

CDE POLICY BRIEF



Photo: Julie Zähringer

Commercial Horticulture in Kenya: Adapting to Water Scarcity

Like other countries in East Africa, Kenya faces seasonal water shortages that make it important to use and distribute water in an optimal way. One of Kenya's biggest water users is its growing commercial horticulture sector, which exports fruits, vegetables, and especially flowers to Europe and elsewhere. Economically, the sector is a big success: it is Kenya's second largest foreign exchange earner and a major employer.¹ In 2014, for example, the horticulture sector contributed EUR 1.7 billion² to the economy, with 42% of the profits coming from exports.³ Neighbouring countries in East Africa have sought to emulate this model.⁴ But its economic benefits must be weighed carefully against relevant social and environmental risks, including competition over precious water.

As in other African countries, agriculture is the lifeblood of Kenya's economy, accounting for 30% of its gross domestic product and 80% of employment. Horticulture is the third most important agricultural subsector, after dairying and tea production. It produces at least 190 types of plants, including many intended for export. Export volumes rose fourfold between 1992 and 2013, with expanding sales of flowers

– especially to Europe – contributing the most. In 2014, flower farming made up roughly 70% of horticulture's total export earnings of EUR 771.12 million.^{3,5} Kenya's neighbours – Tanzania, Uganda, and especially Ethiopia – have also jumped on the horticulture bandwagon, hoping for high investment returns and employment.⁶ But the sector presents risks as well as benefits.



The research featured here is focused on Kenya.

KEY MESSAGES

- Growing flowers and vegetables for export is a vital source of revenue for Kenya and other East African countries. It provides jobs for local people, including women, and creates market channels for small-scale farmers to sell their crops. But working conditions and employment terms must be improved.
- The industry is a major water consumer, competing for water with other users. This is a problem during the dry season. Near Mt Kenya, the sector is shifting from using river water to relying more on stored water and boreholes.
- Capturing and storing water should be encouraged to prevent the overuse of river water and groundwater.
- To prevent conflicts, Water Resource User Associations should be strengthened and their ability to manage water improved.

Box 1. Commercial horticulture and its impact on river water resources northwest of Mt Kenya

The water resource findings described here stem from CDE research conducted on the northwestern slopes of Mt Kenya in 2003 and 2013. The area's sunny weather and the water from the mountain have made Laikipia, Meru, and Nyeri counties home to a growing commercial horticulture industry. 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. Researchers examined the impact of commercial farms' irrigation practices on four major rivers that they draw water from in the dry season. The dry-season flows in three of the four rivers had begun to fall even before commercial horticulture started in the area. Hence, other factors must also be contributing to declining river levels: changing amounts of rainfall, glacial meltwater, and groundwater discharge, as well as perhaps withdrawals by other water users (Lanari 2014, Schuler 2004).

Opportunities and challenges

Export-oriented commercial horticulture can enable East Africa to tap global markets. Local benefits include:

Job creation. The horticulture industry opens up a variety of employment opportunities. Larger outgrower operations that cultivate vegetables in open fields hire many seasonal workers for harvesting. Other farms, especially greenhouses, operate steadily all year. They employ some permanent staff, as well as hiring others, often small-scale or subsistence farmers who can work as hired labour during their own off-season. Horticulture farms have generated thousands of jobs in Kenya, mainly for unskilled or semi-skilled labourers, including women. CDE research (Box 1) on Mt Kenya's northwestern slopes illustrates this vividly: a handful of workers on one farm in 1991 had grown by 2003 to roughly 5,900 workers spread between different companies. Today, at least 30 horticulture companies in the area employ roughly 11,600 workers, representing a doubling of employment in the last decade.⁷

Market access. Vegetable exporters often contract small-scale farmers to grow crops like beans and peas. Such cash crops can be grown alongside subsistence crops, or even intercropped on the same plot. Doing so gives small-scale farmers extra income and better access to markets.⁸

Multiplier effects. The industry creates opportunities for other local businesses. Shops spring up near the farms to sell food and other items to workers. New and better transport services bring people to and from their workplace.⁹ Many horticulture companies support community projects such as schools and hospitals, or help maintain roads and other infrastructure.

Yet the industry also has downsides:

Employment conditions. The farms offer three main types of employment: casual, seasonal, or permanent. The first two do not provide workers with a secure income. CDE research near Mt Kenya shows that vegetable farms tend to have higher numbers of casual and seasonal workers; flower farms hire more permanent labourers. Workers are paid relatively low wages – between roughly EUR 2.00 and 3.00 a day¹⁰ – and face difficult working conditions: very long hours, physically demanding labour, and health risks. Women are assigned tasks that are seen as requiring “feminine” traits such as dexterity and conscientiousness¹¹ but that also tend to be low or unskilled, such as grading, packing, and harvesting. Such work is poorly paid. Most skilled positions are filled by men.^{11, 12} Further, while workers may earn cash, their own farms may be neglected.⁸

Chemical use. Commercial horticulture crops typically get frequent applications of chemicals: pesticides, herbicides, insecticides, and artificial fertilizers. Workers should always wear protective gear around these chemicals, but health risks remain. The dangers are especially acute for workers on floriculture farms: restrictions apply to food crops, not flowers.¹³ Chemicals can also wash into rivers, polluting the water downstream and causing other environmental damage.

Water scarcity. Nothing would be possible without water. Commercial growers require year-round irrigation to supply export markets regardless of the season. But they are not the only – or even the most important – local water users. Rising commercial use strains water resources during times of scarcity and sets the stage for conflict among water users. CDE's research around Mt Kenya sheds light on water supply and use trends as well as possible responses to scarcity and conflict. The rest of this brief focuses on the water issue.

Clearing up water use and conflicts

Declining flows. Mt Kenya serves as a natural water tower in the surrounding savannah. It feeds perennial rivers that horticulture farms and other users in the lowlands to the northwest rely on (Figure 1). Water scarcity in the Upper Ewaso Ng'iro River Basin is largely seasonal, corresponding to the winter months in Europe. The dry-season flows of four major rivers in CDE's research area have declined significantly since the 1960s: flows in the Naro Moru river have fallen by 20.3%, in the Burguret river by 59.7%, in the Teleswani river by 68.2%, and in the Timau river by 81.1%.

When water becomes scarce in the dry season, the blame is often put on large, highly visible water users such as horticulture farms.¹⁴ These negative perceptions are reinforced by the fact that commercial *water use is highest* just when the *least water is available*. Indeed, European demand for vegetables peaks during the driest period locally. As for flowers, Valentine's Day falls in February, the driest month. But two things must be kept in mind: first, for three of the four rivers studied, the dry-season water flows had begun to fall before commercial horticulture was established in the area. This suggests that other water users must also take significant amounts of water from these rivers, and that environmental factors (changing rainfall, glacial meltwater, groundwater discharge) must also play a role.¹⁵ Second, evidence shows that the horticulture farms have reduced their dependence on local river water for irrigation in the last decade.

Industry response. In 2003, about 50% of the irrigation water used by the sector came from rivers, while 40% came from water storage, and 10% was groundwater pumped

from boreholes. But by 2013, on average only about 20% of the water was taken from rivers, while 56% came from storage and 24% from boreholes (Figure 2). Thus, there has been a 30% decrease of river water use, along with a 16% increase in stored water and a 14% rise in the use of groundwater. In sum, although the sector's overall water use during the dry season has increased, its dependence on river water – both as a share and in absolute terms – has declined in favour of storage water and groundwater.

Remaining water risks. In the past, the industry's high water demand during periods of scarcity resulted in conflicts – mainly in the purposeful destruction of infrastructure such as pumps along rivers, and, in very rare cases, physical encounters. Without proper communication and negotiation with other water users, the potential for conflict remains. This is especially so if horticulture companies continue to grow noticeably in scale or number without keeping their net water use in check or adequately explaining their sustainability efforts to local users. The various water users in a river basin are grouped into Water Resource User Associations, whose task is to manage and allocate water in each river, resolve conflicts, and monitor water availability and use.

Horticulture's growing use of groundwater is worrisome, as the role of aquifers in maintaining and replenishing rivers and other surface water in the area is largely unknown. The wider consequences of increased use of groundwater also remain unclear. It may constitute an unsustainable shift from one natural water source to another.

Addressing the problems. A few measures are key to addressing these water issues:

- The law already requires horticulture companies to have facilities that can store about 3 months' worth of water. But they should expand their efforts to capture and store rainwater and floodwater for later use, further reducing their dependence on rivers for irrigation. Depending on the farms' location (their proximity to rivers) and specific facilities (greenhouses), stored water can come from captured floodwater or rainwater harvested from rooftops. Companies often store it in plastic-lined ponds dug into the ground.¹⁶
- Horticulture companies – especially vegetable farms – should maximize their use of efficient irrigation methods, such as drip irrigation. Many farms (over 75% in CDE's study area) already use techniques that efficiently deliver precise amounts of water to each plant.
- Water Resource User Associations should be strengthened as platforms for exchange between small and large water users, including commercial farms (see Box 2). Although

such associations are mandatory in Kenya, not all are well established or able to tackle the challenges of managing water. Communication and negotiation are key to preventing conflict.

Box 2. Water Resource User Associations

When water is short, it can be difficult to divide it among competing users: community projects, medium- and large-scale farms, smallholders, local towns, and the ecosystem. Kenya's 2002 Water Act made water resource user associations that bring together key stakeholders mandatory so as to ensure community participation in managing water.¹⁷ The establishment of these associations has been important to mitigate conflicts over water. Such conflicts often mask complex, multi-layered issues: political and economic considerations, as well as strong emotions. The associations are important grassroots institutions for regulating water use and managing the resource adequately and fairly. However, their success varies greatly, with political power plays, corruption, and lack of financing posing major challenges.

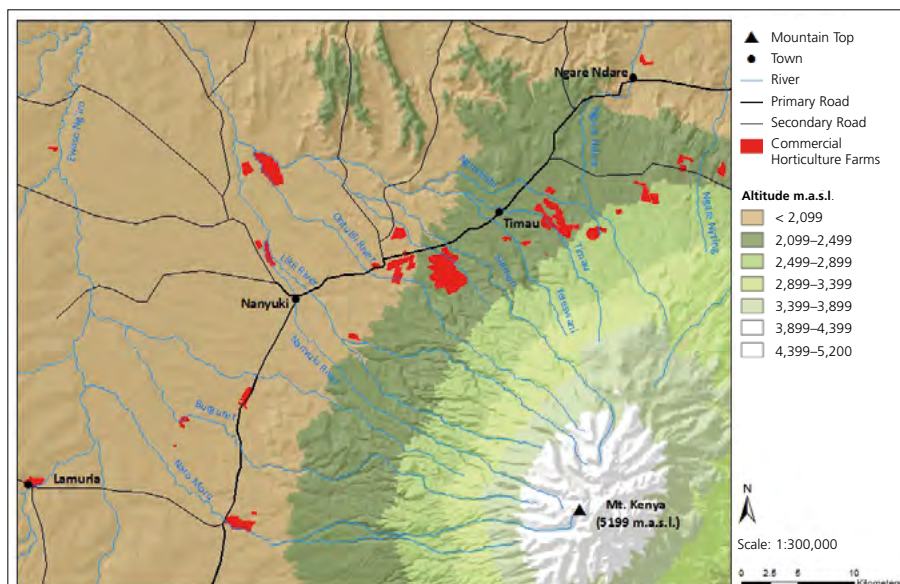


Figure 1. Rivers (blue) and locations of medium- and large-scale horticulture farms (red) northwest of Mt Kenya in 2013. (Source: Lanari 2014)

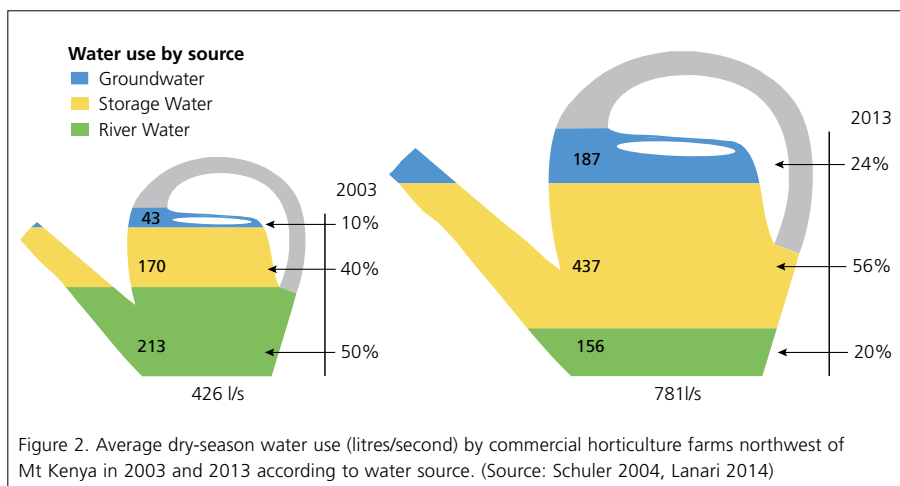


Figure 2. Average dry-season water use (litres/second) by commercial horticulture farms northwest of Mt Kenya in 2003 and 2013 according to water source. (Source: Schuler 2004, Lanari 2014)

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Policy implications of research

Improve horticultural labourers' working conditions and wages

Similar to other unskilled or semi-skilled off-farm jobs in Kenya, the wages paid to horticultural workers typically fail to cover their and their families' basic needs. These workers require a living wage and stable employment terms. Third-party certifications such as Fairtrade may stimulate practices that are more socially and environmentally sustainable.¹⁸

Control the use of chemicals – also on non-food crops

Unlike food crops, the levels of pesticides and other chemicals used on flowers are barely regulated. To prevent harm to workers' health and the environment, they should be for flowers too. Priority should be given to mechanical and biological solutions that are safer for workers and the environment.

Increase water capture and storage and restrict wasteful irrigation

Water storage is the most sustainable source of irrigation. Businesses should invest in gathering surplus river water during the rainy season, or catching rainwater from greenhouse roofs. Overhead irrigation and sprinklers should be restricted, as they are very inefficient and water loss due to surface runoff is high. Wasteful methods such as flood irrigation should be prohibited. Drip irrigation should be promoted for all stages of crop growing.

Strengthen grassroots-level Water Resource User Associations

These associations need to become well-functioning organizations that can build trust among water users and enable them to negotiate the fair allocation of water among their members.

Suggested further reading

Lanari N. 2014. *Development of the Commercial Horticulture Sector Northwest of Mt. Kenya from 2003 to 2013 and its Impact on River Water Resources of the Upper Ewaso Ng'iro Basin* [Master's thesis]. Bern, Switzerland: University of Bern. <https://cdweb4.unibe.ch/Pages/Publication/2745/Default.aspx>

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