, %	A continuous variable that measures the share in percentages of HH's income from off-farm activities to total HH income.
Number of cultivated acres	A continuous variable that measures the number of acres a household cultivates. The variable includes land owned by the households and land borrowed/rented in.
Number of different high-value crops cultivated	A continues variable that measures the number of high-value crops cultivated by the household. Following Temu and Temu (2006), both traditional and newer high-value crops are included. The following crops are considered: coffee, tea, sisal, cotton, sugar, pyrethrum, fruit and tree crops (citrus, cashew, coconut, papaya, mango, pineapple, strawberry, jackfruit, guava, and watermelon), root crops (potatoes), vegetable crops (asparagus, broccoli, cabbage, celery, carrots, cauliflower, radish, tomato), legumes, (snap beans and garden pea), spices and condiments (black pepper, garlic, ginger, and onion), and cut flower.
Fertiliser expenditure, in 100 KSh	A continuous variable that measures a households' spending on fertiliser in KSh. The value is deflated by the consumer price index (base year=2009).
Hired labour expenditure in 100 KSh	A continuous variable that measures a households' spending on hired labour in KSh. The value is deflated by the consumer price index (base year=2009).
HH received credit (1=yes)	A binary variable that takes the value 1 if the household has received credit.
HH labour share	A continuous variable that measures the share of adult household members to total household size.
Distance to fertiliser shop, in KM	A continuous variable that measure distance in kilometer to nearest fertiliser shop. The variable is used to proxy 'market accesses.
Death of a family member (1=yes)	A binary variable that takes the value 1 if a household member has passed away. Losing a family member is a large shock psychologically but often also financially. The variable therefore proxies a 'negative' shock to income and well-being.
Group/association membership (1= yes)	A binary variable that takes the value 1 if a household is member of a group such as farmer associations or women groups. Being member of a group often serves as an informal insurance and/or savings scheme. The variable is used as a proxy for 'social capital'.

Appendix III: robustness check, off-farm income and crop sale

Table 10:
Estimates of the impact of off-farm diversification on crop sale (in 1,000 KSh) among women-headed households (unbalanced panel)

	RE		RE		RE	
Parameter	Estimate	SE	Estimate	SE	Estimate	SE
Age of HH head	-0.761	0.740	-0.639	0.740	-0.713	0.734
Fraction of HH members with secondary education	18.20	11.53	18.69	11.46	19.98*	11.40
Off-farm income, in 1,000 KSh (inflation-adjusted)	0.0793*	0.0469				
Number of income sources			4.779	6.452		
Share of off-farm income/total income, %					-0.027	0.022
Number of cultivated acres	8.272***	2.618	8.125***	2.535	8.196***	2.579
Number of different high-value crops cultivated	3.289	2.473	2.909	2.466	2.954	2.489
Fertiliser expenditure, in 100 KSh (inflation-adjusted)	0.252***	0.093	0.262***	0.093	0.261***	0.093
Hired labour expenditure, in 100 KSh (inflation-adjusted)	0.0107	0.105	0.018	0.102	0.022	0.101
HH received credit (1=yes)	-7.377	10.97	-6.920	11.29	-6.255	10.47
HH labour share, %	-26.30	18.43	-28.66	19.24	-27.91	18.82
Distance to fertiliser shop, in KM	0.444	0.925	0.332	0.909	0.383	0.907
Death of a family member (1=yes)	-7.903	8.626	-7.399	8.619	-7.760	8.618
Group/association membership (1= yes)	15.13**	7.436	15.44**	7.603	16.16**	7.492
Constant	70.83*	40.69	57.38	46.15	74.28*	40.65
Year dummies included	YES		YES		YES	
Zone dummies included	YES		YES		YES	
Observations	**1,123**		**1,123**		**1,123**	
Number of hhid	428		428		428	
Goodness of fit	0.208		0.198		0.196	

Source: Tegemeo data
Note 1: Significance levels are denoted: *p<0.10; **p<0.05; ***p>0.01
Note 2: Women-headed households only.
Note 3: Random effects model.
Note 4: Clustered standard errors.

Table 11:
Estimates of the impact of off-farm diversification on crop sale (in 1,000 KSh) among women-headed households (unbalanced panel)

	CRE		CRE		CRE	
Parameter	Estimate	SE	Estimate	SE	Estimate	SE
Age of HH head	-0.424	0.264	-0.485**	0.246	-0.442*	0.245
Fraction of HH members with secondary education	10.95	11.47	14.13	10.00	14.66	10.03
Off-farm income, in 1,000 KSh (inflation-adjusted)	0.077	0.047				
Number of income sources			4.940	6.405		
Share of off-farm income/total income, %					-0.0233	0.0213
Number of cultivated acres	8.589***	2.647	8.452***	2.550	8.520***	2.606
Number of different high-value crops cultivated	3.022	2.249	2.580	2.305	2.636	2.293
Fertiliser expenditure, in 100 KSh (inflation-adjusted)	0.249***	0.095	0.258***	0.094	0.257***	0.095
Hired labour expenditure, in 100 KSh (inflation-adjusted)	0.011	0.099	0.021	0.097	0.025	0.096
HH received credit (1=yes)	-4.894	9.272	-4.514	9.581	-3.590	8.782
HH labour share, %	-22.49	17.11	-25.80	17.69	-24.46	17.21
Distance to fertiliser shop, in KM	-0.564	0.672	-0.781	0.733	-0.716	0.733
Death of a family member (1=yes)	-7.077	8.553	-6.919	8.535	-7.085	8.525
Group/association membership (1= yes)	14.24*	7.335	14.16*	7.523	15.04**	7.426
Constant	-115.6	71.47	-54.78	56.09	-79.65	56.29
Year dummies included	YES		YES		YES	
Zone dummies included	YES		YES		YES	
Time means included	YES		YES		YES	
Observations	**1,123**		**1,123**		**1,123**	
Number of hhid	428		428		428	
Goodness of fit	0.206		0.199		0.198	

Source: Tegemeo data
Note 1: Significance levels are denoted: *p<0.10; **p<0.05; ***p>0.01
Note 2: Women-headed households only.
Note 3: Correlated random effects model.
Note 4: Robust standard errors.

Table 12:
Estimates of the impact of off-farm income on crop sale (in 1,000 KSh) (full unbalanced panel)

	FE		CRE		RE	
Parameter	Estimate	SE	Estimate	SE	Estimate	SE
Age of HH head			-0.082	0.292	-0.237	0.335
Gender of HH head (ref: male)			8.758	10.85	4.398	3.029
Fraction of HH members with secondary education	22.30	15.24	-14.29	19.43	-7.134	12.22
Off-farm income, in 1,000 KSh (inflation-adjusted)	0.097	0.0781	0.107	0.074	0.155***	0.040
Off-farm income*Gender of HH head (ref: male)	0.032	0.090	0.028	0.095	-0.0989	0.068
Number of cultivated acres	14.99**	7.60	13.79*	7.437	15.01***	1.086
Number of different high-value crops cultivated	8.364***	2.943	9.604***	2.980	11.33***	4.067
Fertiliser expenditure, in 100 KSh (inflation-adjusted)	0.239***	0.077	0.249***	0.075	0.254***	0.021
Hired labour expenditure, in 100 KSh (inflation-adjusted)	-0.031	0.059	-0.006	0.054	0.040	0.041
HH received credit (1=yes)	2.573	5.427	-0.217	5.465	26.99	17.04
HH labour share, %	-1.653	19.20	-2.625	18.75	2.171	11.80
Distance to fertiliser shop, in KM	-0.665	0.683	-1.973***	0.648	-2.039***	0.573
Death of a family member (1=yes)	8.942	10.33	11.44	10.16	9.453	10.60
Group/association membership (1= yes)	-2.911	6.847	-2.450	6.409	6.116	7.021
Constant	10.31	29.35	-95.18**	40.57	-52.91**	22.70
Year dummies included	YES		YES		YES	
Zone dummies included	NO		YES		YES	
Time means included	NO		YES		NO	
Observations	**4,457**		**4,455**		**4,452**	
Number of hhid	1,472		1,472		1,472	
Goodness of fit	0.422		0.419		0.414	

Source: Tegemeo data
Note 1: Significance levels are denoted: *p<0.10; **p<0.05; ***p>0.01
Note 2: The model uses the full unbalanced panel which includes male-headed households. To account for gender differences, an interaction term between gender and off-farm income is inserted.
Note 3: Robust standard errors.

Table 13:
Estimates of the impact of number of income sources on crop sale (in 1,000 KSh) (full unbalanced panel)

	FE		CRE		RE	
Parameter	Estimate	SE	Estimate	SE	Estimate	SE
Age of HH head			-0.456	0.281	-0.519	0.404
Gender of HH head (ref: male)			22.16	23.69	14.09	13.42
Fraction of HH members with secondary education	31.70**	12.78	14.11	9.963	21.42**	9.048
Off-farm income, in 1,000 KSh (inflation-adjusted)	9.557**	4.587	9.665**	4.605	8.025*	4.235
Off-farm income*Gender of HH head (ref: male)	-4.759	7.399	-4.611	7.385	-6.805**	3.451
Number of cultivated acres	13.23**	6.507	13.23**	6.501	15.65***	1.511
Number of different high-value crops cultivated	8.863***	2.418	9.252***	2.504	11.22***	4.077
Fertiliser expenditure, in 100 KSh (inflation-adjusted)	0.258***	0.068	0.259***	0.068	0.263***	0.0249
Hired labour expenditure, in 100 KSh (inflation-adjusted)	-0.0303	0.0417	-0.0301	0.0421	0.0363	0.060
HH received credit (1=yes)	7.238	4.641	6.152	4.515	9.636	9.070
HH labour share, %	-8.054	14.33	-4.895	15.26	-1.972	11.46
Distance to fertiliser shop, in KM	-0.855*	0.450	-1.505***	0.475	-1.479***	0.457
Death of a family member (1=yes)	10.53	8.478	11.19	8.540	9.208	9.949
Group/association membership (1= yes)	3.753	5.797	3.067	5.829	13.19*	7.551
Constant	-11.11	35.59	-57.16	44.87	-40.13*	23.79
Year dummies included	YES		YES		YES	
Zone dummies included	NO		YES		YES	
Time means included	NO		YES		NO	
Observations	**5,391**		**5,389**		**5,389**	
Number of hhid	1,479		1,479		1,479	
Goodness of fit	0.389		0.391		0.392	

Source: Tegemeo data
Note 1: Significance levels are denoted: *p<0.10; **p<0.05; ***p>0.01
Note 2: The model uses the full unbalanced panel which includes male-headed households. To account for gender differences, an interaction term between gender and off-farm income is inserted.
Note 3: Robust standard errors.

Table 14:
Estimates of the impact of share of off-farm income on crop sale (in 1,000 KSh) (full unbalanced panel)

	FE		CRE		RE	
Parameter	Estimate	SE	Estimate	SE	Estimate	SE
Age of HH head			-0.448	0.277	-0.504	0.395
Gender of HH head (ref: male)			5.015	8.832	-8.727	6.082
Fraction of HH members with secondary education	30.17**	12.87	12.48	9.995	22.05**	9.228
Off-farm income, in 1,000 KSh (inflation-adjusted)	-0.0299	0.0185	-0.0304	0.0187	-0.0316***	0.009
Off-farm income*Gender of HH head (ref: male)	0.0466	0.0317	0.0516*	0.030	0.0319	0.022
Number of cultivated acres	13.25**	6.502	13.24**	6.496	15.66***	1.519
Number of different high-value crops cultivated	9.022***	2.428	9.435***	2.513	10.94***	3.750
Fertiliser expenditure, in 100 KSh (inflation-adjusted)	0.259***	0.068	0.259***	0.068	0.263***	0.025
Hired labour expenditure, in 100 KSh (inflation-adjusted)	-0.0305	0.042	-0.030	0.042	0.039	0.063
HH received credit (1=yes)	7.773*	4.596	6.667	4.467	9.966	9.033
HH labour share, %	-7.119	14.27	-3.992	15.21	-1.331	11.27
Distance to fertiliser shop, in KM	-0.834*	0.453	-1.485***	0.474	-1.481***	0.443
Death of a family member (1=yes)	9.773	8.481	10.47	8.540)	8.739	9.655
Group/association membership (1= yes)	3.661	5.796	2.983	5.827	12.82*	7.246
Constant	19.86	27.20	-65.46**	32.12	-16.36	15.05
Year dummies included	YES		YES		YES	
Zone dummies included	NO		YES		YES	
Time means included	NO		YES		NO	
Observations	**5,391**		**5,389**		**5,389**	
Number of hhid	1,479		1,479		1,479	
Goodness of fit	0.392		0.391		0.389	

Source: Tegemeo data
Note 1: Significance levels are denoted: *p<0.10; **p<0.05; ***p>0.01
Note 2: The model uses the full unbalanced panel which includes male-headed households. To account for gender differences, an interaction term between gender and off-farm income is inserted.
Note 3: Robust standard errors.

Appendix IV: robustness check, income diversification and poverty

Table 15:
Estimates of the impact of income diversification on poverty status (poor=1) among women-headed households (unbalanced panel)

	RE probit		**RE probit**		**RE probit**	
Parameter	Estimate	SE	Estimate	SE	Estimate	SE
Age of HH head	-0.005	0.005	-0.003	0.005	-0.00121	0.004
Fraction of HH members with secondary education	-0.122	0.218	-0.374*	0.198	-0.424**	0.193
Off-farm income, in 1,000 KSh (inflation-adjusted)	-0.00860***	0.001				
Number of income sources			-0.238***	0.052		
Share of off-farm income/total income, %					0.0002	0.0006
Number of cultivated acres	-0.0830***	0.027	-0.0784***	0.025	-0.0801***	0.025
Number of different high-value crops cultivated	-0.0378	0.0405	-0.0349	0.037	-0.041	0.036
Fertiliser expenditure, in 100 KSh (inflation-adjusted)	-0.00161*	0.0009	-0.00187**	0.0007	-0.00174**	0.0008
Hired labour expenditure, in 100 KSh (inflation-adjusted)	0.001	0.002	-0.002	0.002	-0.001	0.002
HH received credit (1=yes)	-0.092	0.104	-0.126	0.095	-0.153	0.094
HH labour share, %	-1.103***	0.324	-0.920***	0.291	-0.875***	0.283
Distance to fertiliser shop, in KM	0.005	0.010	0.014	0.010	0.014	0.009
Death of a family member (1=yes)	0.515***	0.132	0.414***	0.118	0.435***	0.116
Group/association membership (1= yes)	-0.0472	0.124	-0.113	0.110	-0.141	0.109
Constant	3.103***	0.653	2.256***	0.543	1.434***	0.506
Year dummies included	YES		YES		YES	
Zone dummies included	YES		YES		YES	
Observations	**1,123**		**1,123**		**1,123**	
Number of hhid	428		428		428	

Source: Tegemeo data
Note 1: Significance levels are denoted: *p<0.10; **p<0.05; ***p>0.01
Note 2: Women-headed households only.
Note 3: Incomes are deflated to 2009 Kenya Shillings (KSh) using the consumer price index.
Note 4: Random effects model.
Note 5: Robust standard errors

Table 16:
Estimates of the impact of income diversification on poverty status (poor=1) among women-headed households (unbalanced panel)

	CRE probit		CRE probit		CRE probit	
Parameter	Estimate	SE	Estimate	SE	Estimate	SE
Age of HH head	0.0006	0.005	0.002	0.005	0.003	0.005
Fraction of HH members with secondary education	-0.134	0.222	-0.348*	0.197	-0.390**	0.193
Off-farm income, in 1,000 KSh (inflation-adjusted)	-0.0113***	0.001				
Number of income sources			-0.277***	0.066		
Share of off-farm income/total income, %					-0.00008	0.0005
Number of cultivated acres	-0.0804**	0.038	-0.0641*	0.038	-0.0684*	0.039
Number of different high-value crops cultivated	-0.0563	0.046	-0.0439	0.043	-0.0471	0.043
Fertiliser expenditure, in 100 KSh (inflation-adjusted)	-0.001	0.0009	-0.00167**	0.0008	-0.00150*	0.0009
Hired labour expenditure, in 100 KSh (inflation-adjusted)	0.00002	0.003	-0.0009	0.002	-0.0009	0.002
HH received credit (1=yes)	-0.127	0.122	-0.177*	0.107	-0.210**	0.105
HH labour share, %	-0.145	0.407	0.140	0.351	0.141	0.341
Distance to fertiliser shop, in KM	0.009	0.011	0.017	0.010	0.016	0.010
Death of a family member (1=yes)	0.378**	0.173	0.271*	0.154	0.272*	0.152
Group/association membership (1= yes)	-0.099	0.160	-0.134	0.141	-0.159	0.140
Constant	5.126***	1.179	3.455***	1.003	2.864***	0.962
Year dummies included	YES		YES		YES	
Zone dummies included	YES		YES		YES	
Observations	**1,123**		**1,123**		**1,123**	
Number of hhid	428		428		428	

Source: Tegemeo data
Note 1: Significance levels are denoted: *p<0.10; **p<0.05; ***p>0.01
Note 2: Women-headed households only.
Note 3: Incomes are deflated to 2009 Kenya Shillings (KSh) using the consumer price index.
Note 4: Correlated random effects model.
Note 5: Robust standard errors.

Table 17:
Estimates of the impact of off-farm income (in 1,000 KSh) on poverty status (poor=1) (full unbalanced panel)

	FE		**CRE**		**RE**	
Parameter	Estimate	SE	Estimate	SE	Estimate	SE
Age of HH head			0.0106***	0.002	0.005	0.004
Gender of HH head (ref: male)			0.164	0.130	0.0597	0.157
Fraction of HH members with secondary education	0.321	0.251	0.321	0.251	-0.161***	0.037
Off-farm income, in 1,000 KSh (inflation-adjusted)	-0.0149***	0.001	-0.00812***	0.001	-0.00770***	0.001
Off-farm income*Gender of HH head (ref: male)	-0.002	0.002	-0.001	0.001	-0.0002	0.001
Number of cultivated acres	-0.0365**	0.017	-0.0365**	0.017	-0.0175	0.022
Number of different high-value crops cultivated	-0.177***	0.037	-0.177***	0.037	-0.0970***	0.023
Fertiliser expenditure, in 100 KSh (inflation-adjusted)	-0.0004	0.001	-0.0001	0.001	-0.0008	0.001
Hired labour expenditure, in 100 KSh (inflation-adjusted)	-0.0017	0.001	-0.00173	0.001	-0.00199**	0.001
HH received credit (1=yes)	-0.0776	0.094	-0.0776	0.094	-0.0739	0.112
HH labour share, %	-0.762**	0.307	-0.762**	0.307	-1.001***	0.211
Distance to fertiliser shop, in KM	-0.006	0.009	-0.006	0.009	-0.007	0.011
Death of a family member (1=yes)	0.351**	0.144	0.351**	0.144	0.270***	0.066
Group/association membership (1= yes)	-0.046	0.128	-0.046	0.128	-0.121*	0.069
Constant			3.012***	0.285	2.119***	0.224
Year dummies included	YES		YES		YES	
Zone dummies included	NO		YES		YES	
Time means included	NO		YES		NO	
Observations	**5,389**		**5,389**		**5,389**	
Number of hhid	1,479		1,479		1,479	

Source: Tegemeo data
Note 1: Significance levels are denoted: *p<0.10; **p<0.05; ***p>0.01
Note 2: The model uses the full unbalanced panel which includes male-headed households. To account for gender differences, an interaction term between gender and off-farm income is inserted.
Note 3: Robust standard errors.

Table 18:
Estimates of the impact of number of income sources on poverty status (poor = 1) (full unbalanced panel)

	FE		CRE		RE	
Parameter	Estimate	SE	Estimate	SE	Estimate	SE
Age of HH head					0.0114***	0.003
Gender of HH head (ref: male)			0.0886	0.226	0.0286	0.183
Fraction of HH members with secondary education	-0.0235	0.228	-.550***	0.097	-0.700***	0.064
Off-farm income, in 1,000 KSh (inflation-adjusted)	-0.532***	0.054	-0.313***	0.030	-0.295***	0.035
Off-farm income*Gender of HH head (ref: male)	0.0745	0.116	0.0418	0.065	0.0723*	0.042
Number of cultivated acres	-0.0410***	0.015	-0.009	0.017	-0.0254	0.015
Number of different high-value crops cultivated	-0.150***	0.033	-0.0786***	0.017	-0.0744***	0.021
Fertiliser expenditure, in 100 KSh (inflation-adjusted)	-0.000772*	0.001	-0.000929***	0.002	-0.001	0.001
Hired labour expenditure, in 100 KSh (inflation-adjusted)	-0.0019	0.001	-0.00141*	0.008	-0.00297***	0.001
HH received credit (1=yes)	-0.111	0.084	-0.064	0.047	-0.0881	0.107
HH labour share, %	-0.537*	0.278	-0.208	0.165	-0.825***	0.156
Distance to fertiliser shop, in KM	0.005	0.008	-0.003	0.004	-0.004	0.009
Death of a family member (1=yes)	0.165	0.126	0.118	0.076	0.225***	0.043
Group/association membership (1= yes)	-0.205*	0.112	-0.107*	0.063	-0.205***	0.057
Constant			2.054***	0.279	1.386***	0.248
Year dummies included	YES		YES		YES	
Zone dummies included	NO		YES		YES	
Time means included	NO		YES		NO	
Observations	**5,391**		**5,389**		**5,389**	
Number of hhid	1,479		1,479		1,479	

Source: Tegemeo data
Note 1: Significance levels are denoted: *p<0.10; **p<0.05; ***p>0.01
Note 2: The model uses the full unbalanced panel which includes male-headed households. To account for gender differences, an interaction term between gender and number of income sources is inserted.
Note 3: Robust standard errors.

Table 19:
Estimates of the impact of share of off-farm income on poverty status (poor = 1) (full unbalanced panel)

	FE		CRE		RE	
Parameter	Estimate	SE	Estimate	SE	Estimate	SE
Age of HH head			0.0150***	0.002	0.0108***	0.003
Gender of HH head (ref: male)			0.255**	0.113	0.261**	0.104
Fraction of HH members with secondary education	0.0707	0.222	-0.548***	0.095	-0.693***	0.072
Off-farm income, in 1,000 KSh (inflation-adjusted)	0.0003	0.001	0.00016*	0.001	0.0001	0.001
Off-farm income*Gender of HH head (ref: male)	-0.0006	0.001	0.0003	0.001	0.0004	0.001
Number of cultivated acres	-0.0396***	0.015	-0.0092	0.017	-0.0223	0.015
Number of different high-value crops cultivated	-0.147***	0.032	-0.0790***	0.017	-0.0752***	0.023
Fertiliser expenditure, in 100 KSh (inflation-adjusted)	-0.000646*	0.001	-0.000868***	0.003	-0.000953***	0.001
Hired labour expenditure, in 100 KSh (inflation-adjusted)	-0.00222*	0.001	-0.00158*	0.001	-0.00307***	0.001
HH received credit (1=yes)	-0.138*	0.081	-0.0795*	0.046	-0.101	0.103
HH labour share, %	-0.527*	0.271	-0.186	0.162	-0.807***	0.145
Distance to fertiliser shop, in KM	0.0012	0.008	-0.0035	0.004	-0.0047	0.009
Death of a family member (1=yes)	0.222*	0.123	0.143*	0.075	0.240***	0.042
Group/association membership (1= yes)	-0.190*	0.108	-0.107*	0.062	-0.214***	0.064
Constant			1.336***	0.226	0.422*	0.223
Year dummies included	YES		YES		YES	
Zone dummies included	NO		YES		YES	
Time means included	NO		YES		NO	
Observations	**5,391**		**5,389**		**5,389**	
Number of hhid	1,479		1,479		1,479	

Source: Tegemeo data
Note 1: Significance levels are denoted: *p<0.10; **p<0.05; ***p>0.01
Note 2: The model uses the full unbalanced panel which includes male-headed households. To account for gender differences, an interaction term between gender and share of off-farm income is inserted.
Note 3: Robust standard errors.

Appendix V: differences among woman heads

Table 20:
Estimates of the impact of age of household head on per capita income

	RE	
Parameter		
Age of HH head	2,862***	963.3
Age of HH squared	-25.19***	8.328
HH size	-7,701***	1,234
Number of acres cultivated	4,997***	1,372
Fraction of HH members with secondary education	15,596*	9,044
Fertiliser expenditure	0.006	0.314
Hired labour expenditure	1.633	1.078
Constant	16,222	28,666
Year dummies included	YES	
Zone dummies included	YES	
Observations	**947**	
Number of hhid	400	

Source: Tegemeo data
Note 1: Significance levels are denoted: *p<0.10; **p<0.05; ***p>0.01
Note 2: Randomised effects model.

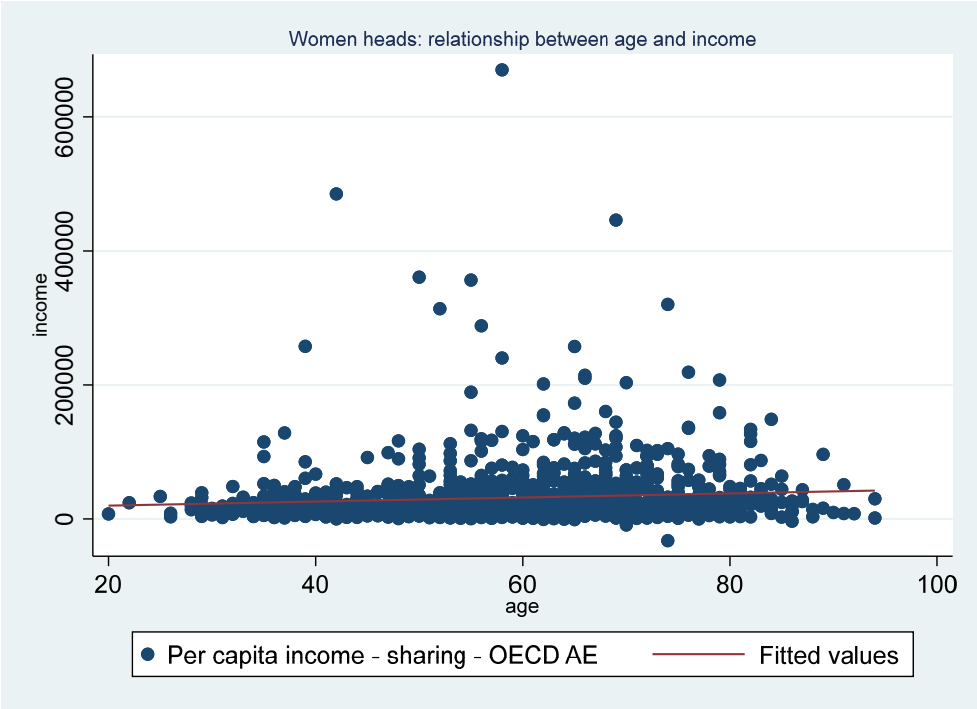

Figure 8: The relationship between age of household head and income
Source: Tegemeo data

Table 21:
Comparison table between women-headed households who are present in all waves versus present in some waves only.

Mean (Std. Err.)	WHH (present always)	WHH (present some waves)	p-value for t-test
Age of HH head	59.9 (0.512)	59.3 (0.573)	0.3681
Fraction of HH members with secondary education	.36 (0.014)	.35 (0.011)	0.7340
HH size (adult equivalent scale)	5.3 (0.138)	5.4 (0.112)	0.7136
Share farm income/total income, %	71.3 (2.270)	64.7 (2.300)	0.0414
Share of crop sale income/total income, %	22.2 (1.104)	21.8 (1.061)	0.8169
Share livestock income/total income, %	12.2 (1.062)	7.8 (2.089)	0.0635
Share non-agr. wage income/total income, %	7.4 (0.856)	8.1 (0.822)	0.5406
Share agr. wage income/total income, %	3.6 (0.522)	4.9 (0.554)	0.1008
Share self-employment income/total income, %	10.0 (0.898)	11.1 (0.870)	0.3841
Share transfers/total income, %	8.0 (0.717)	6.7 (0.947)	0.2832
Number of acres cultivated	3.6 (0.146)	3.5 (0.152)	0.7303
Number of high-value crops cultivated	1.9 (0.079)	1.8 (0.067)	0.3581
HH labour share, %	77.3 (0.006)	70.5 (0.023)	0.0054
Fertiliser expenditure, KSh	4,809.7 (465.9)	4,575.7 (381.8)	0.6978
Hired labour expenditure, KSh	850.0 (101.3)	973.7 (99.4)	0.3839
Distance to fertiliser shop, KM	3.8 (0.249)	4.5 (0.266)	0.0744
Group membership (1=yes)	0.70 (0.020)	0.68 (0.018)	0.3304
Death of HH member (1=yes)	.08 (0.011)	.31 (0.018)	0.0000

Source: Tegemeo data.

Appendix VI: regional gender-income gaps

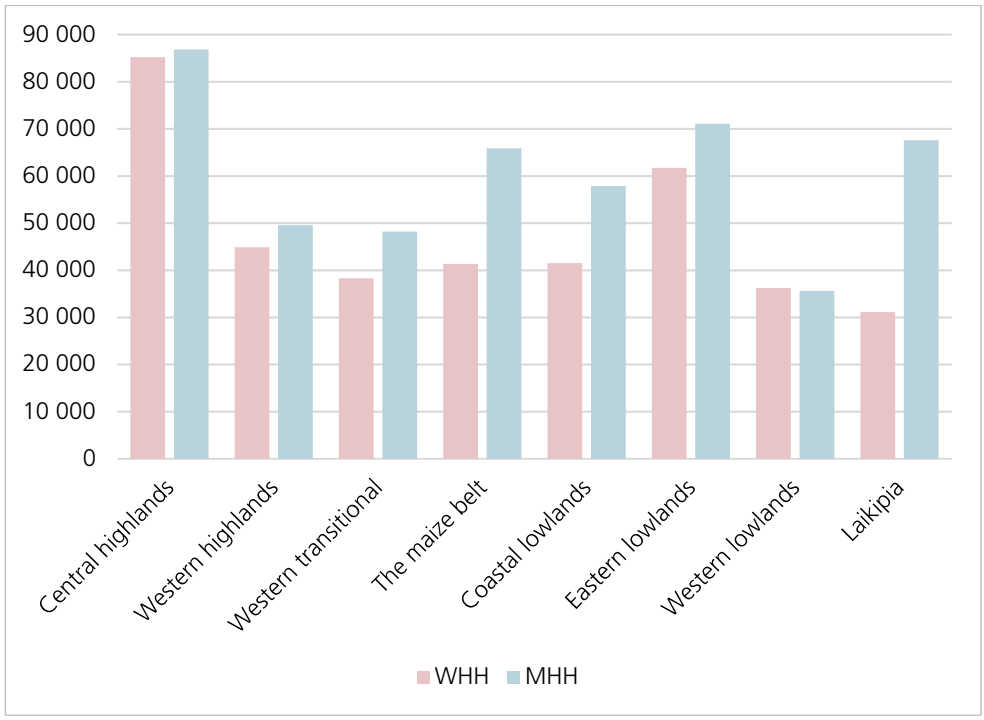

Figure 9: Robustness check: real per capita income by region and gender (only 'old' women headed households)
Source: Tegemeo data.

Table 22:
Comparison table between women- and men-headed households: mean per capita farm and off-farm income (mean 2000-2010; inflation adjusted)

Region	WHH per capita farm income	MHH per capita farm income	P-value for t-test (WHH=MHH)	WHH per capita off-farm income	MHH per capita off-farm income	P-value for t-test (WHH=MHH)
Central highlands	66,064.7	57,518.9	0.1020	22,465.2	28,755.3	0.1634
Western highlands	32,920.3	34,993.3	0.7290	8,403.6	14,448.5	0.1011
Western transitional	30,239.7	32,554.8	0.5344	7,539.2	15,226.9	0.0007
The maize belt	28,386.5	41,170.8	0.0056	13,120.4	23,737.1	0.0002
Coastal lowlands	19,259.6	31,656.3	0.2675	22,259.5	25,932.3	0.4758
Eastern lowlands	44,313.5	39,352.6	0.3858	22,147.4	30,549.4	0.0250
Western lowlands	19,611.2	20,797.3	0.6526	14,510.3	15,146.1	0.7702
Laikipia	16,682.6	26,734.9	0.0683	15,922.1	41,498.1	0.0246

Source: Tegemeo data

Paper IV

Rural Differentiation and Rural Change: Micro-level Evidence from Kenya*

Abstract

This study investigates how smallholder differentiation can be reconciled with processes of rural development. Conventional theories and policies are largely based on assumptions of an undifferentiated smallholder sector. Conversely, agrarian political economy literature argues that smallholder differentiation may indicate a path towards progressive rural development. To contribute to the debate, rural households are stratified into income classes, and accumulation patterns among each income class are examined. The analysis shows that smallholder differentiation does not seem to correlate with a dynamic rural development. Instead of accumulating wealth through farming, richer households have diversified to better-paid wage employment.

Keywords: rural differentiation; inequality; rural Africa; Kenya

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Introduction

This paper examines differentiation[1] within the smallholder sector and its effect on rural change in Kenya. Numerous studies have explored how a specific context affects rural livelihoods. However, the opposite relationship – that is, how livelihood changes affect rural development trajectories – has largely been neglected in conventional rural development thinking.[2]

Influenced by Lipton's (1977) urban-bias hypothesis, studies of inequality in sub-Saharan Africa have commonly been focused on rural-urban inequalities (Bezemer and Headey 2008; Sahn and Stifel 2003; Young 2013). Meanwhile, the few available studies of rural inequality have previously concentrated on the disparity between the small- and large-scale farming sectors and the consequences thereof (Alesina and Rodrik 1994; Deininger and Squire 1998; Griffin, Khan, and Ickowitz 2002). In these studies, the smallholder farming sector is typically characterised as egalitarian, consisting of homogenous family farmers, and the inequality that exists between them is deemed insignificant.[3]

However, this narrow conceptualisation of rural households does not correlate with recent empirical evidence indicating that rural households within the smallholder sector are becoming increasingly stratified (Bernstein 2010; Jayne et al. 2019; Jayne et al. 2016; Jayne et al. 2003; Hall, Scoones, and Tsikata 2017; Oya 2007, 2010b; Peters 2004; Wiggins 2000). An inaccurate conceptualisation of rural households has implications for the implementation of the smallholder-led rural development model,[4]

[1] A useful definition of socio-economic differentiation is found in Oya (2010b), who describes it as 'a process whereby inequality increases together with a growing fragmentation of labour into groups of people who increasingly depend on working for wages and groups who manage to accumulate a bit and employ other people's labour, and between groups who still depend on farm activities and groups who become increasingly reliant on non-farm sources of income' (page 2).

[2] Conventional literature refers to the neo-classical microeconomic smallholder theories that have come to dominate contemporary rural development thinking.

[3] As Wiggins (2000) noted, studies on differentiation within the smallholder sector were widespread in the 1970s and 1980s but then became uncommon. One example of past discussion is the influential 'Kenyan agrarian debate', which in the 1970s divided scholars on the question of the degree of stratification within the smallholder sector and its implications for rural change. Many of the contributions to the debate were published in the Review of African Political Economy and the Journal of Peasant Studies.

[4] The smallholder-led rural development model is defined loosely as focusing on smallholder farmers whose roles are seen as critical to successful poverty reduction. Through the connection of smallholders with incentives and markets, it is envisioned that smallholder subsistence agriculture can be transformed to a commercial agriculture sector capable of driving economic growth (see for example World Bank [2008]).

which hinges on assumptions of an undifferentiated smallholder sector in which most smallholders will benefit from initiatives that connect them with markets.

Inequalities within the smallholder sector are often tied to mass poverty. Increased market integration following the structural adjustment era, has led to increased hardship among smallholders. The agrarian crisis has been accompanied by tendencies of increased rural inequality, as the majority of farmers have become 'too poor to farm'. They are forced to carve out a living in a poorly remunerated off-farm sector, while only few have been able to benefit from commercialising their agriculture (Andersson Djurfeldt 2018; Bryceson 1996, 2000, 2002; Ellis 1998, 2000; Jayne et al. 2003; Alobo Loison 2016; Peters 2004; Whitehead 2009; Whitehead and Kabeer 2001).

Conversely, few studies have indicated that stratification might constitute a dynamic rural development path. Recent empirical studies have suggested that emergent investor farmers[5] who use hired labour to cultivate larger pieces of land may be a source of dynamism, technical change and commercialisation (Hall, Scoones, and Tsikata 2017; Jayne et al. 2019; Jayne et al. 2016).

The argument that richer farmers can drive rural development is similar to the 'differentiation theory' found in Agrarian Political Economy (APE). According to the theory, differentiation might lead to the emergence of a class of richer farmers who by using profits derived from agriculture to accumulate land and employ hired labour may be able to drive rural development (Byres 2003; Cousins 2010; Oya 2007, 2010b, 2010a). Evidence in support of the differentiation thesis stems from historical cases from pre-capitalist North America, pre-collectivist Russia[6] and green revolution India.[7] It is uncertain, though, whether results from different times and places can be applied to contemporary rural Africa.

Consequently, the present paper aims to contribute to the scarce literature on differentiation by asking how inequality among smallholders can be reconciled with agrarian change theories, including the differentiation theory. To do so, the paper uses a longitudinal dataset from rural Kenya spanning the early post-liberalisation era from 2000 to 2010. Apart from a few other African countries such as South Africa and Zimbabwe, Kenya stands out due to its longer history of land scarcity and uneven rural

[5] Thomas Jayne and his co-authors define emergent investor farmers as those who cultivate medium-scale farms of 5–100 hectares of land. Medium-scale farmers are the product of smallholder differentiation, as successful smallholders expand and consolidate more land, and of land acquisition made by wealthier urban and rural people who use off-farm incomes to invest in agricultural land (Jayne et al. 2016; Jayne et al. 2019).

[6] See Lenin (1956) on North America and Russia.

[7] See Bernstein (2010) on India.

structures. By combining micro-level data with secondary research, the paper explicitly links stratification at the micro-level with theories on emerging rural development trajectories, thereby allowing consideration of whether a) capitalist farmers are indeed emerging; and b) if it is viable to assume that they can drive future rural development.

The study confirms findings of differentiation among smallholder farmers. However, the process does not seem to correlate with a dynamic rural development. Profit possibilities in agriculture are few, as evidenced by a decline in farm incomes among all income classes. Instead of accumulating through farming, richer households have increased their income diversification towards wage employment. The consequence of this is likely to be a growing rural labour surplus, as richer and poorer households have diversified away from the farm. This may depress rural wages and cause increased migration and poverty.

The empirical findings of this study have implications for rural development theory, as they demonstrate a need to incorporate inequality within the smallholder sector into theories of rural change. Implementing a smallholder-led rural development model, which is based on an assumption of homogenous rural producers under conditions of increased income diversification and increased rural inequality, threatens the two objectives of the model – namely, poverty reduction and raised agricultural production. First, few households will gain from policies aimed at increasing smallholder production, while the majority who are becoming increasingly dependent on off-farm income might lose out, intensifying existing rural inequality and poverty levels. Second, as the majority of households have begun to devote their energies to off-farm activities, it is questionable whether the promotion of smallholder agriculture will be able to raise total agricultural production.

While Kenya may not appear to be a representative case study, the findings might have implications for other African countries, many of which are currently undergoing a similar process of shifting from land abundance to relative land scarcity, which is often associated with a rise in land concentration (Hall, Scoones, and Tsikata 2017; Jayne, Chamberlin, and Headey 2014; Peters 2004).

The rest of this article is organised as follows: Section 2 presents an overview of dominant conceptualisations of the role of rural inequality in wider rural development. This is followed by data and methodological considerations, presented in Sections 3 and 4. Trends in smallholder differentiation and accumulation patterns are analysed in Sections 5 and 6, and Section 7 presents the study's conclusions.

Conceptual introduction: rural inequality and rural development

To locate the current debates on smallholder differentiation, this section summarises the predominant conceptualisations of rural inequality and rural change.

Conventional 'smallholder' rural development theories

From the 1970s onwards, smallholders became the focal point of rural development. In the wake of the economic crises of the 1980s and what was seen as widespread government failures, the smallholder-orientated rural development field merged with market-orientated microeconomic theories of production and resource allocation. The idea behind the merger was that smallholder farming, being the most productive and efficient type of agricultural production, would prosper in a free market economy. This implied that a rural development based on small-scale production was both efficient and egalitarian (Griffin, Khan, and Ickowitz 2002; Hazell et al. 2010; Larson et al. 2016; Lipton 2006).

The field has produced a range of stylised beliefs, such as the idea that the smallholder sector consists of small-scale homogenous producers, and rural labour markets are thin, as processes of both labour hiring and labour selling are infrequent.[8] Consequently, households are largely undifferentiated, and rural inequality levels among them play an insignificant role in wider rural development.[9] This notion of undifferentiated smallholders can be traced back to the Russian economist Chayanov ([1925] 1966). Chayanov argued that despite increased market integration, differentiation among smallholder farmers would only be temporary.

Since the 1990s, a growing field of livelihood studies has challenged the simplistic conceptualisation of rural households as undifferentiated small-scale farmers.

[8] For critical assessments of the stylised facts advanced in conventional rural development theory; see Cousins (2010), Cramer, Oya, and Sender (2008), Oya (2010b), and Sender, Oya, and Cramer (2006).

[9] Not all 'conventional' scholars would agree with the stylised facts. For instance, the mentioned studies by Thomas Jayne and his co-authors have compellingly challenged the conception of an undifferentiated smallholder sector.

Livelihood studies: a way forward?

Livelihood approaches recognise that rural people do not focus on one economic activity such as agriculture but instead derive their income from numerous activities stemming predominantly from self-employment pursuits. While, some households will be able to combine, off-farm income with investments in commercial agriculture, other households, often due to lack of land, struggle to maintain a foothold in agriculture, forcing them to diversify towards low-return off-farm activities (Ellis 1998, 2000).

A pessimistic interpretation of livelihood diversification and stratification has gained strong momentum (Bramall and Jones 2000; Bryceson 1996, 2000; Bryceson 1999, 2002).[10] The rise in livelihood diversification among smallholders is an indication of increased rural distress and the inability of the smallholder sector to sustain rural households. Differentiation has arisen, as few rural households are able to benefit from the market-orientated smallholder programmes implemented during and after the structural adjustment era. Therefore, the majority of households have been forced to diversify labour towards the informal off-farm sector. Accordingly, despite signs of stratification among smallholders, the outcome of income diversification is a general long-term process of 'de-agrarianisation', a shift away from farming associated with increased poverty levels, as the smallholder sector can no longer sustain rural livelihoods (Bryceson 1996).

However, the de-agrarianisation thesis has come under criticism for its' negative view on smallholder differentiation. Differentiation could, in the long-run, indicate a more dynamic rural development (Mueller 2011; Pontara 2010). A similar argument is found in Jayne et al. (2019) and Jayne et al. (2016). According to the studies, differentiation manifested in the growth of medium-scale investor farmers may be a dynamic driver of agricultural transformation. Through increased mechanisation and by using cash more intensively to invest in farming, investor farmers have higher productivity levels than smaller farms (Muyanga and Jayne 2019).

The arguments put forward by Thomas Jayne and his co-authors are largely based on empirical grounds. To uncover theoretical ties between differentiation and wider rural change and thereby generate findings applicable to a larger number of African countries, it is sensible to consult the APE literature.

[10] Deborah Bryceson defines de-agrarianisation as 'a long-term process of occupational adjustment, income-earning reorientation, social identification and spatial relocation of rural dwellers away from strictly agricultural-based modes of livelihoods.' (Bryceson 2002: 726)

The APE differentiation thesis

APE theories, inspired by the work of Lenin, place smallholder differentiation at the core of theories of agrarian change. Both Byres (2003) and Oya (2007) argue that an agricultural path where smallholders become more differentiated may be particularly relevant for poor developing parts of the world, including African countries.

The differentiation theory was first formulated by Lenin ([1899] 1956), occupied by questions regarding the transition to capitalism, articulated a route to (capitalist) rural development based on the increased differentiation of the peasantry. In his work, Lenin identified three groups of peasants: poor peasants who, due to competition and impoverishment, have too little land and have to sell their labour to survive; middle peasants, who own enough land to survive without having to sell their labour; and rich peasants. Over time, as smallholders become integrated in the world economy, the middle peasantry merges with either the poor or the rich peasants, and two distinct rural classes emerge. One consists of poor farmers who lose access to land, forcing them to sell their labour power for survival; the other is a class of rich capitalist farmers who are highly commercialised. As long as the richer farmers are able to exploit economies of scale by initiating and expanding a cycle of extended production based on accumulation of land and use of hired labour, they will be able to drive rural development.[11]

However, APE scholars do not presuppose that increased levels of differentiation leads to a progressive rural development and the outcome might as well be increased poverty (Oya 2010a).

To date, empirical studies of differentiation that applies political economy analysis have been scarce. Critical works include Sender and Smith's (1990) study of rural labour markets in North Tanzania, Mueller's (2011) thorough follow-up study on the same, and Oya (2007) on rural capitalist in Senegal.

The opposing viewpoints on differentiation and its role in wider rural change are presented in Figure 1. Two caveats pertain to Figure 1. First, the aim of the study is not to examine directly whether richer 'smallholder' farmers are able to utilise economies of scale. The relationship between various farm sizes and land and labour productivity has been studied elsewhere (see e.g. Dzanku [2015]; Fan and Chan Kang [2005]; Muyanga and Jayne [2019]). Second, the study does not analyse if equal opportunities are present in the smallholder sector. Based on livelihood literature on

[11] Historical studies confirm the existence of labour-hiring rural capitalist classes (see Hill [1963] and Austin [2005] on rural entrepreneurs in West Africa, including the Asante cocoa farmers).

stratification, the study takes as its' point of departure that smallholders face different opportunities and constraints.

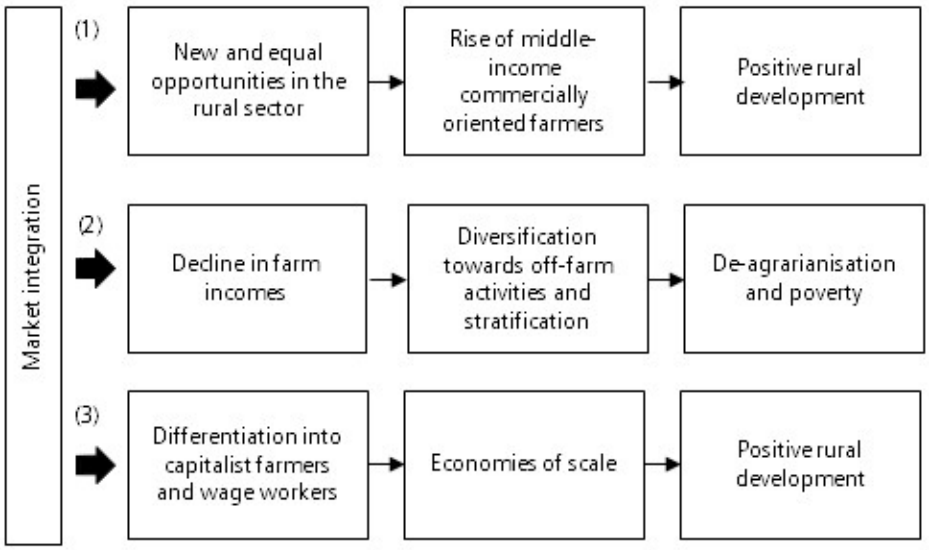

Figure 1: The role of differentiation in wider rural change
Note: (1): conventional smallholder theories, (2): rural livelihood diversification and de-agrarianisation theory, (3): APE differentiation theory.

The viewpoints can be summarised as follows:

- Conventional smallholder theories assume an undifferentiated smallholder sector. Rural development will be driven by fairly homogenous and commercially orientated smallholders who rely on family labour.
- According to several livelihood studies, there is stratification within the smallholder sector. However, the trajectory associated with increased rural inequality is assumed to be de-agrarinanisation and mass poverty.
- Conversely, the APE differentiation theory assumes that differentiation can constitute a way towards a progressive rural development driven by the expansion and accumulation of rich, commercially orientated farmers.

Accordingly, the current study makes two contributions to the existing literature on stratification. Empirically, the paper contributes by making use of a longitudinal micro-level dataset spanning ten years. Theoretically, the paper explicitly engages with the conceptualisations of differentiation within the smallholder sector delineated in Figure

1. To achieve this, accumulation patterns among income classes are analysed. However, first data and methodological considerations are discussed.

Data

The study relies on a randomly sampled quantitative household survey conducted by Tegemeo Institute of Agricultural Policy and Development (hereafter 'Tegemeo'), Egerton University and Michigan State University. Although household survey data that rely on simplistic questionnaires often mask complex social relations, the data has benefits that justify its use. First, the data is longitudinal, spanning ten years, which enables the researcher to study changes in, for example, land accumulation and labour hiring. Second, as the data is representative of the Kenyan rural population, results are more robust compared to purposively sampled survey data often used in APE studies (for examples, see Oya [2007]; Sender [2002]; and Sender, Oya, and Cramer [2006]).

The Tegemeo survey was designed to analyse trends in rural livelihoods and welfare. Data was collected across 24 districts and households were sampled to be representative at 'agro-regional zone' level (Owalde 2008). Table 1 shows the geographical distribution of households.

Table 1:
Geographical distribution of sampled households in the Tegemeo survey

Agro-regional zone	Agro-ecological zone	District	Number of households sampled
Coastal lowlands	CL	Kilifi	27
	CL	Kwale	3
Eastern lowlands	CL	Taita Taveta	4
	LM 3-6	Kitui	18
	LM 3-6	Machakos	20
	LM 3-6	Makueni	51
	LM 3-6	Mwingi	32
Western lowlands	LM 3-6	Kisumu	89
	LM 3-6	Siaya	59
Western transitional	LM 1-2	Bungoma	44
	LM 1-2	Kakamega	100
High potential maize zone	UM 2-6	Bungoma	35
	UM 2-6	Kakamega	24
	LH	Bomet	34
	LH, UM 2-6	Nakuru	96
	LH	Narok	23
	UM 2-6	Trans Nzoia	55
	UH, LH	Uasin Gishu	94
Western highlands	UM 0-1	Kisii	82
	UM 0-1	Vihiga	51
Central highlands	UM 0-1, UM 2-6, LH, UM 2-6	Meru	73
		Murang'a	57
		Nyeri	81
Marginal Rain Shadow	L	Laikipia	35

Source: Owalde (2008)

The households sampled were first interviewed in 1997, and then revisited in 2000, 2004, 2007 and 2010. Hence, by beginning in the year after the last round of structural adjustment policies had been implemented (Nyoro, Kiiru, and Jayne 1999), the period covers a critical era of Kenya's agricultural history, where market integration increased.

The survey data was used to construct a panel of rural households. The 1997 wave collected incomplete information on households' income and the wave is excluded from the panel. This left a final unbalanced panel of 1,479 households of which 1,243 households were present in all waves. An attrition analysis was conducted to see whether households that dropped out of the survey differed systematically from households that were present in all waves (known as 'attrition bias'). The analysis suggested that differences in per capita income did not influence if a household dropped out or remained in the survey (see Appendix I). However, as a robustness check, results are also calculated using a balanced panel where households that dropped out of the survey are removed (see Appendix II Table 13-15).

To examine trends in differentiation, differences across households' adult equivalent adjusted per capita income levels were considered.[12] To estimate rural incomes, best practice guidelines derived from a large research project, the Rural Income Generating Activities, developed by the Food and Agriculture Organization (FAO), the World Bank, and the American University were followed.

Although consumption or income data are preferred measures of household welfare, studies have used an asset-based wealth measure on the grounds that value of assets is a more appropriate measure of welfare (see e.g. Barrett and Swallow [2006]; Carter and Barrett [2006]; Muyanga, Jayne, and Burke [2010]). Unfortunately, the survey only collected and valued a small number of assets consistently across all survey rounds (Muyanga, Jayne, and Burke 2010).[13] Although, these assets are typically more prevalent among richer households, and their use may underestimate the welfare of poorer households, as a robustness check inequality was measured using asset wealth (see Appendix II Table 16-18).

Two other data limitations need mentioning. First, although, a ten-year time period is impressive for an African rural survey, it is insufficient for drawing final conclusions on rural change, and the author can only point to likely trajectories. It would have been preferable to include a recent wave, but unfortunately, there has been no follow-up survey since 2010. To attempt to uncover long-term trends, data from the earliest available representative rural survey, the 1974/5 Integrated Rural Survey (Government 1977), was used.[14] Second, by using data that track households over time, with the passing of years, the longitudinal data will no longer represent the general population, as household members will have aged. Although longitudinal data is better at pointing out likely patterns in accumulation and poverty, an overrepresentation of older household heads might lead to overestimations of poverty, and the levels should not be automatically inferred to the general rural population.

[12] To adjust household size, Tegemeo's recommended adult equivalent scale for rural Kenya was used. The adult equivalent scale developed by Tegemeo is documented in the survey design documents available online at tegemeo.org (last accessed January 2020).

[13] The full list of consistently collected items include ploughs, tractors and draft animal equipment, carts, trailers, cars, trucks, spray pumps, irrigation equipment, water tanks, stores, wheelbarrows, combine harvesters, donkeys, bulls, chickens, goats, sheep, calves, cows, pigs, turkeys and ducks (Muyanga, Jayne, and Burke 2010).

[14] Although rural surveys were conducted in 1950, 1960 and 1963, the 1974 rural survey was the first to collect income data of a representative sample of the rural population.

Method

Depending on theoretical inclination, there are many ways to abstract inequality or differentiation. Economists often examine the distribution of households that belong to specific income classes such as poor, middle-income, and rich. Landholding size and livelihood strategy are also common ways to conceptualise differentiation (Peters 2004). APE studies, however, in keeping with the Leninist definitions, tend to define classes as relational.

In this paper, differentiation was abstracted by following the income class stratification applied in economics studies.[15] It would have been useful to classify households according to social relations. However, quantitative survey data, unless specifically designed to do so, is not well suited for distinguishing 'classes'. Further, it is the author's belief that distinct wealth categories or classes have yet to emerge in African rural societies, including Kenya.

Instead, a middle ground was followed. First, rural households were stratified into income classes and then, to explore whether any capitalist tendencies appear to be emerging, accumulation patterns among each income class were examined.

To stratify households according to income class, a method used by Banerjee and Duflo (2008) was applied. The authors use an absolute measure of income classes to define households in developing countries. The poor are defined as households/individuals with less than USD 2 per capita per day[16]; the middle-income class are defined as those having between USD 2–10 per day; while the rich households have per capita incomes above USD 10 per day.

The African Development Bank (AfDB) has used a similar absolute measure to stratify households. However, their measure makes more assumptions about the middle-income class (Mubila, Aissa, and Lufumpa 2011). The poor are classified as individuals/households who have incomes below USD 2 per capita per day, while the rich are defined as individuals/households who have above USD 20 per day. The

[15] These measures were not specially designed to examine rural economies, and they rely on the assumption that welfare can be monetised, either by using expenditure or income data. Poverty is generally considered multi-dimensional, and numerous poverty measures are suggested in the global poverty literature, including non-monetary measures. Nevertheless, such measures are typically recommended as complementary to income- or consumption-based poverty measures (Atkinson 2017). For that reason and due to paucity on data, this study relied on an income-based measure of poverty.

[16] The cut-off point is similar to the second International Poverty Line defined by the World Bank.

middle class is therefore extended to include those with USD 10–20 per capita per day. The AfDB further classifies the middle class into:

- Floating income class (USD 2–4 per capita per day): households/individuals in this group are vulnerable to slipping into poverty in the event of shocks.
- Lower-middle income class (USD 4–10 per capita per day): this group lives above subsistence level and is able to save and consume non-essential items.
- Upper-middle income class (USD 10–20 per capita per day).

Finally, the 'rich' are defined as households with per capita income above USD 20.

For the present study, the simple measure defined by Banerjee and Duflo (2008) is preferred due to its fewer assumptions about the middle-income class. However, by having a lower cut-off point compared to the AfDB's USD 20, the simple measure comes with the disadvantage of potentially overestimating the share of richer households. Results are therefore discussed in consideration of the AfDB and the asset wealth measure. A commonly used relative income measure is also used as a robustness check. Following Easterly (2001), the relative measure defines the middle class as those lying between the 20th and 80th percentile on the consumption distribution. It follows that the poor are those who consume below the 20th percentile and the rich consume above the 80th percentile.

Purchasing power parity (PPP) exchange rates are used to convert the USD cut-off points to the local currency, Kenya Shillings (KSh).

Differentiation within the smallholder sector

In the post-liberalisation era, which is the focus of the current study, there is mixed evidence on rural inequality. The privatisation of the cereal market might have created 'winners' and 'losers' as the prices and production of food crops decreased drastically (Nyoro, Kiiru, and Jayne, 1999), while the price and productivity of smallholder cash crop such as tea rose slightly.[17] According to a report, Kenya saw a rise in the national Gini coefficient from 0.45 in 1994 to 0.57 in 1999 and a Gini coefficient for rural areas of 0.54 in 1999 (SID 2004). This trend towards relatively high levels of inequality is supported by Jayne et al. (2003), who found evidence of increased land concentration

[17] Inflation-adjusted tea prices rose from 275 KSh per KG in 1990 to 290 KSh per KG in 2000. Land productivity increased marginally from 1,642 KG per hectare in 1990 to 1,793 KG per hectare in 1999. Data is taken from the Economic Surveys 1990 and 1999 available online at www.knbs.or.ke.

within the smallholder sector between 1994 and 2006. Contrastingly, a study by Suri et al. (2009) – which also relied on the Tegemeo data used in this paper – reported a decline in income inequality in the smallholder sector indicated by a Gini coefficient of 0.53 in 1997 and of 0.47 in 2007. As the robustness checks detailed in Table 9 in Appendix II demonstrate, Gini coefficients are sensitive to data specifications such as the removal of outliers from the dataset. Consequently, this study finds Gini coefficients in the range 0.45 to 0.50 (see Table 2 and Table 9 in Appendix II).[18] In contrast to Suri et al.'s (2009) findings, inequality appears to have risen between 2000 and 2004 and remained stable thereafter (Table 2). The rise in inequality indicated is fairly robust when subject to different data specifications. However, the use of the asset measure drastically increases the Gini coefficient in all years (Appendix II Table 9). This was expected, as the list of assets used to construct the asset measure was narrow and did not apply well to poorer households.

A Gini coefficient of between 0.45 to 0.50 is lower than that of Southern African countries, where Gini coefficients are in the range of 0.55 to 0.75; nevertheless, it is higher than that of Asian countries, where the Gini coefficient of rural areas is typically between 0.30 and 0.38 (Oya 2010b).

Table 2:
Income inequality within the smallholder sector, 2000-2010

Variable/year	2000		2004		2007		2010	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Gini coefficient	0.46	0.009	0.51	0.012	0.50	0.016	0.50	0.014
Gini coefficient measured by Suri *et al.* (2009)	0.49	n/a	0.49	n/a	0.47	n/a	n/a	n/a

Source: Tegemeo data.

To engage with the theories discussed in Figure 1, the next subsection divides the rural population into poor, middle, and rich income classes, and subsequently examines the accumulation patterns of each income class.

[18] The differences in Gini coefficients and trajectory probably arise due to the methods used to determine rural income. In contrast to the study by Suri et al. (2009), this study, in order to consider self-subsistent households, includes the value of retained production (harvest minus sales) in the income measure.

Rural income classes

Figure 2 shows the proportion of households in each income class. As controls, distributions according to the AfDB, the relative income measures and the asset wealth measure are presented in Appendix II.

The simple absolute measure shows an increase in the proportion of poor households and a decline in middle-income class households (Figure 2). The proportion of 'richer' households is stable (close to 6%), although declining.

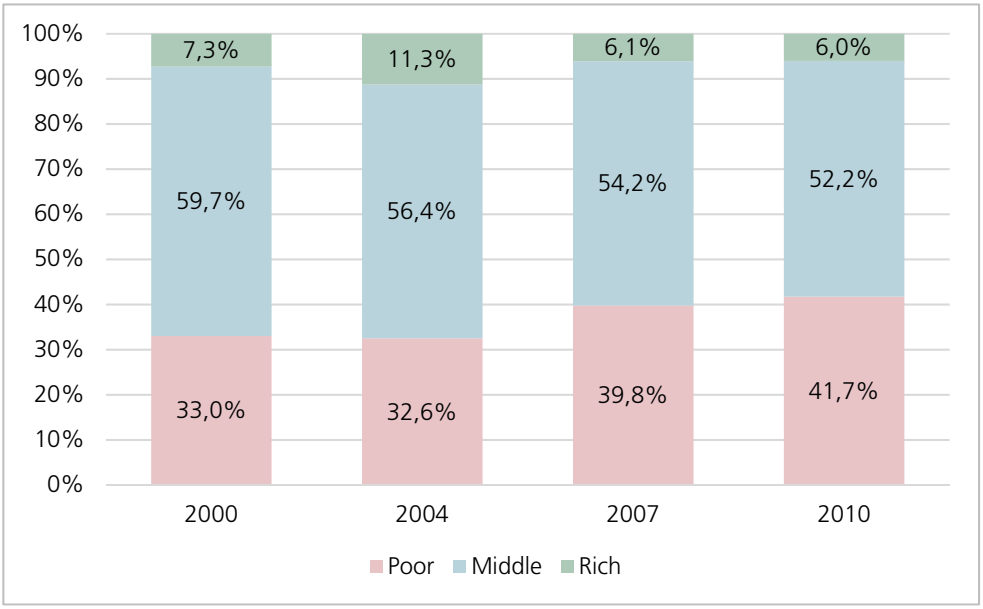

Figure 2: Income distribution of households 2000 to 2010: absolute poor, middle (simple measure)
Source: Tegemeo data.
Note 1: Households are classified using an absolute measure as described in Banerjee and Duflo (2008).
Note 2: Unbalanced panel.
Note 3: The study by Suri *et al.* (2009) which relies on the same data reports a decline in poverty rates. Instead of using the USD 2 per capita income per day poverty line which is applied in this study the official Kenya national poverty line is applied. Using the official poverty line, the authors report poverty rates that are slightly higher than the rates reported in this study yet declining: 42.3% in 2000, 41.7% in 2004 and 37.6% in 2007. The low level in 2007 might be attributed to assumptions made to estimate the 2007 official Kenya poverty line. Official poverty lines are reported for 1997, 2005, and 2015. To estimate a poverty line for 2007, the authors use the 2005 Kenya poverty line to extrapolate. However, the period after 2005 has seen a rise in inflation and the latest 2015 poverty line was adjusted upwards to factor in inflation. If one uses the log growth in the poverty line between 2005 and 2015 to extrapolate the 2007 level, poverty has in fact gone up (results are not reported). Perhaps indicating that a rise in poverty is plausible, the study by Suri *et al.* (2009) reports declining real incomes between 2000 and 2004 and again between 2004 and 2007.

Using the AfDB upper-bound definition of 'rich' households naturally lowers the proportion, suggesting that the richer farmers in the sample are more akin to the upper-middle income class (see Appendix II Figure 4). The AfDB categorisation of households further suggests that the proportion of lower-middle income households has declined.

Similarly, the relative measure also shows an increase in the share of poor households (see Appendix II Figure 5). However, in contrast to the absolute measures, a rise in the share of middle-income households is recorded. There is reason, however, to suspect that the relative income measure overestimates the share of richer households and underestimates the share of poorer households. The average per capita income for a household above the 80th income percentile (i.e., a rich household) is just USD 13, which is below the USD 20 income cut-off point set by the AfDB. Moreover, the share of poor households is underestimated, as households who have below USD 2 are placed in the middle-income class. The asset wealth measure also shows an increase in the share of poor households and a decrease in middle-income and rich households, and yet the proportion of poor people is larger. This was expected, as many poor households do not possess the assets that are used to calculate the wealth measure (see Appendix II Table 16-18). Results only change marginally when removing outliers from the data or applying the balanced panel (see Appendix II Table 10-15).

To compare the distribution with past measures, Table 3 presents income class distribution from the 1974/5 Kenya Integrated Rural Survey. Unfortunately, PPP exchange rates are not available before 1990, making it impossible to directly compare the proportions of each income category to the contemporary results. It is, however, a safe assumption that the measure of absolute poverty has not changed drastically in the 30-year period. Hence, one can start by comparing the proportion of poor households. In 1974, the estimated share of absolute poor households was 29%. In 2010, using the World Bank (1.90 USD) measure of absolute poverty, the share had risen to 39.6%.19

It is more problematic to compare the middle-income and the relatively rich households, as the cut-off points for each income class are different. However, the absolute poverty level can be used as a benchmark. In 1974, richer households were defined as having incomes above KSh 8,000 per year – four times the absolute poverty level. Such a definition placed 25% of households in the rich category. When applying a similar cut-off point of four times the absolute level (USD 7.6 per capita per day), the proportions of richer households are: 13.4% in 2000, 16.2% in 2004, 11.1% in 2007 and 10.6% in 2010.

[19] Calculated using the Tegemeo survey data.

Table 3:
1974 income distribution of households in %, poor, middle, rich (simple absolute measure)

Income class/year	1974	2000	2004	2007	2010	Trajectory
Poor (< 2,000 KSh.)	29%	30.7%	29.8%	37.8%	39.6%	⬆
Middle (2,000 – 8,000 KSh.)	46%	55.9%	54.0%	51.1%	49.8%	⬆
Rich (> 8,000 KSh.)	25%	13.4%	16.2%	11.1%	10.6%	⬇

Source: The estimates are available in Collier and Lal (1980). The authors calculate proportions based on the 1974 Integrated Rural Survey data.
Note 1: For 2000 to 2010, absolute poverty is calculated using the International Poverty Line (USD 1.90). The proportion of rich households is calculated using a cut-off point of four times the absolute poverty line. The share of middle-income households is calculated as a residual.
Note 2: To convert USD to KSh, Purchasing Power Parity exchange rates are applied taken from the World Bank database: data.worldbank.org (last assessed February 2020).

Thus, as Table 3 shows, the contemporary data suggests a smaller group of rich households, a larger middle-income class and a larger share of households with incomes below the absolute poverty line.

As mentioned in Section 3, the survey tracks households over a ten-year period and consequently, the household members have become older than the general population.[20] A simple regression analysis shows that the age of the household head has a positive effect on income, and yet age squared has a negative effect, indicating that above a certain threshold, ageing of the household head is associated with a reduction in income (see Appendix II Table 19). Consequently, poverty and income trajectories should not be automatically inferred for the general population.

In the next section, the accumulation patterns of the three income classes are discussed, to examine the link between differentiation and wider rural development trajectories.

Accumulation patterns

A useful analysis of rural structures described by Bernstein (2010) asks four key questions: Who owns what? Who does what? Who gets what? What do they do with it? In this study, to operationalise the four questions, initial ownership of assets in 2000 is first presented. This is followed by 'who does what?', where trends in labour hire and sell are presented alongside income diversification trends. Payoff from the different

[20] In 2000, the average age of the household head in the sample was 53 years, and in 2010, it had risen to 60 years. Kenyan data available on the age of rural households suggests that in 2016 46% of household heads were aged between 35 and 59 years, while 17.6% were 60 years or above. The data is taken from the Kenya Open Data database, which aims to make Government data available to the public. The data is available online at icta.go.ke/open-data (last accessed March 2020).

income diversification strategies – in other words, 'who gets what?' – is explored next. Finally, trends in agricultural investments – 'what do they do with it?' – are examined.

In Table 4, initial ownership conditions are presented for the start year 2000.

Table 4:
Who owns what? Initial conditions, 2000

Variable/income class	Poor	Middle	Rich
Acres owned (with title deed)	1.7	2.3	5.7
Acres cultivated (owned land, with or without title deed, and borrowed land)	3.9	4.9	10.9
Livestock owned (measured as Tropical Livestock Units	1.9	2.6	4.0
Number of agricultural machinery items[1]	0.02	0.05	0.19
Number of agricultural implements[2]	1.3	2.6	5.4

Source: Tegemeo data.
Note 1: Following the Food and Agriculture Organization (FAO), agricultural machinery is defined as tractors, combines, implements and devices more sophisticated than hand tools, powered mechanically or by animals and used in agricultural production (FAO 2018).
Note 2: Following FAO (2018), devices that perform agricultural tasks and which are attached to, pulled behind, pushed by or otherwise operated by a human, animal or mechanical power source are considered as agricultural implements. Agricultural equipment such as stationary mechanical devices, including irrigation pump sets, hammer mills, centrifuges and milking machines, is included in the measure of implements.

Land is the most important asset in agricultural-based rural societies. Conventional theories (see e.g. Griffin, Khan, and Ickowitz [2002]; Hazell et al. [2010]; Lipton [2006]) have associated an egalitarian land distribution with a positive, pro-poor agricultural transformation. In contrast, land inequality manifested in the loss of land among the poorer segments of rural society and the concentration of land in the hands of richer farmers is central to the APE differentiation theory, while the de-agrarianisation theory is associated with a general decline in productive agricultural assets, including land.

In 2000, the richer income class owned almost three times as much land as the poor households and twice as much land as middle-income households. The poor, owning on average 1.7 acres (or 0.7 hectares), were close to near-landlessness, which has been defined by leading agricultural economists as the possession of less than 0.5 hectares of land (Jayne, Mather, and Mghenyi 2010). Middle-income households owned 2.3 acres (or 0.9 hectare). By owning more than 2 hectares (5.7 acres), richer households were better equipped for commercial farming, although they were far from the 'medium-scale farm' classification used by Jayne et al. (2019) to describe investor farmers, which requires 5 to 100 hectares.

At first sight, Kenya's rural sector appears land-constrained for all income classes; however, data suggests that households were able to rent or borrow additional land (or owned land that they did not possess a title deed to). Poor households cultivated 3.9 acres (or 1.6 hectares). Because poorer households could access additional land, they were only partially integrated in the labour market, as they still possessed the means of production. Middle-income households cultivated 4.9 acres (or just below 2 hectares), while richer households cultivated farms close to the medium-scale farm category (cultivating 10.9 acres or 4.4 hectares).

Richer households also had the advantage of possessing twice and one-and-a-half times as much livestock, measured in tropical livestock units, as poor and middle-income households, respectively. The spread of agricultural machinery such as tractors and combines – an indicator of modernised agriculture – was low among all households in 2000. On average, poor and middle-income households owned close to zero items of machinery per household, while richer households had on average 0.2 items of machinery per household. In the following tables, trends in the ten-year period 2000 to 2010 are investigated.

In Table 5, the question 'who does what?' is explored. As mentioned earlier in this paper, by assuming that households rely predominantly on family labour, conventional theories view labour hire and labour selling as insignificant (see Leavy and White [2000]; Mueller [2011]; and Oya [2010b] for a similar critique). The livelihood approach, while acknowledging that households have diversified towards off-farm activities, tends to emphasise self-employment activities over wage labour, implying that rural labour markets are fairly inactive.

In contrast, labour hire and sell are at the core of the APE differentiation theory. A political economy-inspired study of differentiation among Senegalese farmers, found that labour control was fundamental to processes of accumulation (Oya 2007). For richer farmers to be able to expand their agricultural production, they need to hire wage labour, as family labour will be insufficient. This finding was reiterated by Mueller (2011), who noted that a group of successful farmers in North Tanzania were becoming increasingly dependent on the hire of causal labour, as their farms had grown in size, while poorer households depended on the small incomes derived from selling their labour. Similarly, Wiggins (2000) argued that differential access to labour and capital, as opposed to access to land and natural resources, serves as the key divider of African farmers.

Table 5:
Who does what? Labour use and income diversification, 2000-2010

Variable/income class	Poor	Middle	Rich
Share of HHs that sell agricultural wage labour, %	2000: 23.3 2004: 18.4 2007: 29.2 2010: 23.0	2000: 18.7 2004: 12.7 2007: 17.7 2010: 15.2	2000: 11.7 2004: 10.7 2007: 10.7 2010: 0.1
Share of HHs that hire agricultural wage labour, %[12]	2000: n/a 2004: 54.2 2007: 21.6 2010: 53.8	2000: n/a 2004: 73.3 2007: 45.1 2010: 66.1	2000: n/a 2004: 84.0 2007: 61.9 2010: 88.4
Degree of commercialisation (crop sale income to total income, %)	2000: 17.3 2004: 18.0 2007: 18.2 2010: 21.0	2000: 26.4 2004: 24.1 2007: 30.5 2010: 28.0	2000: 28.7 2004: 23.5 2007: 25.3 2010: 40.1
Quality of commercialisation (share of high-value crop sale income to total crop sale income, %)	2000: 31.2 2004: 30.6 2007: 28.0 2010: 28.4	2000: 45.8 2004: 40.2 2007: 42.5 2010: 40.4	2000: 46.7 2004: 35.6 2007: 39.5 2010: 48.0
Dependence on off-farm income (share of off-farm income to total income, %)	2000: 28.3 2004: 34.4 2007: 57.7 2010: 61.0	2000: 30.3 2004: 34.4 2007: 38.6 2010: 44.2	2000: 29.7 2004: 35.7 2007: 49.5 2010: 49.2
Dependence on non-agricultural wage income (share of non-agricultural wage income to total income, %)	2000: 5.6 2004: 6.5 2007: 9.5 2010: 8.5	2000: 13.6 2004: 15.9 2007: 16.9 2010: 23.2	2000: 10.3 2004: 19.2 2007: 22.9 2010: 31.0

Source: Tegemeo data.
Note 1: Data on labour hire and sell was not collected in the 2000 wave.
Note 2: A decline in labour hire in 2007 is recorded among all households. The decline could be due to the post-election violence that plagued 2007 and 2008 causing major internal displacements of rural people and the destruction of assets.

Although poorer households are more likely to sell their labour to other farmers, selling labour is not always restricted to the poorest class.[21] In 2010, roughly 23% of the poor, 15% of middle-income farmers and less than 1% of richer farmers sold labour power to other farms. The trend has been stable for poor households, while middle-income households have seen a decline of three percentage points. The largest decline in agricultural wage labour is seen amongst the richer households.[22]

Similarly, labour hire is not confined to the richer income class. In contrast to the arguments put forward in the differentiation theory, the distinct division of rural people into classes of rural wage labourers and richer farmers relying on wage labour is not pronounced. Instead, all income classes use hired wage labour. Close to 50% of poor

[21] A household is registered as selling labour power to other farms if one or more household members have income from agricultural wage labour.

[22] The steep decline should be treated with caution, as it was not possible to rule out that it reflects mistakes made in the field or during the data entry process.

households have used hired agricultural labour, and the same is true for roughly two-thirds of middle-income households and around 84–88% of richer households.

The notion of an active rural labour market is similar to findings from North Tanzania. In a period overlapping with the present study, Mueller (2011) found that 80% of households participated in the labour market as employers or employees. However, in contrast to this study, the analysis from Tanzania showed that middle-income farmers were struggling to fight processes of proletarianisation, as more felt the need to sell their labour power to survive.

Unfortunately, the data does not allow for a distinction between labour contracts – that is, the possibility that poorer households might rely on hired day labourers while richer households might make use of more permanent labour. Moreover, the data indicates that the share of households that sell labour may be underestimated compared to the share that hires labour. There are two plausible explanations for this. First, selling agricultural wage labour is associated with stigma (Mueller 2011), and households may therefore seek to hide their involvement in rural labour markets. Second, household surveys are not well suited to capturing the poorest of the rural segments, who are often landless people, causing an underreporting of the prevalence of the selling of agricultural labour power (Oya 2010b).

According to conventional literature, a crucial factor driving rural development is the increase in agricultural commercialisation, which enables households to escape poverty and join the ranks of middle-income households (see e.g. Larson et al. [2016]; Lipton [2006]; Hazel et al. [2010]). Meanwhile, the differentiation theory assumes that richer farmers will engage in commercial agriculture, while middle-income farmers will lose out in competition with richer farmers, causing them to gradually lose their foothold in agriculture and join poor households in their reorientation towards agricultural wage labour.

Examining trends in agricultural commercialisation measured as the share of crop sale income to total income in percentages, richer households are indeed more commercialised. In 2010, they derived 40% of their income from sales of crops. Conversely, poor households have the lowest share (21%), followed by middle-income households (28%). However, in contrast to the differentiation theory, there are years when middle-income households derive a larger share of income from crop sale than richer households. Investigating the quality of commercialisation measured as the share of high-value crop sale income in total crop sale income, middle-income and richer households again have an equal share for most of the years studied. Throughout, poorer households have the lowest share.

In line with the de-agrarianisation theory (Bryceson 1996, 2000, 2002), all income classes have followed a similar diversification pattern, where incomes are diversified away from the farm. While all households have drastically increased their dependence on off-farm income, poorer households are most dependent on off-farm sources, having increased the share by 32 percentage points. Contrary to the differentiation theory, richer households have drastically increased their share by 19.5 points. Middle-income households, usually characterised in conventional literature as small-scale farmers,[23] also derived a high share of close to 40% of income from off-farm activities in 2010. Thus, a general trend among all households is the gradual shift towards a greater reliance on off-farm activities. However, as Table 5 shows, households are stratified in their ability to raise incomes from better-paid off-farm activities such as non-agricultural wage labour.

Table 6 shows that diversification away from the farm has not raised incomes, and all income classes have experienced a decline in real per capita income, which is largely driven by declines in farm incomes. Middle-income households have seen the largest decline (50%), followed by poor households (49.9%), and richer households (48%). Common in all income classes is the inability of off-farm incomes to offset the decline witnessed in farm incomes.

Table 6:
Who gets what? Per capita incomes, 2000-2010

Variable/income class	Poor	Middle	Rich
Total per capita income in KSh (inflation adjusted)	2000: 20,177 2004: 16,377 2007: 15,090 2010: 12,334	2000: 78,832 2004: 62,720 2007: 55,892 2010: 50,592	2000: 290,304 2004: 254,428 2007: 242,964 2010: 212,681
Total per capita farm income in KSh (inflation adjusted)	2000: 14,353 2004: 11,655 2007: 8,863 2010: 7,190	2000: 55,686 2004: 40,909 2007: 34,449 2010: 27,842	2000: 210,033 2004: 165,560 2007: 128,174 2010: 109,022
Total per capita off-farm income in KSh (inflation adjusted)	2000: 5,825 2004: 4,722 2007: 6,223 2010: 5,144	2000: 23,146 2004: 21,811 2007: 21,443 2010: 22,749	2000: 80,271 2004: 88,469 2007: 114,790 2010: 103,556

Source: Tegemeo data.

Although richer households derived a per capita income almost 17 times the size of poorer households' income, the decline in incomes of richer households would suggest that a dynamic rural development, as envisaged by the differentiation theory, has not

[23] In the late 1990s and early 2000s, the rural off-farm sector, including rural labour markets, was 'discovered' by conventional scholars (see e.g. Barrett, Reardon, and Webb [2001], Haggblade, Hazell, and Reardon [2007]). However, because land was considered to be in abundance, smallholder agriculture has generally been viewed as the dominant economic activity among rural people.

transpired. However, trends in per capita incomes give insufficient information from which to draw conclusions on emerging rural development trends. To assist in giving a clearer picture, Table 7 shows investment patterns.

For a class of rural capitalist farmers to emerge from the group of richer farmers, an increase in investments in agricultural assets such as land and machinery is expected, while middle-income and poorer households are expected to lose access to agricultural assets. Conversely, de-agrarianisation implies that the vast majority of households are losing their foothold in agriculture, as witnessed by disinvestments in productive agricultural assets.

As Table 7 shows, the richer class has seen smaller increases in acres owned, from 5.7 in 2000 to 7 in 2010. At the same time, however, the number of acres cultivated has decreased slightly from 10.9 in 2000 to 9.9 in 2010. The relatively small land size of richer farmers is concomitant with arguments made by Jayne et al. (2019), who reported that in densely populated countries such as Kenya, land scarcity and high land values impede the growth of medium-scale farms. In contrast to the predictions of the differentiation theory, poor and middle-income households do not appear to have lost land during the period covered.

Table 7:
What do they do with it? Agricultural investments, 2000-2010

Variable/income class	Poor	Middle	Rich
Acres owned	2000: 1.7 2004: 1.5 2007: 1.3 2010: 1.7	2000: 2.3 2004: 2.6 2007: 2.6 2010: 2.1	2000: 5.7 2004: 5.4 2007: 7.9 2010: 7.0
Acres cultivates (owned, with or without title deed, and borrowed land)	2000: 3.9 2004: 3.1 2007: 3.3 2010: 3.3	2000: 4.9 2004: 5.0 2007: 4.6 2010: 4.0	2000: 10.9 2004: 8.6 2007: 11.6 2010: 9.9
Livestock owned (TLU)	2000: 1.9 2004: 1.8 2007: 1.9 2010: 2.3	2000: 2.6 2004: 3.1 2007: 2.7 2010: 2.2	2000: 4.0 2004: 5.3 2007: 5.6 2010: 3.6
Number of agricultural machinery items[1]	2000: 0.02 2004: 0.02 2007: 0.01 2010: 0.05	2000: 0.05 2004: 0.06 2007: 0.08 2010: 0.05	2000: 0.19 2004: 0.39 2007: 0.52 2010: 0.34
Number of agricultural implements[2]	2000: 1.3 2004: 1.4 2007: 1.7 2010: 1.9	2000: 2.6 2004: 2.7 2007: 2.8 2010: 3.0	2000: 5.4 2004: 4.4 2007: 5.4 2010: 6.4
Crop cultivation (number of high-value crops grown)[3]	2000: 2.3 2004: 0.4 2007: 2.5 2010: 1.8	2000: 3.3 2004: 0.6 2007: 2.9 2010: 2.5	2000: 4.2 2004: 0.5 2007: 3.0 2010: 2.8
Irrigation (share of HHs that have irrigation, %)	2000: n/a 2004: n/a 2007: 9 2010: 15	2000: n/a 2004: n/a 2007: 19.3 2010: 22.8	2000: n/a 2004: n/a 2007: 29.7 2010: 36.7
KSh spent on fertiliser (inflation adjusted)	2000: 8,984 2004: 5,710 2007: 8,240 2010: 9,493	2000: 13,777 2004: 10,879 2007: 18,004 2010: 10,262	2000: 59,519 2004: 29,275 2007: 47,371 2010: 30,570
KSh spent on hired labour[4] (inflation adjusted)	2000: n/a 2004: 4,628 2007: 1,826 2010: 2,569	2000: n/a 2004: 6,074 2007: 2,735 2010: 2,542	2000: n/a 2004: 11,597 2007: 4,221 2010: 5,364
Share of HHs that invest in land preparation (non-manual, either draught animal or tractor)	2000: 53.5 2004: 24.1 2007: 21.8 2010: 30.8	2000: 46.1 2004: 26.4 2007: 26.6 2010: 22.4	2000: 37.2 2004: 35.2 2007: 30.9 2010: 24.0
Investment in education (fraction of household members with secondary education, %)	2000: 15 2004: 21 2007: 35 2010: 37	2000: 26 2004: 35 2007: 43 2010: 47	2000: 35 2004: 47 2007: 53 2010: 59

Source: Tegemeo data.
Note 1: Following FAO agricultural machinery is defined as tractors, combines, implements and devices more sophisticated than hand tools, and powered mechanically or by animals and used in agricultural production (FAO 2018).
Note 2: Following FAO, devices that perform agricultural tasks and which are attached to, pulled behind, pushed by or otherwise operated by a human, animal or mechanical power source are considered as agricultural implements. Agricultural equipment such as stationary mechanical devices, including irrigation pump sets, hammer mills, centrifuges and milking machines, is also included in the measure (FAO 2018).
Note 3: To define high-value crops, this paper follows Temu and Temu (2006) and includes the following traditional high-value crops: coffee, tea, sisal, cotton, sugar and pyrethrum; and the following newer high-value crops with good markets and high returns per acre: fruit and tree crops (citrus, cashew, coconut, papaya, mango, pineapple, strawberry, jackfruit, guava, watermelon), root crops (potatoes), vegetable crops (asparagus, broccoli, cabbage, celery, carrots, cauliflower, radish, tomato), legumes, (snap beans, garden pea), spices and condiments (black pepper, garlic, ginger, onion), and cut flowers.
Note 4: Information on hired labour use was not collected in the 2000 wave.

Overall, it appears that richer households have been unable to increase their investments in agriculture in any significant manner. While investment in irrigation has risen substantially, the number of agricultural implements and items of machinery is low and has only increased marginally. Meanwhile, fertiliser expenditure and the number of high-value crops has declined, as has the share of richer households that have invested in non-manual land preparation. More significantly, spending on hired labour has declined.

At the same time, the share of members of richer households who have a secondary education has increased. This might be due to the ageing of household members during the survey, and yet it could also indicate that more households are investing not in farming but in securing future off-farm income streams. The observation that farmers may accumulate wealth with a view to ensuring upward mobility within the family, investing in their children's education and thus shifting investment away from farming, was first noted by Berry (1985). Rigg (2006) has since suggested that skills and education, rather than land, now fulfil the role of the key enabler of future wealth accumulation.

The witnessed differentiation among rural households challenges the conventional conceptualisation of a homogenous smallholder sector. However, the increase in rural inequality does not correlate with the differentiation theory either. As mentioned previously in this paper, capitalism from below, arising from smallholder differentiation, is more likely to occur where profit possibilities are high – for example, as new technology is introduced. However, profit opportunities appear to be low, as evidenced by the decline in real farm incomes. Moreover, richer farmers have decreased their spending on hired labour, which questions whether they can generate the rural demand and employment opportunities needed to offset the decline in farm incomes suffered by the poorer farmers.

Instead of accumulating through farming, richer households have increased their diversification towards better-paid off-farm activities such as non-agricultural salaried jobs.

Although poorer households have not become landless, their increased diversification towards off-farm incomes suggests that they might be becoming 'too poor to farm', forcing them to seek low-paid alternatives.

Overall, households in the sample have not fared well in the period studied. The findings contrast with those of Sender and Smith (1990), who, based on fieldwork conducted in North Tanzania, argued that differentiation in an active rural labour market was correlated with a progressive process of capital accumulation and job creation in the rural areas. Instead, the findings correspond to Mueller's (2011)

observation that processes of differentiation in post-liberalisation Tanzania had failed to lead to a dynamic rural development, and instead differentiation was connected with increased rural hardship.

The decline in agricultural investments, the shift towards off-farm activities and the rise in poverty in the decade following the implementation of the last structural adjustment policies are aligned with the rural development trajectories put forward in the de-agrarianisation theory.

Concluding remarks

An ideological divide in opinion on the role of rural inequality in wider rural development exists between conventional rural development scholars and agrarian political economists. While conventional rural development theories see rural inequality within the smallholder sector as a) diminutive, and b) not of relevance to wider rural development, agrarian political economists and, recently, a few agricultural economists argue that not only is differentiation well underway in rural economies, but that it can also play a beneficial role in wider rural development. The differentiation into poorer and richer farmers may create the dynamic forces needed to drive future rural development. Under the right circumstances, richer farmers may develop into a class of capitalist farmers who use profits to invest in agriculture as a means of expanding their agricultural production, by employing large numbers of hired labourers drawn from the poorer segments of rural society.

To contribute to the debate on rural inequality, this paper combines micro-level evidence with theories of agrarian change, including the differentiation theory. In doing so, it is able to link trends in rural inequality at the household level with the associated emerging trajectories of rural development.

A polarised rural society seems to best describe contemporary rural Kenya. Inequality within the smallholder farming sector is not a minor issue. However, differentiation within the smallholder sector does not seem to correlate with a dynamic rural development path. Instead of accumulating through farming, richer households have increased their income through diversification towards off-farm activities. Even though the richer income class has seen a small increase in irrigation uptake and in the amount of agricultural machinery and implements, other agricultural investments – such as acres cultivated, spending on hired labour, cultivation of high-value crops and livestock ownership – have fallen. Moreover, profit opportunities in agriculture are low, as evidenced by a decline in real farm incomes among all income classes. Consequently,

the richer income classes do not seem capable of making the investments in agriculture needed to drive future rural development. Instead, the outcome of smallholder differentiation is likely to become a growing rural labour surplus, as rich and poor households have diversified away from the farm.

The witnessed smallholder differentiation has implications for the smallholder-led rural development model, which is based on an assumption of homogenous rural producers. Implementing the model under conditions of increased income diversification and smallholder differentiation threatens the two objectives of the model, namely poverty reduction and raised agricultural production. First, few households will gain from policies aimed at increasing smallholder production, while the majority who are becoming increasingly dependent on off-farm income will lose out from the implementation of such policies, intensifying existing rural inequality and poverty levels. Second, as the majority of households have begun to devote their efforts towards off-farm activities, it is questionable whether the promotion of smallholder agriculture will be able to raise total agricultural production.

More studies across African countries are needed to draw conclusions on the role that richer farmers may or may not play in promoting rural change.

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Appendix I: attrition analysis

As some households dropped out of the survey, concerns of attrition emerged. If households that drop out were systematically different from households that were present in all waves, results may be either over- or underestimated. The distribution of households' per capita income is shown in Figure 3. The figure shows that the dropout sample had fewer households with very low incomes.

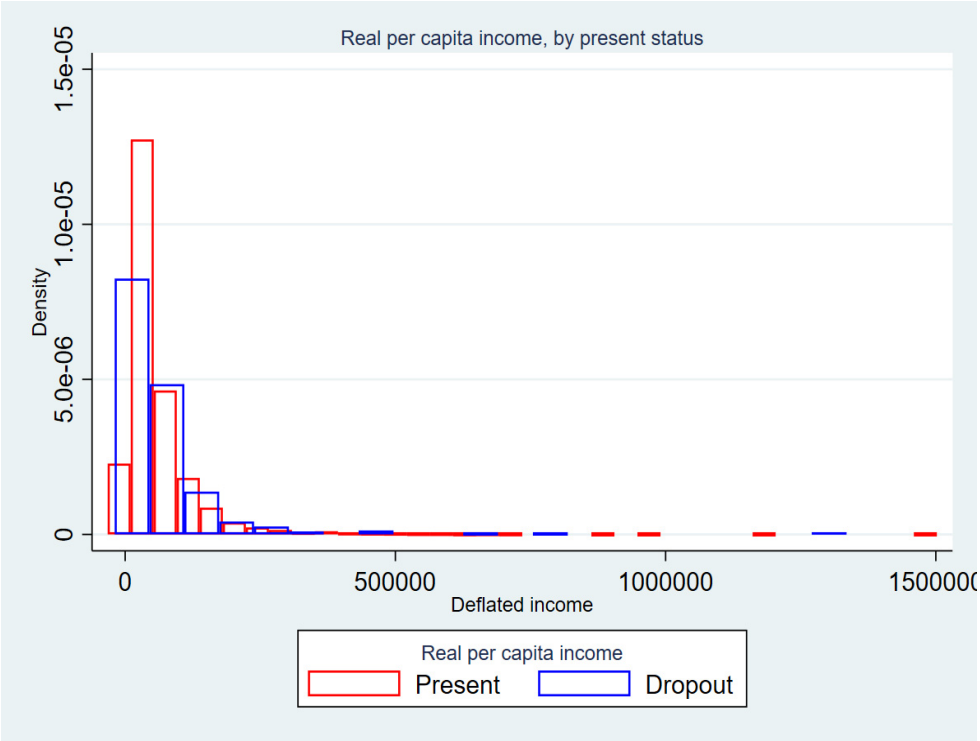

Figure 3: Distribution of real per capita income by present status
Source: Tegemeo data.
Note: Present refers to a household that was interviewed in all four waves. Dropout refers to a households not present in all waves.

A simple econometric model was fitted to test whether per capita income explained a households' status (drop out/present) in the survey. Results suggested that the relationship was insignificant (see Table 8). Hence, in the main analysis, it was assumed that observations were missing at random (MAR) and the full unbalanced panel was used. As a robustness check, however, all income class measures were re-estimated using the balanced panel (where dropout households were removed from the analysis).

Table 8:
Estimates of the impact of per capita income (in 1,000 KSh) on present status (present/dropout)

		RE
Parameter	Estimate	SE
Real per capita income	0.002	0.002
Age of household head	0.063***	0.0213
Gender of household head (ref: female)	0.440	0.689
Household size	0.069	0.103
Constant	13.45***	2.167
Year dummies included	YES	
Zone dummies included	YES	
Observations	**5,425**	
Number of hhid	1,479	

Source: Tegemeo data
Note 1: Significance levels are denoted: *10 pct. level, **5 pct. level, ***1 pct. Level
Note 2: Random effects model.

Appendix II: robustness checks

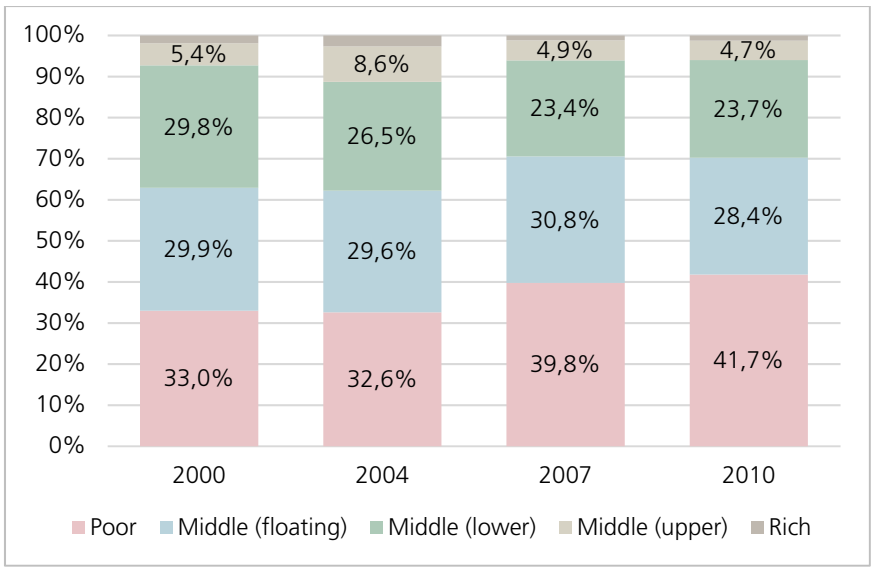

Figure 4: Income distribution of households 2000 to 2010: absolute poor, middle (floating, lower, upper), and rich (AfDB absolute measure)
Source: Tegemeo data.
Note 1: Households are classified using an absolute measure as described in Mubila, Aissa, and Lufumpa (2011).
Note 2: Unbalanced panel.

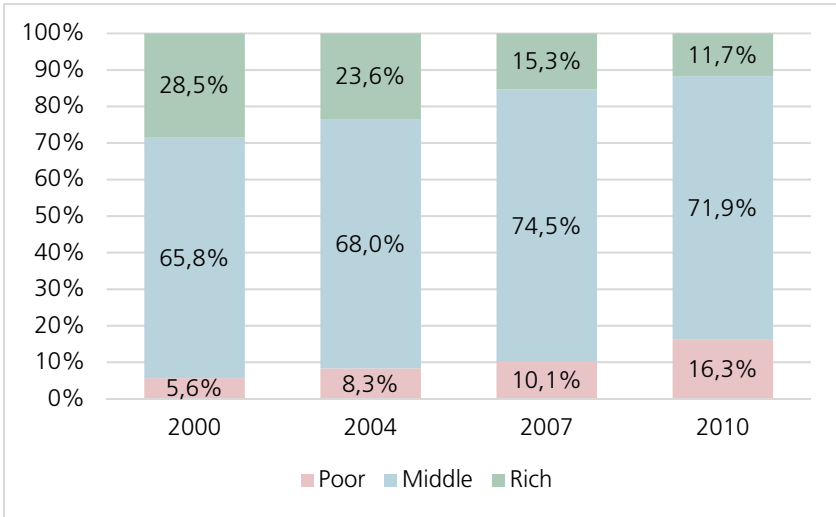

Figure 5: Income distribution of households 2000 to 2010: poor, middle, and rich (relative measure)
Source: Tegemeo data.
Note 1: Households are classified using a relative measure as described in Easterly (2001).
Note 2: Unbalanced panel.

Table 9:
Income inequality within the smallholder sector in Kenya, 2000-2010

Variable/year	2000		2004		2007		2010	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Gini coefficient (outliers removed)[1]	0.45	0.008	0.49	0.008	0.48	0.009	0.50	0.012
Gini coefficient (balanced panel)[2]	0.47	0.010	0.51	0.012	0.49	0.015	0.50	0.013
Gini coefficient (asset measure)[3]	0.66	0.020	0.69	0.042	0.68	0.024	0.67	0.019

Source: Tegemeo data.
Note 1: To remove outliers a winzorised approach is applied. Winzorising data sets all outliers to a specified percentile of the data. A common practice is followed that sets all data below the 5th percentile to the 5th percentile. Data above the 95th percentile are set to the 95th percentile.
Note 2: Dropout households are removed from the analysis.
Note 3: The values of the following items are used to construct the asset wealth measure: ploughs, tractors and draft animal equipment, carts, trailers, cars, trucks, spray pumps, irrigation equipment, water tanks, stores, wheelbarrows, combine harvesters, donkeys, bulls, chickens, goats, sheep, calves, cows, pigs, turkeys and ducks.

Table 10:
Income distribution 2000-2010, %: absolute poor, middle, rich (absolute measure), winsorized data

Income class/year	2000	2004	2007	2010	Trajectory
Poor (< 2 USD)	33%	32.6%	39.8%	41.7%	⬆
Middle class (2-10 USD)	59.7%	56.1%	53.9%	52.3%	⬇
Rich (>10 USD)	7.3%	11.3%	6.3%	6.0%	⬇

Source: Tegemeo data.
Note: To remove outliers a winzorised approach is applied. Winsorising sets all outliers to a specified percentile of the data. A common practice is followed that sets all data below the 5th percentile to the 5th percentile. Data above the 95th percentile are set to the 95th percentile.

Table 11:
Income distribution 2000-2010, %: absolute poor, middle (floating, lower, upper), rich, (AfDB absolute measure), winsorized data

Income class/year	2000	2004	2007	2010	Trajectory
Poor (< 2 USD)	33.0%	32.6%	39.7%	41.7%	⬆
Middle – floating (USD 2-4)	30.0%	29.6%	30.8%	28.4%	⬇
Middle – lower (USD 4-10)	29.8%	26.5%	23.4%	23.8%	⬇
Middle – upper (USD 10-20)	5.4%	8.6%	4.9%	6.1%	⬇
Rich (> USD 20)	1.8%	2.7%	1.2%	0.0%	⬇

Source: Tegemeo data.
Note: To remove outliers a winzorised approach is applied. Winsorising sets all outliers to a specified percentile of the data. A common practice is followed that sets all data below the 5th percentile to the 5th percentile. Data above the 95th percentile are set to the 95th percentile.

Table 12:
Income distribution 2000-2010, %: poor, middle, and rich (relative measure), winsorized data

Income class/year	2000	2004	2007	2010	Trajectory
Poor (< 2 USD)	5.7%	8.3%	10.1%	16.4%	⬆
Middle class (2-10 USD)	65.8%	68.1%	74.5%	71.9%	⬇
Rich (>10 USD)	28.5%	23.6%	15.4%	11.7%	⬇

Source: Tegemeo data.
Note: To remove outliers a winzorised approach is applied. Winsorising sets all outliers to a specified percentile of the data. A common practice is followed that sets all data below the 5th percentile to the 5th percentile. Data above the 95th percentile are set to the 95th percentile.

Table 13:
Income distribution 2000-2010, %: absolute poor, middle, rich (absolute measure), balanced panel

Income class/year	2000	2004	2007	2010	Trajectory
Poor (< 2 USD)	32.3%	32.8%	40.3%	41.1%	⬆
Middle class (2-10 USD)	60.2%	56.2%	53.7%	52.7%	⬇
Rich (>10 USD)	7.5%	11.0%	6.0%	6.2%	⬇

Source: Tegemeo data.
Note: Dropout households are removed from the analysis.

Table 14:
Income distribution 2000-2010, %: absolute poor, middle (floating, lower, upper), rich, (AfDB absolute measure), balanced panel

Income class/year	2000	2004	2007	2010	Trajectory
Poor (< 2 USD)	32.3%	32.7%	40.3%	41.1%	⬆
Middle – floating (USD 2-4)	30.0%	30.2%	30.9%	28.9%	⬇
Middle – lower (USD 4-10)	30.2%	26.0%	23.3%	23.7%	⬇
Middle – upper (USD 10-20)	5.6%	8.5%	4.8%	4.9%	⬇
Rich (> USD 20)	1.9%	2.6%	1.2%	1.2%	⬇

Source: Tegemeo data.
Note: Dropout households are removed from the analysis.

Table 15:
Income distribution 2000-2010, %: poor, middle, and rich (relative measure), balanced panel

Income class/year	2000	2004	2007	2010	Mean income (2010)	Trajectory
Poor	5.6%	8.3%	10.2%	16.0%	0.56 USD	⬆
Middle	65.5%	68.7%	74.6%	71.9%	3 USD	⬆
Rich	28.8%	23.0%	15.1%	11.9%	13 USD	⬇

Source: Tegemeo data.
Note: Dropout households are removed from the analysis.

Table 16:
Asset wealth distribution 2000-2010, %: poor, middle, rich, (absolute measure)

Income class/year	2000	2004	2007	2010	Trajectory
Poor (< 2 USD)	61.7%	68.9%	73.7%	83.5%	⬆
Middle class (2-10 USD)	31.5%	24.7%	22.0%	13.5%	⬇
Rich (>10 USD)	6.8%	6.4%	4.3%	3.0%	⬇

Source: Tegemeo data.
Note: The values of the following items are used to construct the asset wealth measure: ploughs, tractors and draft animal equipment, carts, trailers, cars, trucks, spray pumps, irrigation equipment, water tanks, stores, wheelbarrows, combine harvesters, donkeys, bulls, chickens, goats, sheep, calves, cows, pigs, turkeys and ducks.

Table 17:
Asset wealth distribution 2000-2010, %: poor, middle (floating, lower, upper), (AfDB absolute measure)

Income class/year	2000	2004	2007	2010	Trajectory
Poor (< 2 USD)	61.7%	68.9%	73.7%	83.5%	⬆
Middle – floating (USD 2-4)	19.2%	15.9%	14.3%	8.8%	⬇
Middle – lower (USD 4-10)	12.3%	8.7%	7.8%	4.7%	⬇
Middle – upper (USD 10-20)	4.6%	4.3%	2.5%	2.3%	⬇
Rich (> USD 20)	2.2%	2.2%	1.7%	0.7%	⬇

Source: Tegemeo data.
Note: The values of the following items are used to construct the asset wealth measure: ploughs, tractors and draft animal equipment, carts, trailers, cars, trucks, spray pumps, irrigation equipment, water tanks, stores, wheelbarrows, combine harvesters, donkeys, bulls, chickens, goats, sheep, calves, cows, pigs, turkeys and ducks.

Table 18:
Asset wealth distribution 2000-2010, %: poor, middle, and rich (relative measure

Income class/year	2000	2004	2007	2010	Mean asset wealth (2010)	Trajectory
Poor	9.3%	18.8%	5.3%	6.2%	1.3 USD	⬇
Middle	68.3%	61.5%	73.6%	77.2%	104.9 USD	⬆
Rich	22.4%	19.7%	21.1%	16.6%	1,012.4 USD	⬇

Source: Tegemeo data.
Note: The values of the following items are used to construct the asset wealth measure: ploughs, tractors and draft animal equipment, carts, trailers, cars, trucks, spray pumps, irrigation equipment, water tanks, stores, wheelbarrows, combine harvesters, donkeys, bulls, chickens, goats, sheep, calves, cows, pigs, turkeys and ducks.

Table 19:
Estimates of the impact of age of household head on per capita income

	RE[2]		FE[3]	
Parameter	Estimate	SE	Estimate	SE
Age of household head (HH)	1,558***	498.7	2,338**	1,080
Age of HH squared	-15.44***	4.156	-19.02**	9.058
HH size	-7,165***	604.9	-9,354***	993.9
Gender of HH (1=woman)	-8,857***	2,707	-2,757	-2,757
Number of acres cultivated	4,080***	363.6	3,759***	880.2
Fraction of HH members with secondary education	26,096***	5,141	2,860	7,800
Fertiliser expenditure	0.339**	0.156	0.244	0.159
Hired labour expenditure	0.959**	0.487	0.289	0.512
Constant	58,028***	14,593	44,459	29,541
Year dummies included	YES		YES	
Zone dummies included	YES		NO	
Observations	**3,982**		**3,982**	
Number of hhid	1,396		1,396	

Source: Tegemeo data
Note 1: Significance levels are denoted: *p<0.10; **p<0.05; ***p>0.01
Note 2: Randomised effects model.
Note 3: Fixed effects model.

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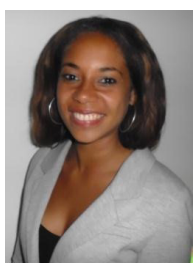
Despite conventional belief in the African historiography, the diversification towards rural wage labour in settler economies does not appear to have caused widespread rural poverty in the colonial era. After independence, households have continued to derive a high share of income from off-farm activities. However, the associated rural change is ambivalent. Off-farm incomes have low returns and the majority of households who have become highly dependent on access to off-farm income appear to be on a path similar to the de-agrarianisation hypothesis. Yet, a minority of households (including women-headed households) are able to follow a more successful agricultural-based path where off-farm incomes are combined with commercial agriculture.

The book comes to the conclusion that, income diversification and differentiation in post-independence Kenya does not seem to correlate with a dynamic rural development. Instead differentiation among smallholder farmers appears to mainly results in the impoverishment of a large proportion of households without a parallel expansion of commercially oriented middle- and rich classes emerging from the smallholder sector.



Maria Fibæk is PhD Candidate at the Department of Economic History at Lund University. Her research focuses on long-run changes in rural livelihoods and welfare in Kenya. She has more than seven years of professional experience with consultancy and research work in East Africa.

This book is her doctoral thesis. It was produced at the Department of Economic History, Lund University.

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