

Opportunities and Challenges in Export Horticulture as an Agro-industrial Food System: Case Study of Northwest Mount Kenya Region

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ABSTRACT

Export horticulture in Kenya viewed as an agro-industrial food system is currently the fastest growing agricultural sub-sector in terms of foreign exchange earnings. Increased demand for horticulture products led to production spreading beyond the traditional mountainous high yielding areas into arid and semi-arid zones as in Northwest Mount Kenya. This food system competes with other food systems for common pool resources needed for the production of food. We argue that local actors, especially poorer households lack the power to influence the institutions ('rules of the game') of production and resource ownership by which the dominant agro-industrial system impacts their livelihoods.

This paper is structured to include the following sections: the introduction, materials and methods, results, discussion and conclusions on the challenges and opportunities in export horticulture as an agro-industrial food system: case study of Northwest Mount Kenya region.

Keywords: *Agro-industrial food system; institutional settings; livelihoods; opportunities; challenges*

1 Introduction

Globally, over 70 percent of the poor in developing countries live in rural areas where they depend on agriculture to sustain their livelihoods. Just like other developing Sub Saharan African countries, agriculture is the backbone of Kenya's economy, supporting up to 80% of the rural livelihoods (KNBS, 2017; FAO, 2016; IFPRI, 2004;). Kenya's export horticulture is regarded as an agro-industrial food system based on the economies of scale producing for mass markets outside of the production area (Colonna et al., 2013). Much of the food consumed from this food system has undergone multiple transformations, travelled substantial distances, passed through different hands and been subject to a host of laws, standards and regulations as well as institutions (Henson and Humphrey, 2010; Colonna et al., 2013).

The horticulture sector which is currently the leading agriculture subsector in Kenya has evolved from small-holder farming to agro-industrial large-scale export farming dominated by multinational companies (Colonna et al., 2013; AFFA, 2014). There are also small-holder farmers producing as out-growers for the export companies and others for the domestic markets (Ongeri, 2014; Ulrich, 2014). The sector's production of vegetables, fruits and high care products is market driven with increasingly stringent food safety standards resulting from consumer awareness and a series of food safety failures in the 1990s

(Humphrey, 2008; MacGregor et al., 2014). Institutions such as international food safety standards now play a vital role in the sector as there are mandatory certifications and standards to be adhered to in light of the environment, workforce and food safety (Ouma, 2010; MacGregor et al., 2014).

Despite the stringent standards, the consumer-led demand for these products has been increasing steadily in the last three decades with Kenya's value of horticultural products quadrupling within this period.

Today, horticulture is Kenya's largest single source of export earnings employing an estimated 4.5 million people in production and processing (CARE, 2016; KNBS, 2017). The increased production in Kenya from the rising market demand of horticultural products has caused the sector to spread beyond the mountainous high yielding areas into arid zones often prone to resource contestation (Schuler 2004; Ulrich 2014; Lanari et al 2016). Studies on horticulture in Kenya and other African countries including Senegal reported both positive and detrimental effects of this sector to development and livelihoods (Dolan and Humphrey, 2000; Humphrey, 2008; Asfaw et al., 2010; Onger, 2014; CARE, 2016).

Export horticulture, when regarded as an agro-industrial food system producing for commercial markets outside of the production area thus, needs to be interrogated further in relation to sustainable food systems and ecological considerations and resource use (Colonna et al 2013). There are institutions ('rules of the game') in export horticulture that define the institutional setting for access to resources and production. As export horticulture rises in financial importance and becomes more valuable it impacts on the local institutional setting of working conditions, property rights and access to common pool resources such as water and pasture vital for local livelihoods. The important research question for this study is if the agro-industrial food system has a critical impact on other food systems and if their viability in a semi-arid zone is threatened when weighted against overall effects on livelihoods and resource utilization?

Previous studies have focused majorly on production in high yielding zones with arid and semi-arid zones where horticulture production remaining under-researched (Dolan, 1995; Dolan et al., 2002; Gikunju, 2011; Lanari, 2014; Mwangi, 2016; Nzioki, 2013; Onger, 2014; Ulrich, 2014; Zaehring et al., 2018). This paper focuses on export horticulture investments in a semi-arid zone of Northwest Mount Kenya. It does this by paying special attention to the institutional setting of the agro-industrial food system and highlight challenges and opportunities it presents to local livelihoods. It relates to research on large-scale land acquisitions or land grabbing debates by focusing on an institutional analysis that studies the impact on unsecured wage labour contexts, household economies and access to common pool resources (water and pasture).

This paper is structured in form of an introduction to the research topic; a detailing of the materials and methods applied in the research study; results, discussion and conclusions drawn from the research key findings.

2 Materials and Methods

2.1 Description of study area

This exploratory study targeted an export horticulture investment located in Northwest Mount Kenya region, downstream of the Ewaso Ng'iro North Basin, within Muramati Location of Laikipia County, with some out-grower farmers in Meru and Nyeri Counties (Map 1).

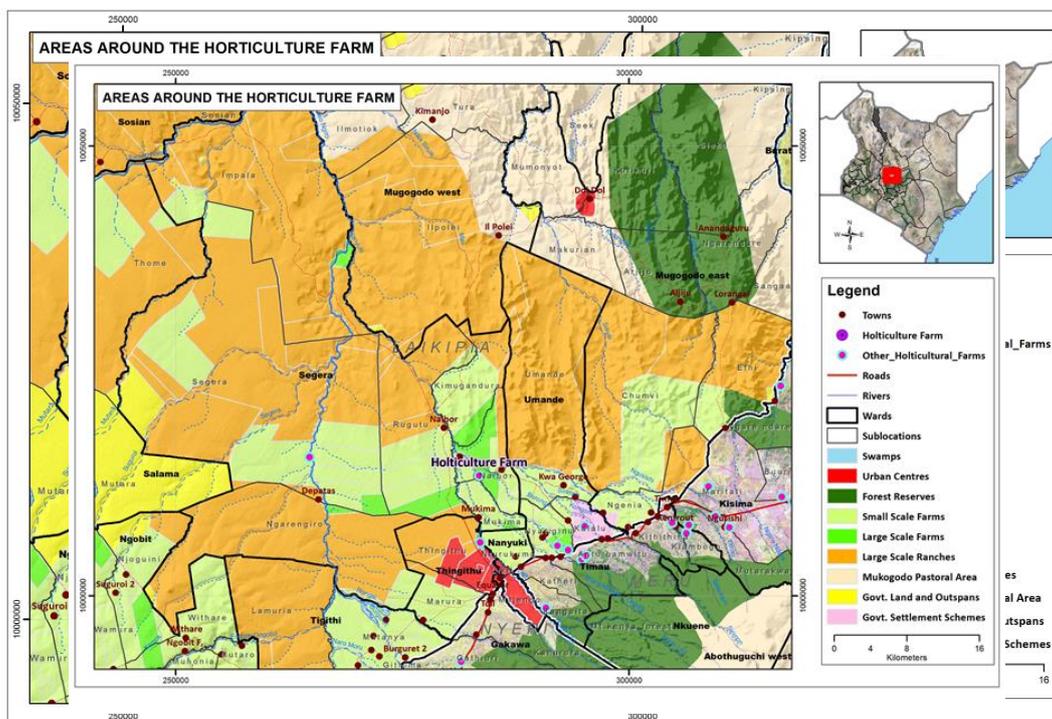


Figure 1. Map of the study area (Source: CETRAD)

The horticulture farm is the first of three farms owned by a horticulture investment with headquarters in Nairobi that exports fresh fruits and vegetables to the United Kingdom (U.K.) since the 1970's. The investment in Northwest Mount Kenya comprises a farm and onsite packhouse. Production is an all year-round activity in large-scale horticulture farming except in seasons of drought and water scarcity. The climate in Northwest Mount Kenya varies from humid to semi-humid on the mountain slopes and semi-humid to semi-arid on the lowlands.

The area experiences erratic rainfalls with a precipitation of 450 -700 mm per annum with prolonged dry spells. The level plateau and the entire county drainage are dominated by the Ewaso Nyiro North basin with its tributaries which have their sources in the slopes of the Aberdares and Mt. Kenya and flow from South to North (GOK 2013). The flow of these rivers matches the topography which slopes gently from the highlands in the South to the lowlands in the North. The rivers determine to a large extent the settlement patterns, as they are a source of water for human and livestock consumption as well as irrigation activities (GOK, 2013).

The export horticulture investments, ranches and wildlife conservancies have also notable presence in the region with large tracts of land fenced off. They increase their water accessibility through the drilling of boreholes and rainwater harvesting and storage. There are 30 export horticulture investments operating on 35 farms and covering an area of 1385 hectares in Northwest of Mount Kenya (Lanari 2014). The small-scale farmers diversify their crops to include traditional subsistence crops like cereals and tubers and commercial cash crops for both domestic and export markets such as vegetables, herbs and fruits. The farmers gain access to land as private property by inheritance, purchase and lease. The pastoral communities have settled in community group ranches with a few families moving away and settling in their own purchased land but still holding forte in the group ranches. In seasons of harsh weather and limited water access, the different food systems often compete for the resources with potential for conflict (Lanari et al., 2016; Ulrich, 2014).

2.2 Study design and selection of study participants

This study adopted an inductive case study design based on in-depth qualitative exploration to establish the challenges and opportunities of export horticulture in Northwest Mount Kenya region. The study adopted a qualitative approach to allow for emic perspectives of the food system actors. The study looked into actions and interactions of actors involved in the agro-industrial food system production, processing, as well as distribution of food produced in the study area. Study participants were purposively sampled, taken through the informed consent process and verbal consent obtained with emphasis made on the

participant’s right of voluntarism in deciding whether or not to participate in the study.*

2.3 Fieldwork and data analysis

Data was collected through triangulation of different qualitative methods (30 in-depth and 08 key informant interviews, unstructured observations and 2 focus group discussions) to enhance data validity and reliability.

Qualitative interviews were carried out at a time and place convenient to the study participants with consideration for their work demands. Observations were on-going for the entire study period. The qualitative data obtained through the in-depth interviews, key informant interviews, focus group discussions and field notes compiled from observations was inductively coded and thematic analysis applied. Verbatim quotations were used to present information provided by the informants in retrospect. Ethical considerations were applied to data collection and subsequent analysis.¹

3 Results

Export horticulture production is dominated by multinational companies that have established large-scale land investments of over 100 hectares of land with technology and labor to complement the production. The main produce comprised high-value crops including fresh vegetables, fruits and herbs for the global horticulture markets in European Union (EU) mostly the United Kingdom (UK). As at the time of the study (September 2016 to March 2017) the export horticulture investment enjoyed a stable customer base over the years since its establishment in 2004/2005. The socio-demographic characteristics of the local actors linked to export horticulture as an agro-industrial food system in Northwest Mount Kenya are summarised in table 1.

Table 1.

Socio-demographic characteristics of local actors linked to export horticulture in Northwest Mount Kenya

Actors	Socio demographic characteristics
Wage-workers	Recruited from the neighbouring areas Unskilled labor with minimum employment requirements Mostly migrants from other regions in search of income opportunities 75 percent of the workers are women and aged between 18 and 50 years 80 percent live in rental houses in Nanyuki and surrounding areas away from horticulture investment and use company bus transport to come to work Only about 1 per cent of workers in horticulture investment own land in study area.
Outgrowers	Only provide 20 percent of the export produce Recruited from counties in Northwest Mount Kenya namely; Laikipia, Nyeri and Meru counties Work as individual or farmer groups Vetted by export horticulture investment on the international food standards for safety and quality
Neighbouring communities	Living around the export horticulture investment Share common pool resources such as water and land Look for income opportunities as casual labor in horticulture investments, real estate and in ranches / conservancies Largest proportion represented by pastoral community living in communal lands and a few with private land nearer to the horticulture investment and practise subsistence farming

* Ethical considerations

The approval and permit for this study were issued by the National Council of Science, Technology and Innovation (NACOSTI), Kenya. Collaboration and approval was further sought from the Export horticulture investment, County Government Education and Agriculture offices. The participants were given full details of the study including any fore seen or anticipated risks and how to tackle them in case they occurred, and any benefits / compensations or lack of beforehand. Informed consent and permission to record interviews was obtained.

Table 2 captures summaries of all the respondents’ perspectives on the opportunities and challenges of export horticulture as an agro-industrial food system in Northwest Mount Kenya

Table 2.
Structured summaries of conclusions from study respondents

Data collection tool	Respondent (s)	Conclusions from respondents on the opportunities in export horticulture	Conclusions from respondents on the challenges in export horticulture
In-depth interviews (N= 30)	Wage workers Neighboring communities (small holder farmers and pastoralists)	According to the in-depth interview respondents export horticulture provided income opportunities for wage work and outgrower farming. These incomes enabled access to livelihood needs of the workers and outgrowers. There was also access to best practices, knowledge and skills transfer from export horticulture.	However, there were also challenges including short term opportunities for wage workers without security of tenure in employment. Outgrower schemes are costly in the long term for the small holders because of compliance costs and perennial water shortages resulting in waste of resources used for horticulture production. Outgrowers and wage workers were unable to negotiate for better terms of engagement given the lower bargaining power position in the agro-industrial food system.
Focus Group Discussions N = 2 groups comprised of 8 members each	Neighboring communities (small holder farmers and pastoralists)	Export horticulture increased livelihood options for outgrower and wage work. Infrastructure development like roads, electricity, schools in the study area linked to presence of export horticulture	Export horticulture had challenges that affected its viability as an agro-industrial food system in the study area. These focus group discussants corroborated the perspectives on the in-depth interview respondents. According to the discussants, export horticulture has also contributed to water scarcity and contamination, a potential for resource-related conflict in the study area.
Key informant interviews N=08	Management of export horticulture representatives and state actors	Horticulture is beneficial to study area. It has opened up the region, led to improvement of infrastructure and offers income opportunities previously unavailable. The perspectives of these respondents were similar to those of in depth interview and focus group discussion participants.	Stringent market standards and high cost of compliance. Water shortages threatening viability of export horticulture in study area and a potential for resource-related conflicts which the informants didn’t link to the agro-industrial food system unlike the in-depth interviews and focus group discussions perspective. The greater challenge from the key informants’ perspective was the need for compliance with the ever-increasing stringent market standards.

3.1 Opportunities in export horticulture in Northwest Mount Kenya

The export horticulture investment is labelled to provide work benefits through wage workers salaries, outgrower incomes, and exchanges of good agricultural practices. These are regarded as useful for enabling the livelihoods of the local food actors to access basic needs and improve on their farming skills and technologies as summarized in table 3

Table 3.

Summary opportunities in export horticulture as an agro-industrial food system in Northwest Mount Kenya

Opportunities in Export horticulture		
Development of the local area linked to the establishment of the export horticulture investment	Community	Development of infrastructure after horticulture investment was set up namely; roads, electricity, schools and health facilities
		Alternative livelihood activity away from the previous limited opportunities like charcoal burning and subsistence farming
Linkages to local food systems through income-earning opportunities and exchanges of good agricultural practices	Wage workers	Daily wage-based incomes
		Social welfare through meal and transport subsidies
		Easy to get work opportunity for unskilled labor
		Access to on the job farming skills relevant in their local subsistence
	Outgrowers	Technical support and capacity building through outgrower farming e.g involvement in fair trade beans competition
		Access to credit facilities for farming inputs
		Offers casual labour for community members as an alternative livelihood
		Income from contract farming agreements with export horticulture investments

Development of the local area linked to the establishment of the export horticulture investment

Export horticulture has contributed to development in the study area. Setting up of large-scale farms in the locality opened it up as it was almost deserted with sparse small-scale subsistence farming and pastoralism. Before the export horticulture investment set base on its farm, the area was closed out with no good roads, no electricity and with only one primary school covering a large area and a small health centre.

Over time the infrastructure namely; roads, electricity and telephone network have been put in place in the area because of the location of the export horticulture investments. For the large-scale farm their corporate social responsibility (CSR) initiatives in the community are seen to improve their livelihoods as espoused in the excerpts;

Normally, they contribute money and give it to the head teacher towards construction. They give us jobs here. They have really employed very many people from here, Naibor, Jua Kali, even town (Nanyuki) (Community FGD_01, Northwest Mount Kenya).

The supermarkets who buy products of the horticulture farm came and asked how they could help the community. As a committee we had thought of a laboratory but when they came here we saw the need for a full maternity including the laboratory and they built it for us (KII_07, Government representative, Northwest Mount Kenya)

Linkages to local food systems through income-earning opportunities and exchanges of good agricultural practices

The export horticulture investment provides an opportunity to produce high-value products with good returns for the export horticulture investment as well as other linked actors namely out-growers and the wage workers.

Men and women especially unskilled labour with little or no academic qualifications from the region, find an opportunity for work in the export horticulture investments. As long as an individual is available to work and had the minimum requirements then they are eligible for work. Hiring is on a rolling basis especially in the high peak seasons and with minimal recruitment criteria as espoused in the excerpt:

Something we appreciate about the farm, they live well with the neighbours...They have employed our women and our youths... (Community FGD_02, Northwest Mount Kenya).

The work is based on minimum wages with basic social welfare provisions such as free transport and subsidized meals in the workplace. Notably, though the employment is on short term 1 to 3-month contracts only without guarantee for an extension. After the end of a contract period a worker may retain his / her job and sign a new contract; or may be relieved of their duties, a decision squarely dependent on the farm management. Such decisions are defined a lot by individual performance as much as farm production dynamics. Work often started at the lowest cadre of a general worker paying a minimum wage of Kshs 240 (2.37 USD). Several workers in the export horticulture investment despite being on short-term contracts have a work record of up to even 3 years. Wage workers also express the aspect of being exposed to new farming techniques and technologies while on the job as a benefit for working at the export horticulture investment. This enables skills transfer for wage workers which are useful for influencing their local farming practices. Some wage workers argue that they double up as small-scale farmers for their supplementary subsistence or as out-growers for exporting companies as illustrated in the excerpt;

First, I came not to work [at horticulture farm] but to farm. I am a farmer. Therefore, I started farming in my farm and I got employed here in the same County where also I have been working [at horticulture farm] the same time (IDI_03, Farm supervisor, Northwest Mount Kenya)

The export horticulture investment has also subcontracted out-growers to supplement and diversify their product lines. Out-growers are usually smallholder farmers with access to the land of 0.5 to 2 hectares (ha). They produce specific crops mainly fine beans (green and yellow) and baby corn as contracted by export horticulture investment packhouse as illustrated in the following excerpt;

We train out-growers through our technical assistant who goes out to out-growers. They train them; they can as well come and see what we are doing... We have a big base of out-growers and big farms that is why we have been able to sustain or leading in exports' (KII_01, horticulture investment management, Northwest Mount Kenya).

The export horticulture investment also ensures that out-growers benefit to the maximum by arranging credit-based farm input for accessing seedlings, fertilizers and pesticides needed for the nurturing of crops and thereafter have it deducted from their gross returns; they also buy all the produce from their farms even beyond agreed-upon targets except for 'rejects' not meeting the market threshold. The out-grower scheme has been a welcome opportunity as illustrated in the excerpts from the management of the horticultural farm and local county administration;

Horticultural out-growers have changed the life of the farmers...very much. There before most of the people here were charcoal burners and were trying all means of survival and doing shoddy jobs. When the horticulture farm introduced the out-growers scheme, I have seen that for many people the level of poverty has gone down (KII_04, Local administrator, Northwest Mount Kenya).

3.2 Challenges in export horticulture as an agro-industrial food system

While export horticulture offers income opportunities for out-growers and wage workers. Additionally, there are development aspects in the neighbouring areas that can be linked to the establishment of the export horticulture investment. However, with the export horticulture as an agro-industrial food system producing food for mass markets outside of the region on the basis of economies of scale, often there are limited benefits for the local actors.

Given the institutional arrangements around the wage work and outgrower contracting, the export horticulture setting only provides livelihood options for local actors in the short term. There are also challenges related to common pool resource use and sharing especially for water and land with potential for conflicts that affected communities around export horticulture investments as summarized in table 4

Table 4.

Summary of the challenges of export horticulture as an agro-industrial food system in Northwest Mount Kenya

Challenges in Export horticulture		
Unsecured livelihoods	Wage workers	Short term (1-3) months contracts with no guaranteed extension
		Work availability dependent on production demands and climate variability in ASAL area
		Minimum wages of Kshs 240 (2.37 USD) per day, which is below the standard living wage
	Outgrowers	Production dependent of compliance with stringent international food standards and climate variability in the arid and semi-arid area (ASAL)
		Dropped out of value chain due to increased transaction costs for the exporter influenced by devolution in Kenya
		Have to shoulder losses resulting from water scarcity as well as rejected produce.
Community conflicts over common pool resources (CPRs)	Communities downstream river basin (Pastoral communities, small holder farmers and export horticulture investment)	Water already a scarce resource in ASAL area with erratic rainfall patterns.
		Dry spell seasons result is scarce water resource affecting availability of water and pasture.
		Communities and export horticulture investments upstream abstract water to the loss of downstream users.
		Risk of trespass into horticulture investments in search of CPRs
		Downscaled production in dry spell seasons for export-horticulture resulting in lost business opportunities and losses through dried up crop.

Unsecured livelihoods of communities as out-growers and wage labourers

Workers and the communities liked that they could easily get work at the export horticulture investment as there was on-going recruitment with minimal requirements except during the dry spells. However, workers were also aware of the little pay based on minimum daily wages and majority cited this as a reason for terminating contract at the horticulture investments. Workers would leave work often without following due process when better opportunities for income generation were realised.

When the farm was started production in 2004/2005 many people from this area sought work but over time they left and found other activities. With fewer people from the areas closest to the farm working their discourse on the farm wages as little compared to what people from around the locality were offered in other casual labour or self-employment were dominant. Alternative casual employment available included construction work that attracted a daily wage of 400 shillings; burning and selling of charcoal or even working as a motorcycle rider to offer transport services and get roughly Kshs 500 a day from either of the 2 ventures rather than the 240 shillings a day offered at the export horticulture investment.

The wage workers were greatly impacted by the institutional setting in export horticulture investments. Their jobs are all but reliable for most of the workers due to several reasons. The investor defines the rules of the game in deployment of workers to suit its interests to access cheaper labor, minimize on production costs and maximize the profits. This often at the loss of the wage workers engaged on short-term contracts without any social security or worker union arrangements.

Because of water scarcity, the export horticulture investments have to downscale production in spite of constant market demand for products. In some instances already planted crop is left to wither and dry resulting in massive losses. Additionally, with the water scarcity that reduced production, workers were relieved of their income opportunities often without prior notice. Downscaling production translated into reduced workload and thus the need to also downsize the labour force and reduce costs of production. This often impacted negatively on the worker's livelihoods as it terminated their income earning without adequate notice to prepare for the transition as highlighted in the excerpt:

You know there is no work that will take place if it does not rain because there will be no water... If you plant what will you water with? Even if workers in harvesting are retained, they will pick today, but what of tomorrow? ...So even last time (2015 March), I remember when we finished water and there was no rain in my department we were sent home (IDI_05, Farm Supervisor, Northwest Mount Kenya)

For the export horticulture investors to meet market standards, thorough vetting on produce for their own farms as well as the smaller out-grower farmers is mandatory. The vetting is to check for compliance with international and investor food safety standards and requirements. Many smallholder farmers are vetted out of export horticulture due to non-compliance linked their limited resources and capacities. The following citation of an interview with the management of one such investment highlights this;

We used to rely heavily on the small holder farmers. But there was a regulation that was passed by European Union (EU) on the minimum residue level and the small holder farmers were given the new regulations. For those who managed we continued working with them and for those who did not manage by the new standards we left them out (KII_06, horticulture investment management, Northwest Mount Kenya)

So driven by the stringent market driven food safety standards, the investor defines the rules of the game and farmers unable to comply are out of the game. In addition, other governance reasons related to political changes due to the devolution of power from national to county-level governance translated into multiple taxations of horticultural produce and products hence increased transaction costs for the companies. Counties implement their individual tax charges yet levies are also charged at the national level presenting multiple taxation scenarios; a new development since the 2010 Kenya constitution dispensation. Where the exporting companies find it expensive to manage the levies charged while transporting produce from out-grower farm gates, the contracts are discontinued. Out-growers and exporters who've invested time and resources to align with the stringent food standards, access farming incentives end up not benefitting from the value chain.

Interestingly also, during the periods that the investment faced reduced production because of water scarcity, the out-growers from the region are also not able to meet production targets. Water scarcity affected the out-grower farmers as they solely depended on the river water, unlike the export horticulture investments that had reservoirs and boreholes to sustain them a bit more in dry seasons.

Community conflicts over common pool resources (CPRs) especially water and pasture

The horticulture crops are highly valued agricultural products that are water intensive. The large-scale and smallholder farmers in the study area depend on irrigation farming. This is because of the water scarcity resulting from scarce rainfall in the semi-arid area and the drying up of river water sources. However, the water volume and supply have been reducing over time because of the increasing users up and downstream as well as the minimal rainwater. The tensions regarding shortages of water are exacerbated when there is an increase in use. Other food producers including subsistence farmers and pastoralists are affected by the water scarcity and often turn the blame of the large-scale farms in the region whom they believe to be utilizing and abstracting large volumes of water at the loss of the same for other users especially those downstream as elaborated in the excerpts;

Before, we were using irrigation water from the river. It has been a huge challenge because the flower farms, there are huge flower farms here upstream... that abstraction means that water is held up somewhere...diverted to the farms, huge farms... (IDI_013, Smallholder farmer, Northwest Mount Kenya)

Some time ago the river never dried up, because people in this area were not really farmers. Most of the people who practised farming were from around Timau coming this way downstream of the Ewaso Ng'iro river basin. Now the small scale farmers increased and with the establishment of the large farms in the upper areas, this affected the water levels in the river (Community FGD_01, Northwest Mount Kenya)

This narrative clearly outlines the perception that subsistence farming is hindered especially also by large water [export horticulture investments] users which turn the river that never dried up into a scarce water resource. The export horticulture investment in the study also suffered from the upstream overuse of water given its downstream location. The downstream users point fingers at the water management authorities for not properly regulating the use. In spite of the erratic rainfalls, downstream users feel river water would still be available and enough if it was properly regulated and coordinated.

However, this would also mean that one should look at the relations of abstractions which are due to the export horticulture investment and to out-growers and also subsistence producers.

The change in river dimension is to an extent attributed to the changing climate patterns in the region and also to the increased human activity along the river catchment area. The latter is something that is a growing concern especially with the water resource user associations at times giving user rights to many more users than the water catchment area capacity and also the unauthorized users both large-scale and small-scale who often use the water without following the regulations as espoused in the excerpt;

I remember at some point in the 2000s, there was a huge demonstration by the people of Isiolo, Samburu and Laikipia Counties [people downstream] the pastoral communities that are there because this river basin is their lifeline and the abstraction was affecting water availability (IDI_015, Smallholder farmer, Northwest Mount Kenya)

This citation recalls the discourse that the lifeline of seasonal users are cut in this way and also illustrates that affected users try to react to the what for them seems to be an unfair abstraction of their lifeline. Furthermore, small-scale farmers and pastoralists do not believe in the narrative of climate change alone how the following citation illustrates:

Even when it is in the dry season, the river has water. Farm Y have closed this water. You know they grow flowers, and the demand for flowers is big [If Farm Y has closed this water, can't the government intervene? So that people benefit]. Farm Y is a very big company and we are just locals. If they give a bribe of say 3 million Kenya shillings, we can't compete with that... (Community FGD_02, Northwest Mount Kenya).

Local actors have a much-reduced bargaining power vis a vis the export horticulture investments and that the government does not take them seriously. In addition, the management of the water is not regulated as during rainy seasons there might be too much water. Basic access to drinking water, a constitutional right in Kenya, is a struggle. Thus resilience of farmers and pastoralists is reduced and water is increasingly transferred from CPR managed in a commons regime to a commoditized CPR.

The water scarcity issue also affects access to pasture for the cattle and livestock reared within this region. As such there is usually potential for conflict where in search of pasture and water pastoralists may trespass into privately owned properties including large-scale export horticulture investments and spark conflict as elaborated in the excerpt;

For grazing sometimes, you just let the animals roam into that farm and when they ask us we say they had wandered but in the real sense it was us that drove the animals there for pasture (Community FGD_02, Northwest Mount Kenya).

There was this case that lasted for some 6 to 7 years about grazing of goats in the horticulture farm by one individual. The farm owners went to court and it almost caused enmity in the community because the head of security that had forwarded the case became the people's enemy.... (Community FGD_01, Northwest Mount Kenya)

4 Discussion

Export horticulture has the potential for substantial economic, social, health and environmental opportunities to smallholders and the rural poor (AFFA, 2014; CARE, 2016; Onger, 2014; Weinberger and Lumpkin, 2007). In Northwest Mount Kenya region, sunny weather and the water from the mountain have made Laikipia, Meru, and Nyeri counties home to a booming export horticulture industry (Lanari, 2014; Schuler, 2004). Export horticulture is a beneficial venture for investors as well as the local communities as they are able to generate income from the sale of fresh fruits and vegetables, offer employment and income for out-grower farming (Dolan et al., 2002; Dolan and Humphrey, 2004; Humphrey, 2004; Weinberger and Lumpkin, 2008; Fink, 2014; MacGregor et al., 2014). In the study area, Schuler (2004) demonstrated that a handful of workers on one farm in 1991 had grown by 2003 to about 5,900 workers across different companies. Presently, there are at least 30 horticulture companies employing an estimated 11,600 workers in the last decade (Lanari et al., 2016; Schuler, 2004).

In addition to the economic opportunities of horticulture for the producer, the high labour demands of horticultural production and related processing industries have the added benefit of local employment generation, development of the local areas and exchanges of good agricultural practices (AFFA, 2014; CARE, 2016; Onger, 2014). Out-growers of export horticulture are therefore said to be able to earn extra

incomes, gain better access to markets and improve their livelihoods. Working with the exporting companies as a seasonal worker or as an out-grower is as viewed as an opportunity to earn some additional income and provide money for subsistence and for contributing to smallholder farming activities (Afari, 2013; Onger, 2014; CARE, 2016; Lanari et al., 2016).

While export horticulture has provided opportunities beneficial to local actors there are environmental, social and economic challenges associated with export horticulture. New institutionalism and political ecology analysis in social anthropology regard the prevailing food system contestation over resources for food production and livelihoods as not being a natural one that is related just to population growth and the need to increase production but as the outcome of problems related to access, governance and distribution of resources (Haller, 2010; De Schutter, 2014; Haller et al., 2016). Kenya just as other sub-Saharan countries encounters seasonal water shortages driven by varying climatic conditions and water use and therefore a great need to manage well its use, access and preservation (Ulrich, 2014).

Export horticulture which grows mainly fresh fruits, vegetables, flowers and high care products including herbs are one of Kenya's largest water users. Large-scale farms compete with small-scale farmers, urban centres, and downstream users for seasonally scarce water, increasing the potential for conflict over water use (Ulrich, 2014; Lanari et al., 2016). There is also an on-going debate on the impact of large-scale land acquisitions (LSLAs) for instance the land acquired for export horticulture production in the regions where the land is acquired (Zaehringer et al., 2018). The growing demand for food and non-food crops, fuel and other raw materials, as well as the financial crisis starting in 2008, are seen as the main drivers of these LSLAs. However, the loss of access to land-related resources taken up by the LSLAs often results in notable dietary, social, cultural and economic consequences of the communities in the target areas (De Schutter, 2011; Borrás et al., 2016).

In fact it is not just the land but the 'grabbing' of the commons which lead to problems for local communities and especially marginal resources users as the common pool resources are no longer in common but in state and later on due to the high bargaining power of the agro-industrial system under de facto private property of companies. The problem with commons grabbing is that it is the loss of a previously continuously accessible resource (Davis, 2006; Haller et al., 2013), which is in the export horticulture investment discourse said to be substituted with job, out-grower and development gains. This, however, needs to be questioned for LSLAs as is shown in comparative as well as in detailed literature (Haller et al., 2013; Borrás et al., 2016).

In relation to unsecured livelihoods linked to this agro-industrial food system, the reducing participation of smallholder farmers in horticulture has been mainly attributed to the rising costs in production associated with the need to comply with the national regulation and the increasing international food standards (Asfaw et al., 2010; Henson and Humphrey, 2010; Ouma, 2010). Exporters now typically take up production to reduce on the transaction costs of risk and move away from the more traditional spot markets that were arguably much easier to access for the smallholder farmers (Cornelia and Guilherme, 2013; MacGregor et al., 2014).

The global horticulture value chain has specific yet strict quality standards and specifications for which the product is tailored to meet and these influences labour and production dynamics of export horticulture. The strict adherence to international food standards is beneficial for consumer satisfaction. However, it is the farmer who has to bear the costs of compliance without any additional profits (Ouma, 2010; Onger, 2014; CARE, 2016). The working arrangement institutions are defined and controlled by the export horticulture in compliance with international standards. For seasonal workers and out-growers, these are of insecure and are rather temporary income opportunities that limit the possibility to plan for long-term livelihood strategy especially within the semi-arid climate zones where more and more horticulture production is taking place with increased demand that overwhelms the mountainous high yielding zones (Ulrich, 2014).

While people appreciate the opportunities for work and income earning provided by the export horticulture investment they give different justifications to why working at the export horticulture investment is not enviable. The short-term contracts, minimum wages without social security considerations and the erratic nature of work make their wage income opportunities very unpredictable for the workers and for most of them only on a short-term basis of a few months (own research). Out-growers also face severe constraints as they are only able to produce as long as they can access water for irrigation and given the semi-arid climate, there are seasons in the year they cannot benefit from this venture (Adeoye et al., 2012; Lanari et al., 2016) This means that for the largest part of local households engaged in rural economy neither profiting from wage labour nor from out-grower schemes seems to be a long enduring and resilient activity,

while access to common pool resources (CPRs) such as water is seriously curtailed (Weinberger and Lumpkin, 2008; Sharma and Alam, 2013; MacGregor et al., 2014; Otieno, 2016) .

It, therefore, is not only that the agro-industrial system dominates the institutional setting and control over resources via private property rights, but it ideologically legitimates their operation with modernity that the investment brings with the narrative of poverty in the area and the discourse of development that it brings. This acts as an Anti-politics Machine that hides that the government is not willing or cannot provide basic services and that the export horticulture investment will bring betterment with the government handing over land and vital CPRs to them (Ferguson, 1994). It hides the vulnerability and the short-term duration of such operations, as well as the lack of bargaining power local households and especially poorer segments and women, have to secure income from these new operations. It might be that people try to get cash for short-term which they invest in other activities. However this will only be possible on small scale for poorer households as the monetization of life eats up most of the cash earned easily, while later on access to the commons is lost. For out-growers who might get indebted via their operations there as well the danger to lose their land.

Large-scale land investments such as export horticulture often emphasize the rapid increase in the yields they can produce and the additional employment they can provide with little attention given to the long-term effects in the regions where production takes place. The additional opportunities of export horticulture are often not felt locally or only on a short-term basis as related to livelihoods (Ali and Kapoor, 2008; Anseeuw et al., 2011; Asfaw et al., 2010). Export horticulture presents challenges to common pool resources required for the production of food by the different food systems. Export horticulture investments have the power to define the rules of the game regarding working conditions and access to land and land-related resources even in a semi-arid resource limited setting, as such negatively impacting livelihood sustenance.

5 Conclusions

Export horticulture is seen to contribute to Kenya's economy with the potential to attract more income through foreign trade, employment in large-scale farming and processing zones and for smallholders as out-grower farmers. There is also potential to boost domestic production for food security through best practices, knowledge and skills transfer from export horticulture farming (Adeoye et al., 2012; CARE, 2016). However, given that the horticulture sector is regulated by stringent production standards and trade regimes; coupled with external factors such as climate change, variable weather, sluggish recovery in Europe; internal structural and institutional issues have over time affected the sector performance in relation to livelihoods and common pool resources utilization (Nicola and Fontana, 2010; Ouma, 2010; Adeoye et al., 2012; Anseeuw et al., 2011; MacGregor et al., 2014).

Notably in relation to sustainable food systems and ecological considerations, export horticulture when practised alongside other local production systems such as subsistence farming and pastoralism in resource-limited settings such as semi-arid climatic zones has the potential to result in conflict over common pool resources needed for the production of food; it also threatens the livelihoods of smallholders and workers as illustrated in these study findings.

This impedes the viability of the food system when weighted against overall effects to livelihoods. Studies incorporating larger data sets of horticulture companies and actors are needed to further detail the opportunities and challenges as identified in this study.

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