



Kenya's youth agricultural livelihoods and the land–water–environment nexus

Grace Mwaura



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Abstract

Kenyan youth have started to embrace agriculture as a viable livelihood source following a decade of the 'youth-in-agriculture' narrative that promotes, among other things, agribusiness as a viable youth employment opportunity. Among the multiple framings employed by this narrative is the proposition that pathways involving agriculture can generate livelihood options for young people, while also having the possibility of greening these livelihoods. This paper elucidates the extent to which the proposition for greening youth livelihoods is plausible by examining how young farmers navigate the land–water–environment nexus. The main question addressed here is 'to what extent does the land–water–environment nexus influence (and, indeed, is influenced by) youth agricultural livelihoods?'

The paper contributes to a growing body of knowledge on the intersections of youth livelihoods and natural resources governance. By elucidating how resource constraints intersect with youth livelihoods, the paper offers a nuanced understanding of the opportunity space for meaningful youth livelihoods in line with transforming African agriculture. The paper's focus on young people already engaged in agriculture focuses on an often neglected yet significant question on the sustainability of youth livelihoods. Importantly, the findings emphasize that youth livelihoods are deeply entrenched in natural resources governance and, hence, that there is a need to conduct further analysis of the complex intersections of youth employment and the resources nexus.

Keywords: Kenyan youth, agribusiness, youth livelihoods, land–water–environment nexus, natural resources governance, African agriculture, resources nexus, greening livelihoods

1 Introduction

Between 2013 and 2015, a doctoral study of educated young farmers in parts of Western, Eastern and Central Kenya found that as young people engaged in agriculture, they always grappled with land, water and environmental challenges and that these influenced the extent to which their agricultural livelihoods became established and the manner in which they did (Mwaura 2015). A follow-up study with these young farmers was conducted in 2017 to provide a nuanced understanding of the young farmers' perspectives on the land–water–environment nexus and the consequential intersections with their livelihood strategies. Further, the study sought to understand the policies and institutions at the centre of sustainable youth livelihoods. A wide range of data from interviews, field observations, focus group discussions and grey literature has been analysed to answer these two questions. This particular paper presents findings on the intersections of youth agricultural livelihoods and the land–water–environment nexus. While these findings are not generalisations for all young farmers in Kenya, they offer useful insights into what is happening among the few young people currently choosing agriculture as a livelihood option and will inform future research on the subject. Importantly, the findings help expound the notion of greening youth livelihoods in a jobless economy facing natural resource challenges.

As efforts to accelerate agricultural growth and address food security have often been separated conceptually from efforts to create jobs for young people (Filmer *et al.* 2014), studies on the intersections of youth agricultural livelihoods and governance of agricultural resources are timely. Such studies are not only necessary in Kenya but across Africa, where, increasingly, unemployed youth are being encouraged to seek livelihoods in agriculture, a sector already encumbered with resource challenges. In south-eastern Cameroon, MacNeil examined how young people derived livelihoods from forest resources and how they were represented in local decision-making institutions concerning forest governance. She observed that youth livelihoods derived from forested landscapes were already threatened by factors such as scarcity, climate change, and other environmental and human factors, and that these were likely to increase in the future (MacNeil *et al.* 2014). Also in Cameroon, another study on the intersections of youth livelihoods and climate change observed that in response to changing climatic conditions, young farmers were reducing their dependence on rain-fed agriculture, diversifying to options such as irrigation and off-farm income-earning activities (Sah Akwen 2017). The study also found that the adaptation strategies available to young farmers were determined by their access to productive resources, their technical know-how and their financial means. Since young people were differently equipped to adapt to climate change, their diversification options included abandoning agriculture altogether. Jayne *et al.* (2016) emphasised the need for research on policies and regulations facilitating youth access to resources (especially land) in order for them to succeed in agribusinesses. These studies underscore the need for nexus thinking in defining sustainable pathways for youth livelihoods in the face of rising unemployment, constrained resources and a changing climate.

The rest of the paper is organised as follows. The second section illuminates how the resources nexus is presented in the youth-in-agriculture narrative and proposes a conceptual framework for greening youth livelihoods. The third section presents empirical findings on how land, water and environment resources are integral to young people's agricultural livelihoods. The fourth section makes a case for the intersections of natural resources governance and meaningful youth livelihoods, while the fifth section concludes by making suggestions for further research and policy recommendations on the resource nexus and sustainable youth livelihoods.

2 From 'liquid in the pocket' to 'secure ourselves': The framing of resources in the 'youth-in-agriculture' narrative

I know food insecurity is huge but it has been about maize and beans for a long time [...] I hope many young people will remodel that and change it. But for most of us, it is the frustration of not getting a job. We are in it [farming] to secure ourselves; securing a livelihood for yourself and those close to you.

Maybe there should be more focus, and even getting the young people to think about food security nationally.

(Njango, female young farmer, Central Kenya¹)

Many of my friends do not embrace farming. They think when you get into farming you are finished. They want clean jobs, but you need to be liquid in the pocket. You would rather be dirty and have money in the pocket.

(Masika, male young farmer, Western Kenya)

Population growth, rising youth unemployment, urbanisation, the global food crisis and declining agricultural productivity, among other challenges in Africa, have all influenced the 'youth-in-agriculture' narrative that targets the burgeoning youth population as food producers. Varied actors (policy makers, the private sector, international development institutions, etc.) present young people as energetic and increasingly educated and, hence, as innovative – attributes they are expected employ to boost agricultural productivity and so create employment for themselves (Sumberg *et al.* 2017; White 2015). Yet this narrative of enticing young people into agriculture has emerged after decades of educating young people out of farming and socialising them to disconnect with rural areas (White 2012). The narrative has also emerged amid multifarious challenges in the agriculture sector, especially those affecting smallholder farmers, such as access to resources and markets, and changes in climate. On the flipside, as educated youth increasingly find themselves unemployed, the idea that agriculture, despite being previously viewed as a demeaning and labour-intensive occupation, could enable them to remain 'liquid in the pocket' (i.e. to earn an immediate income) becomes plausible. In fact, this narrative is influencing how youth are beginning to imagine themselves in relation to their unemployment; they are consequentially seeking to establish agribusinesses as a solution (AGRA 2015). Yet researchers are also beginning to observe that young people tend to choose agriculture primarily for its opportunity to enable them to earn a quick and immediate income (being 'liquid in the pocket') which offers a temporary livelihood ('secure ourselves') and avoids the possibility of being 'finished' (i.e. not making it) (Okali and Sumberg 2012; Mwaura 2017a).

Evidently, the aspirations of young farmers – to earn quick money and secure a livelihood – seem to contradict the dominant narrative that an agricultural transformation could be achieved by involving young farmers in agribusiness. Instead, they posit a complex web of issues relating to resources, livelihood approaches, policies and institutions. Several framings emerge from the youth-in-agriculture narrative that offer an understanding of the complexity of the resources nexus.

First, development practitioners and policy makers have made a compelling claim that African agriculture is perhaps the only sector with the potential to provide the number of jobs required to address the rising youth unemployment while also making a significant contribution to food security and the sustainability of the agriculture sector. Different authors have argued that for agriculture to provide this, it ought to become more attractive, more productive and more profitable, meaning that it

¹ 'Central', 'Western' and 'Eastern' Kenya are used in this paper to refer to the geographical location of the young farmers, rather than the previous administrative regions known by these names.

must modernise and adjust into an enterprise (AGRA 2015; Ripoll *et al.* 2017; Yami *et al.* 2019). Such advances are framed as requiring educated, innovative, energetic and entrepreneurial actors, and young people, educated and unemployed, are presented as the right fit for this role (AGRA 2015; IFAD 2011). Away from seeking employment, young people are now expected to establish agribusinesses as a way of creating their own employment, while also addressing problems of food insecurity. Indeed, efforts to attract young people into agricultural livelihoods have increased in the last decade, with philanthropic institutions such as the Mastercard Foundation, international agencies such as the Food and Agriculture Organization, the International Institute for Tropical Agriculture, the International Fund for Agriculture and Rural Development (IFAD), national governments and for-profit companies, among many others, designing ‘youth in agriculture’ programmes within the broader framework of addressing youth unemployment. The Alliance for Green Revolution in Africa (AGRA) even dedicated their 2015 Status of Agriculture Report to Youth in Agriculture, demonstrating the commitment to youth agricultural livelihoods. While this action is crucial, and indeed many young people are benefitting from the widened opportunity space, there remains little attention to the governance of those natural resources from which young people will derive their agricultural livelihoods.

Second, it is speculated that the ageing farming population will decline and, as such, there is a need for increased effort to ‘recruit’ young farmers who can utilise existing agricultural land (AGRA 2015). Conceptually, young people would potentially take over the land owned by the ageing farmers, using this to create productive agribusinesses and thereby contributing to agricultural productivity, while creating jobs for themselves. While there is no reliable data on how much agricultural land would be available to young farmers in this way (Losch 2016), there is evidence from demographical data that young people will remain the majority in the workforce for the next three decades, so livelihoods in agriculture are plausible. Some of the options suggested for accessing such land include leasing, contributing to family farms and transferring the land rights to younger generations through inheritance and leasing (AGRA 2015). Overall, land access is presumed to motivate advances in technology, entrepreneurial mindsets and diversification into the agricultural value chains by the new farmers (Ripoll *et al.* 2017). The framing of ageing farmers, however, tends to transfer the burden of food security and sustainable agriculture to young people without adequately addressing the challenges of the intergenerational transfer of land rights and the systemic challenges in the agricultural sector. With land acquisition, young people are expected not only to take on the responsibility of working as smallholder farmers, but also to meet the other needs of the sector by increasing productivity, creating employment and ensuring sustainability – that is, contributing to the country’s development agenda. This notwithstanding, the framing focuses only on the opportunity spaces for youth employment; it fails to tackle the systemic barriers in the wider agrifood sector, such as inputs, markets, climate change, infrastructure and the policy environment, which affect the extent to which a young person can utilise a land resource.

It can be observed here that resources are the enabler for youth livelihoods, yet different viewpoints exist on how these should be prioritised, accessed and utilised. The underlying challenges with the resources nexus in the agriculture sector remain unaddressed in the efforts to entice young people into agriculture; as such, this poses a challenge to how young people view, access and utilise resources.

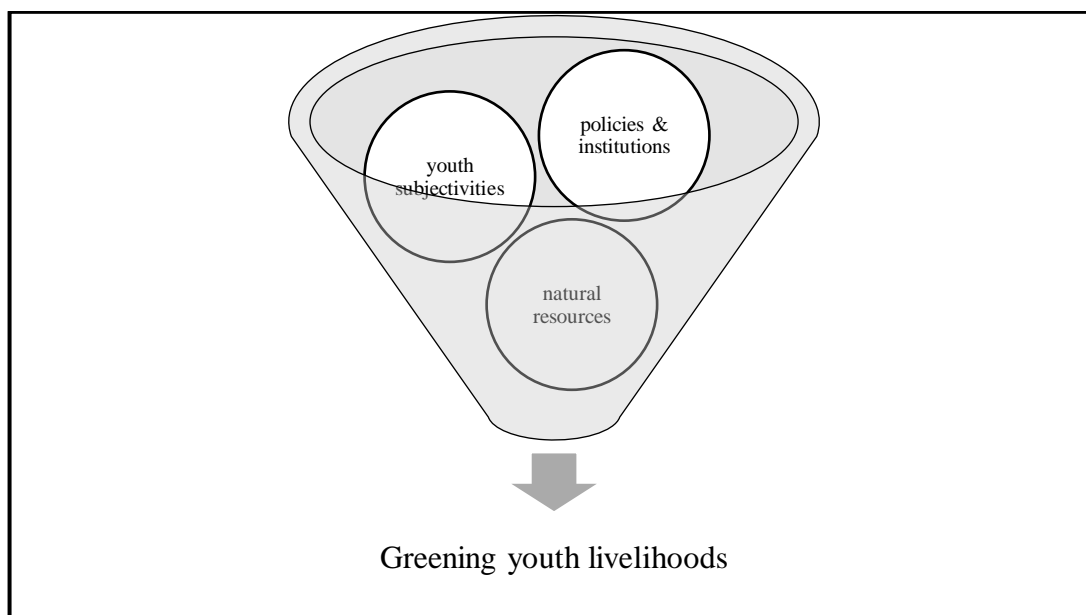
2.1 *A framework for greening youth livelihoods*

Given these challenges, I propose a ‘greening youth livelihoods’ framework to enable a nuanced analysis of youth livelihoods derived from productive sectors such as agriculture. Previously, I have described greening youth livelihoods as ‘the daily encounters of neoliberal youth subjects in a constrained commodity market, their on-going (and also anticipated) adaptation strategies that enable them to manage the uncertainties of the physical environment from which they derive their livelihoods, which are continually performed and reworked to suit young people’s everyday needs and to keep them on the momentum of attaining social adulthood’ (Mwaura 2015: 241). To a young person, greening a livelihood represents engaging in a process involving multiple pathways to respond to changes in the

physical, socio-economic and political environments from which that person derives such a livelihood and, in doing so, remaining resilient to these changes. Therefore, the notion of greening livelihoods closely relates to the notion of sustainable livelihoods. Scoones argues that to say a livelihood is sustainable to a select group of people, one must first understand the livelihood resources, institutional processes and strategies that are important in enabling or constraining the achievement of those livelihoods (Scoones 1998; Scoones 2016).

However, to green youth livelihoods, we must first concern ourselves with understanding how young people perceive natural resources and how they respond to vulnerabilities induced by natural resource constraints in their endeavours to create a livelihood out of those resources. We must also understand their vulnerability to resource constraints arising from pre-existing youth inequalities in the distribution of assets and opportunities; these severely constrain young people's choices in the face of change (Sah Akwen 2017). Vulnerabilities, or the anticipation of them, inform the way in which young people acquire resources and address challenges and constraints encountered in the course of deriving meaningful livelihoods. Further, as Scoones suggests, we must also understand institutions and strategies that shape young people's livelihoods. As illustrated in Figure 2.1, the elements of greening youth livelihoods relate to the perceptions around the resource nexus and resultant strategies to respond to the resource constraints. Thus, for a young person to secure a livelihood that is meaningful and sustainable (or green), even in the short-term, there is a complex relationship that he/she must endeavour to navigate that concerns resources nexus, policies and institutions and their subjectivity as a young person. These must be at the core of enticing young people into agriculture, or into any productive sector.

Figure 1: A framework for greening youth livelihoods



The next two sections employ this framework to analyse how the resources nexus has influenced, and has been influenced by, young farmers' livelihood strategies.

3 The intersections of youth agricultural livelihoods and the land–water–environment nexus

This section employs the framework of greening youth livelihoods to demonstrate how the resources nexus has shaped the livelihood strategies of young people and, in return, how livelihood strategies have implicated the resources nexus. To do so, young farmers' perceptions of resources and how these have influenced their utilisation of the same are analysed.

3.1 *Adapting to resource constraints*

On a daily basis, young farmers encounter a wide range of constraints relating to land, water and environmental resources and, in effect, develop adaptation strategies for each of them. First, issues of land access are not new. In sub-Saharan Africa, land remains largely 'abundant', but given the ambiguities of land acquisition processes, it has become virtually impossible for young people to acquire land that can sustain their engagement in farming (Kidido *et al.* 2017). Predominantly young farmers rely on inheritance to access agricultural land (Auta *et al.* 2010; Holden and Bezu 2013). However, their access is influenced by age, marriage (Bezu and Holden 2014), gender (Berckmoes and White 2014), mobility increases in the corporate or absentee acquisition of community land and local micro-grabs (White 2012), and land subdivision and fragmentation, which has created unviable land parcels that increasingly make youth landless (Bennell 2007). Furthermore, the notion of young people taking up farmlands owned by ageing farmers is far-fetched as in reality there are generational dynamics that constraint the transfer of land, agricultural knowledge and decision-making powers (White 2015). Meanwhile, the rapid increase in land prices has made farmland more attractive for corporate investment while becoming less accessible to young people who would like to start a life in farming (Losch 2012).

For these reasons, and coupled with the rapid population growth and a changing climate, which put pressure on agrifood systems, few young people expect to access land resources and meaningfully engage in agriculture. In effect, we are witnessing massive rural-to-urban migration, demographic changes and labour market shifts (Jayne *et al.* 2016). Proctor and Lucchesi (2012) observed that even where land, or support to access land, has been facilitated, this kind of support is often towards small-scale farming, which is already characterised as a low asset base, operating on an average of two hectares of cropland and where the labour and income is often provided by family and friends. Thus, such small-scale agribusinesses would need extra effort to meet the economies expected in making it a meaningful livelihood for young people. These farms are also faced with challenges such as availability of public goods, pressure from urbanisation, desertification, salinisation and agro-ecological conditions, among others. Increasingly, these small-scale farms are becoming unviable as sustainable socio-economic units owing to subdivisions and the challenges to maintain them (Jayne and Muyanga 2012).

To adapt to these challenges, the young people in this study embarked on farming not because they had access to land, but because they needed to earn an income in the absence of formal employment. Inheritance, borrowing, leasing and purchasing land were the common means of accessing land among the young farmers. A piece of land was considered fit for agriculture because of its geographical location, physical properties and tenure system, including conditions for use, such as the owner's preferences. The portions of land accessible to young farmers depended on the land tenure system in place, the type of farming activities intended, and the access to the necessary financial capital to support the intended farming activities.

Every young farmer faced varied challenges when acquiring land, for example relating to the tenure system, the biophysical properties of the land and its geographical location. For instance, among the young farmers who inherited or borrowed land, the portions were often either too small, lacked

adequate water, or had degraded soils. Landowners leasing land to young farmers also limited the extent to which investments in their land could be made.

In response to the challenges faced on inherited and borrowed land, young farmers sought alternatives, such as small-scale intensification strategies, the diversification of on-farm activities and acquiring land elsewhere. On some portions of land as small as 70 by 70 feet, young farmers practised hydroponic farming, vertical farming, greenhouse farming and drip irrigation, among others. For instance, Kimondo used his small portion of land as a demonstration site for organic strawberry farming, which included offering training or propagation, the production of organic fertilisers and the optimisation of space and water. He also diversified his on-farm income sources by selling seedlings, offering extension services to his clients and finding a market for the organic strawberries produced by his clients.

*Ile kidogo unayo, tumia [whatever small piece of land you have, utilise it] ...
when guys come to the farm the first question is, 'where do you want to
farm? Do you have land'? Some say 'yes, I have land but it is small' but I
always tell them there is nothing like small like. If you are going to sit in my
class, that place you call small can turn into something big!
(Kimondo, male young farmer, Central Kenya)*

Purchasing land was an option only for the young farmers who had a decent income from a formal job and had plans to invest in an agribusiness. Only a few had saved their profits from agriculture and other income-earning activities to buy agricultural land. Sometimes, this was financed through borrowing from family, friends and savings groups. Often, land was purchased or leased in the rural areas where it was cheaper, but had limited access to markets and infrastructure.

The land tenure system influenced the activities of the young farmers. Only those who owned land or were farming on their parents' land had an interest in sustainable soil and water conservation practices such as the use of organic fertilisers, agroforestry, rainwater harvesting and crop rotation, among other practices. Further, a young farmer's access to financial capital and skills influenced the kind of farming activities they prioritised. As such, it was observed that where land was acquired through leasing and where young farmers had access to finances and advanced skills, they would optimise their profits by investing in intensification, but at the expense of the long-term health of the land. Leasing land was also time-bound, meaning that one could only make investments for a period of time, and this limited the nature of farming practices to those requiring short-term investments but offering high returns in the shortest time possible. Thus, young farmers sought to grow crops or keep animals that promised quick returns and would switch to other approaches when the conditions changed.

Second to land come the availability of water, which determined the kind of farming practices adopted, the geographical location of the land, and times of the year to engage in farming. Young people would pursue parcels of land that had accessible and affordable water sources – a river source, a borehole (or possibility of sinking one), a dam for irrigation purposes and, occasionally, rainfall. This meant that young farmers were open to leasing land with water access anywhere in the country. This was the case even when they had access to family land. For example, Komen, who was leasing land, opted to practise rain-fed agriculture instead of incurring the high cost of irrigation. Thus, he farmed only during the rainy seasons and had leased land in the Rift Valley region where rain was more reliable. This also enabled him to remain a telephone farmer while in Nairobi, where he sought a formal job.

Closely interconnected was land tenure, which determined how the water was utilised on the farm, as demonstrated by Janet:

The thing I loved about that land was that we have a permanent river. My biggest challenge had been to get a farm where I had water so I found it very suitable for me. But there was also other expensive costs like I had to buy a pump, then I had to fix the pipes to deliver water to my farm. You know. Build a store [for the equipment]. It has been good. Though the challenge is that you can never know how long you can lease that farm because maybe the owner may have another agenda for that farm.

(Janet, female young farmer, Central Kenya)

Similarly, after searching and leasing a piece of land adjacent to a river, Janet had invested in a pump and pipes to enable her to practise irrigation. Yet she remained uncertain of her next steps on the farm as she always expected the landowner to request his land back. For this reason, she only grew short-term, high-value crops which required intensive irrigation.

Even with the competing demands for water, management practices and governance models across Kenya, the narrative of engaging youth in agriculture has not steered the understanding of the complexities in water resources management. While some simple and low-cost technologies for use in the agriculture sector exist, there was little awareness and adoption of these by the young farmers. Indeed, many of them still relied on rain-fed agriculture and irrigation models that were becoming even more unreliable with weather changes. Additionally, there was limited support for the adoption of water-efficient practices, including the implementation of policies that encouraged, for example, rainwater harvesting, water recycling, precision irrigation and multi-use reservoirs. As a result, young farmers' use of water was based on their immediate need and often took no consideration of other users.

Third, the narrative of enticing young people into agriculture has rarely tackled the challenge of the changing weather patterns and how these affect smallholder farmers. Yet the unpredictable weather patterns increase the risks of investing in agriculture, causing young people to either quit farming or farm only at certain times of the year. Some of the unpredictable weather changes recorded during this research period included floods, drought, hailstones and prolonged dry seasons that resulted in increased pests and diseases. On the flipside, most young farmers were unaware of the need to assess the risks involved at every stage of their agricultural activities and plan accordingly. Crop and livestock insurance were not within the reach of young farmers and only two of them mentioned having considered insuring their farms (they did not do so because of the financial implications). Instead, they pursued other navigation strategies. For example, Bina and Patrick delayed their planting until after the river flooding, so as to capitalise on the nutrient-rich sediments deposited by the floods on their farm. Kimondo, with small portion of land, a borehole shared with the family, and expensive metred water, started farming strawberries on gunny bags and sunken beds. Realising that he could not expand the farm size, he opted to offer training in organic strawberry farming, and his trainee farmers began to supply him with the fruit which he sold at the organic farmers' market in Nairobi. Similarly, other young farmers practised greenhouse farming, which gave them the ability to control all the variables necessary to increase their yields.

3.2 Navigating with limited agricultural and environmental knowledge

Knowledge and skills in resilient farming techniques determined the extent to which a young farmer succeeded, for instance by being able to monitor and manage risks and optimise investments for increased productivity and better markets. However, access to useful and verifiable agricultural information remained a challenge for most young farmers. Even though they expressed an interest in acquiring new agricultural knowledge, they were often limited in knowing where to access and validate such information. As a result, some of their farming practices were not their ideal ones, but what they could manage given their limited knowledge and skills. On the other hand, even where land was readily available to a young farmer, the human capital needed to develop it was crucial. For instance, Bina and

her husband Patrick, both young and caring for their extended family of ten siblings and an ageing mother, owned prime agricultural land adjacent to a permanent river, near a trading centre and a major highway. However, the two lacked the necessary technical capital to enable them establish a profitable agribusiness on the farm. As a result, their earnings from agriculture were spent on Bina's college education, with the hope that she would eventually get a formal job to supplement the dwindling family income. Patrick too planned on returning to school and later opening a shop in the trading centre. None intended to invest in the land or in agriculture in the future, despite the fact that perhaps their education would potentially give them the capital to advance in farming.

With the study sample being young farmers with post-high school education, there was an assumption that they would potentially have some basic environmental knowledge that would in turn influence their decisions on environmental resources use and sustainable farming practices. Yet there was a huge disparity in how they understood and responded to environmental resources in relation to their farming. Some acknowledged not knowing what to do when faced with environmental challenges and most had difficulties accessing information that would help them make informed decisions. Because most of them were in agriculture as a temporary livelihood option, managing environmental challenges was rarely part of their livelihood plan. For instance, whereas the author expected that water for irrigation, fertilisers and pesticide use would be contentious issues, each young farmer had a different opinion on how to manage water and soil fertility, and how to control pests and diseases.

For example, certain misconceptions about water resources emerged from the young farmers. Gitonga, one of the young farmers engaging in dairy farming, stated that he had 'no problem' with water because he lived next to a constructed dam that had supplied water to his entire peri-urban community since colonial days. While there were charges for use of this water, he did not foresee any implications for his farm if the water uses were to change. However, his community was undergoing gentrification with arable land being transformed into residential high rises: this would mean an increase in water demands and concerns over water pollution, which could potentially compromise Gitonga's access to clean water for the dairy farming. Yet, being among the few farmers in that neighbourhood, Gitonga said 'I have too much water', which could indicate a lack of awareness of the interconnectedness of water and other development factors. Similarly, Adhiambo believed that she had to use chemical fertilisers as the organic ones were 'slow' relative to her immediate income needs from a leased parcel of land. She had also relocated to lease land closer to a river so that she could minimise her irrigation cost by adopting flood irrigation.

*Fertilisers hazina [have] effect on the land because ukiweka [when you put] fertiliser huenda kwa mumea lakini si kwa udongo [it goes to the plant, not to the soil] and it is the same problem that we undergo when you want to lease a land coz mtu atakuuliza [because someone/landowner will ask you] are you going to use fertiliser? And if you say yes unapata unakosa [you don't get the lease] so you end up using folio fertilisers. But farmyard manure is very expensive like when you want to use it in six-acre piece of land. So, we use the granules fertiliser from the shops.
(Adhiambo, female young farmer, Western Kenya)*

As with Gitonga's view of water resources, one is left to speculate that perhaps these perspectives on resources were informed not by a lack of knowledge of the consequences of their actions, but by the reality at hand – that potentially adhering to such would jeopardise their immediate income sources. The main challenge with addressing soil health among farmers such as Adhiambo was that, for those on leased land, there were minimal incentives and motivation to adopt sustainable practices for boosting soil health. In their own terms, this seemed expensive relative to other options available, such as use of fertilisers, pesticides and crop boosters. Yet Gitonga believed that he produced the best organic manure from his dairy farming which he used to grow his fodder, while Kimondo and Wangai believed in

producing high-quality organic foods and had invested in producing their own organic manure and bio-pesticide to aid their organic farming. Only two farmers were planting trees and, interestingly, there was almost no mention of deforestation or emissions from agriculture. Those planting trees did so for agroforestry benefits, such as firewood, fruits, shade, fertiliser, live fencing and timber.

3.3 Multiple pathways

Young farmers employed a range of context-specific coping strategies in response to other challenges encountered in their agricultural livelihoods. For instance, while most innovations were found among young farmers who either owned the land through inheritance or purchase, other factors influenced the kind of innovations adopted. Female farmers farming on their parents' or spouses' land tended to invest in short-term 'women's crops' such as vegetables and poultry on small portions of the land – the kitchen garden – while their male counterparts invested in both short-term and long-term farming activities. These included livestock keeping, horticultural and cash crop farming, but also expanded to sustainable practices such as agroforestry, rainwater harvesting, drip irrigation and the on-farm production of organic fertilisers.

The most common navigation strategies in response to water-resource challenges included the adoption of farming techniques that required the minimal use of water, such as growing stress-tolerant crops, rain-fed agriculture, sunken beds, mulching, hydroponics, waste water treatment and recycling, drip irrigation and greenhouse farming. Young farmers also diversified to other on-farm income-earning activities such as training, the sale of seedlings, and processing and marketing farm produce. Other options included leasing land in other regions of the country with reliable water sources, drilling boreholes, and harvesting rainwater. Seeking alternative farming seasons and quitting farming were also equally important options because of young farmers' understanding of water as a key resource in their farming activities. As noted in the follow-up conversations with the farmers that the author visited in 2014, some of them had already quit farming, mentioning unreliable rainfall patterns. The high cost of irrigation was followed by the high cost of inputs as reasons for abandoning or alternating farming with other livelihood sources. Abandoning farming for other livelihood sources seemed normal to the young people and often meant that the young person had little confidence in investing more resources in an agricultural livelihood, or any other activity that did not offer a quick income.

Young farmers, depending on their experiences with water resources, had different perspectives on their role, if any, in conserving the resource. For instance, if one had access to a river that enabled furrow irrigation, money was often spent on the fuel for the generator and labour if they needed someone to assist with the piping for irrigation purposes. Such a farmer did not see the need to invest in sprinklers or drip irrigation, which would cost more but ensure efficient water use. However, if the farmer's water source was metred, he/she would seek a means of reducing the water bills and this would include timing irrigation, installing sprinklers or drip irrigation, harvesting rainwater, or even switching their farming practices to those that consumed less water. This was the case for some young farmers.

For now, the issue of water harvesting is probably what would work most for now because there is a direct correlation between not having water and your crops failing, and having water and you harvesting. So, unless you can make that direct correlation with the money, it [agriculture] probably is not going far for now, especially with the youth.

(Wangechi, female young farmer, Central Kenya)

Whereas some young farmers may be aware of the need to adopt environmental conservation strategies, their need for a quick income causes them to pursue the conventional practices of intensification.

The thing was, we never even got to the point of training people on that [minimum tillage] because in the first place, when people came to us, we noticed their need for agribusiness was something they can make money from. Because we were targeting the youth, they are at the point in their life where they are looking for a career and money. They are basically looking for money, not even a career. So how is minimum tillage going to help them get money? There was a bit of disconnect there.

(Wangechi, female young farmer, Central Kenya)

It is the actual cost of getting the water to the crops that determined the extent to which the young farmers sought alternatives, among which would be conservation strategies. Indeed, contradicting what is often assumed, resource challenges constrained young people's engagement in agriculture, more than access to markets. With their tech-savvy lifestyles and their ability to decide on the geographical location of their farm, young farmers were found to innovate ways of easing access to markets but were limited in their ability to address challenges relating to accessing, utilising and managing agricultural resources.

Obviously, the availability of resources remains the key determinant when a young person is deciding on an agricultural livelihood. Overall, young people are systematically discriminated in their access to productive resources and status, and this influences the extent to which they consider resource-intensive agriculture as a sustainable livelihood option. Jayne *et al.* (2016) argue that as an asset-poor group with limited access to finance, land and business development services, youth in developing countries are at a big disadvantage in creating agro-enterprises.

4 The materiality of agricultural resources and youth livelihoods

The previous section has demonstrated that the extent of a farmer's understanding of the resources nexus may aid their navigation strategies and influence the extent to which they can green their livelihoods. What is clear from the young farmers is that they apply a continuous navigation strategy in a bid to make a living out of agriculture, despite the complexity of resource challenges. This strategy has taken three major forms: managing resources constraints; finding solutions even without the full knowledge of the complexity of resource challenges; and finding multiple pathways to cope and remain resilient despite the resource constraints. The approaches observed here are similar to those observed by other scholars when communities are faced with resource-induced vulnerabilities (Thorn *et al.* 2015; Sah Akwan 2017; Vigh 2015). In their analysis of 'illicit coping strategies' among smallholder farmers, Mosberg and Eriksen (2015) argue that citizens are not just victims of climate change, or resource scarcity; rather, they are active agents who employ a variety of strategies to secure their wellbeing in the face of social, economic, political and climatic challenges. In doing so, they buffer negative effects on their livelihoods, retain influence over their own circumstances, and challenge existing authority and power relations. As a result, the relationship between what is illicit and what is socially acceptable is malleable, and subjectivities and authority are both reinforced and contested through coping strategies in various ways (Mosberg and Eriksen 2015).

This argument surrounding illicit coping strategies has important implications for youth agricultural livelihoods in the face of resource constraints. It is obvious from their perspectives and their utilisation of resources that the top priority for most young farmers was securing a livelihood for themselves over and above ensuring food security or even conserving resources. Driven by self-making and self-entrepreneurial mindsets (Mwaura 2017b), they pursued opportunities that promised to maximise their earned income; these ranged from applying new farming methods, using fertilisers, pesticides and growth boosters, producing high-value commodities, and introducing new technologies to enable them

to navigate resource challenges. The navigation strategies are in line with Masika's views of needing to remain 'liquid in the pocket', despite also acknowledging the need to ensure food security in the country. Being 'liquid in the pocket' was a temporary need that justified an educated young person to take up farming without the full knowledge of the complexity of the resources involved. Such an understanding of agriculture could also be assumed to justify the kind of practices that young farmers embraced.

Many of my friends do not embrace farming. They think when you get into farming you are finished. They want clean jobs, but you need to be liquid in the pocket. You would rather be dirty and have money in the pocket.

(Masika, male young farmer, Eastern Kenya)

In their attempts to earn a quick income, we witness illicit coping strategies, such as in utilising land and water resources at the expense of degradation and soil health. Yet sometimes it was not just about securing a livelihood; it was also about managing the expectations of their identity as educated young farmers. Some, such as Njango and Janet, despite their fears of how they would maintain their farming activities, still imagined a meaningful livelihood in agriculture. Njango imagined young farmers contributing to national food security agenda, while Janet saw herself in a leading agribusiness:

For me, why I am doing agriculture is because I have a future [...] I want to have an international brand that is what I am working on and it is something that I am so passionate about. Nothing can come between me and my dreams so [...] I keep on dreaming big and big so I keep on hanging inside there.

(Janet, female young farmer, Central Kenya)

Njango and Janet could be said to have bought into the narrative of youth in agriculture and indeed believed they had the solution to their unemployment. Yet such a drive to 'keep on hanging inside there' was rare and often came at a huge cost to the young people. At the time of the interview, Njango had only started greenhouse farming because she could not find a job, despite two degrees acquired abroad, while Janet was leasing her farming land and already anticipating that changes in the land tenure would affect her current engagements. They were both keeping their minds open to the idea that they could remain in agribusiness as long as there were no better job opportunities.

Such ideas – of agriculture being able to provide temporary incomes while also shaping sustainable livelihoods for young people – must be viewed in the context of greening youth livelihoods. On one hand, earning a quick income from agriculture is evidence of a lack of awareness of the complexity of the agricultural systems and that present farming activities always have implications for the resources. On the other, the desire for sustainable livelihoods underscores the need to provide the full picture of agricultural resources and to prepare young people for resilient livelihoods in the face of social, economic, financial and biophysical challenges. Understanding young people's vulnerabilities and how these play out in their quest for livelihoods is therefore important as these inform the extent to which a young person may pursue a particular livelihood over and beyond an immediate income.

In the context of greening youth livelihoods, this means understanding the consequences of the everyday navigations of young people as they try to get by while pursuing agricultural livelihoods. Most find themselves gambling for a livelihood in a resource-constrained economy. As one young farmer commented:

Farming is like gambling. You have to keep on trying different crops and how they are faring on your farm and in the market.

(Mburu, male young farmer, Central Kenya)

Evidently, young farmers gambled with farming, and by extension, with resources. The idea that one can quickly turn around a few resources to earn an income without considering the sustainability of such an agribusiness is of great concern. Each of the young farmers referred to here, in addition to their vulnerabilities as young people, had to navigate the resources challenges they encountered in multifarious ways in order to make a living out of agriculture. Adhiambo believed that to be productive and earn the expected income from her leased land, she must use chemical fertilisers, pesticides and growth boosters to hasten growth. Bina and Patrick, even though they owned a prime piece of land, were only farming to finance their exit from farming into formal jobs. Omonge dropped out of school to farm in order to educate his siblings, hoping that they would eventually get formal jobs and free him to continue with his education. Njango farmed as she tarmacked for her ideal formal job in international relations. Others such as Kimondo preferred to offer services rather than farm so as to avoid the resource challenges that came with farming. In an effort to embrace the youth-in-agriculture narrative, each young farmer evidently gambled with their education, with the limited agricultural resources available to them, and hence, could be said to have engaged in illicit coping strategies.

Beyond the perspectives and strategies discussed here, resource constraints such as natural disasters, climate change, war and even unemployment have been known to stimulate youth migration (Baez *et al.* 2017; Berckmoes and White 2014; Mertz 2009). The uprisings in Western and Northern Africa and the Middle East have all been linked to youth unemployment, with education seemingly contributing to youth awareness of the shrinking opportunity space for work (Bezu and Holden 2014). It is particularly concerning for rural-to-urban migration, where growing urban populations are faced with multiple urban challenges of youth unemployment and strive, the high cost of living, the pressure on urban resources and consequential pressure on other support sectors. Thus, the idea that agribusiness could potentially shift employment opportunities into the rural areas and encourage reverse migration is most welcome. Different studies have documented the cyclical phenomenon of educated youth migration which is informed by the location of the opportunity space rather than whether one is moving from the countryside to the city. Indeed, during the doctoral work, a similar phenomenon was observed where majority of young farmers interviewed had 'ru-urbanised' lifestyles, settling on the peripheries of the city and practising farming in the rural areas. Others were farming in the rural areas and remaining in the city in search of other side-hustles (Mwaura 2017a). This, too, was an effort to manage resource constraints while creating a livelihood.

Overall, all young people can be argued to be responding to their need to earn a livelihood through illicit coping strategies; these presumably have also been accepted as a means of survival. Instead of witnessing the creativity and innovation of educated young farmers, we are instead witnessing craftiness in their self-making efforts that eventually will have implications for agricultural resources. This poses significant challenges for our understanding of youth livelihoods, on the one hand, and of agricultural transformation, on the other hand. We anticipate that youth livelihoods would be sustainable and enable the young people to make a transition to adulthood, but their current status does not guarantee such. We also anticipate that young/new farmers would facilitate agricultural transformation; however, given the current practices, we foresee a further complexity in the sector in the sense that there is a generation unaware of sustainable resource use currently extracting as much as they can to build temporary livelihoods which will soon leave the sector to seek other livelihood options. This is a major challenge to the expense of greening youth livelihoods.

5 Conclusion

In conclusion, this paper makes several arguments concerning youth livelihoods, resource governance and pathways to sustainability. First, this paper has argued that youth agricultural livelihoods present both an opportunity and a challenge to achieving sustainable development goals as the efforts to

achieve them are confounded by complex resources constraints: agricultural land and water resources are becoming scarcer; rainfall patterns are changing; changing temperatures are disrupting planting seasons; there are more and unprecedented extreme conditions of drought and floods; and soils are becoming ever more degraded. Additionally, these biophysical challenges are coupled with youth vulnerabilities that further complicate the process of achieving sustainability and meaningful livelihoods.

Second, to address this concern, youth subjectivities must be at the centre of greening youth livelihoods; these are presented here as a process and a strategy for self-making aimed at securing oneself the social markers of adulthood. Doing so enables researchers to question other vulnerabilities faced by young farmers by virtue of being young people, even before they encounter the challenges of the resources nexus in the agriculture sector. As a result, for us to claim success in engaging youth in agriculture, we must conduct a deeper analysis of the interconnections of agricultural productivity, decent employment, food security, poverty alleviation, rural transformation and ecosystem services.

Third, a key future research question concerns the intersections of youth livelihoods and the changing climate, which already threatens the constrained resources base. Unfortunately, current young farmers have inadequate knowledge of the implications of their agricultural activities for the climate system. Studies are required to explain the necessary biophysical and socio-economic changes that will enable people and their livelihoods to remain resilient in times of climate change. This means that the youth-in-agriculture narrative would advance from seeking to increase the number of young people in agriculture to widening the opportunity space by considering the kind of knowledge, technologies, practices, policies and institutions that enable young farmers to maintain sustainable livelihoods in a changing climate.

Finally, this paper has suggested that young people may not have the necessary resources to adapt to and manage the resource constraints and vulnerabilities encountered in their quest for agricultural livelihoods, raising the question of what policies and institutions influence what resources become available to young people. The author argues that it is imperative that future work addresses the pertinent question of youth, resources, and their policies and politics. We must question the role of different actors in defining the young people and how this influences the kind of livelihood approaches promoted to these young people. Such an understanding might also help us explain the extent to which policies and politics widen or constrain the opportunity space for youth livelihoods. Importantly, such an analysis must be considerate of the nexus thinking that places sustainable livelihoods at the centre of achieving sustainable development.

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Kenya's youth agricultural livelihoods and the land–water–environment nexus

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Kenyan youth have started to embrace agriculture as a viable livelihood source following a decade of the 'youth-in-agriculture' narrative that promotes, among other things, agribusiness as a viable youth employment opportunity. Among the multiple framings employed by this narrative is the proposition that pathways involving agriculture can generate livelihood options for young people, while also having the possibility of greening these livelihoods. This paper elucidates the extent to which the proposition for greening youth livelihoods is plausible by examining how young farmers navigate the land–water–environment nexus. The main question addressed here is 'to what extent does the land–water–environment nexus influence (and, indeed, is influenced by) youth agricultural livelihoods?'

The paper contributes to a growing body of knowledge on the intersections of youth livelihoods and natural resources governance. By elucidating how resource constraints intersect with youth livelihoods, the paper offers a nuanced understanding of the opportunity space for meaningful youth livelihoods in line with transforming African agriculture. The paper's focus on young people already engaged in agriculture focuses on an often neglected yet significant question on the sustainability of youth livelihoods. Importantly, the findings emphasise that youth livelihoods are deeply entrenched in natural resources governance and, hence, that there is a need to conduct further analysis of the complex intersections of youth employment and the resources nexus.

