

September - October 2022

THE LEADING FLORICULTURAL JOURNAL IN THE REGION

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For more information please contact:

Maurice Koome: 0704 411 325

Simon Ngucugua: 0704 411 301

Philip Kung'u: 0715 407 215

Victoria Ndung'u: 0791 379 125

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### The Leading Floriculture Magazine

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**Floriculture** is published six times a year and circulated to personnel in the Horticulture Industry, foreign missions and Kenyan Embassies abroad, Flower Growers, Exporters and Consumers, extension officers in the Ministry of Agriculture and counties, research offices and suppliers of agricultural inputs in Kenya.

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## We Need to Talk

*We want to have just an off—the—cuff chat between you and me —— us. We want to talk right down to earth in a language that everybody can easily understand. We all agree today, all of us have agreed that we have a very serious problem. Not only do we have a very serious problem, but our sector has a very serious problem. Our problem is us. We're the problem. The only reason we have a problem is we are divided. Once you face this as a fact, then you can start plotting a course that will make you appear intelligent, instead of unintelligent.*

*Alas! For how long will we keep on complaining about our cost of doing business? Why on earth are we accused of degrading the environment, enslaving our workers, poisoning fauna and flora, over using water? Why is everyone thinking we are the bad boys from the consumers to our own community back at home? Are we that bad? This is the time to stand up and talk.*

*We have a common enemy. So now*



*we all realize that we have this common enemy, then let us unite on the basis of what we have in common. And what we have foremost in common is that enemy —— division. He's an enemy to all of us.*

*Have a chat reading.*

***Masila Kanyingi***  
***Editor***



*Publishers of Floriculture Magazine*

P.O.BOX 79396 - 00200, Nairobi.

Tel: 020-2440909 • Cell 0732-558172,

Fax: 020-2244892

Email: [info@floriculture.co.ke](mailto:info@floriculture.co.ke)

Website: [www.florinews.com](http://www.florinews.com)

## Floriculture Team

### Editor

Masila Kanyingi

### Sub-Editor

Mary Mwendu Mbithi

### Editorial Assistant

Cornelius Mueke

### Contributors

Koppert

Ruth Vaughan

Chrysal Africa

Andrea Dijkstra

NHFAIR

### Photographers

Jairus Ndani

### Graphic Designer

Evelyne Ndiema

### Marketing

Martin Nyachwaya

### Editorial Consultants

Tom Ochieng : Penta Flowers

Victor Juma : Syngenta EA Ltd

Simon Kihungu : Corteva

Steve Gachoki : Elgon Kenya

Daniel Kisongwo : Consultant

Maurice Koome : Bayer Cropscience



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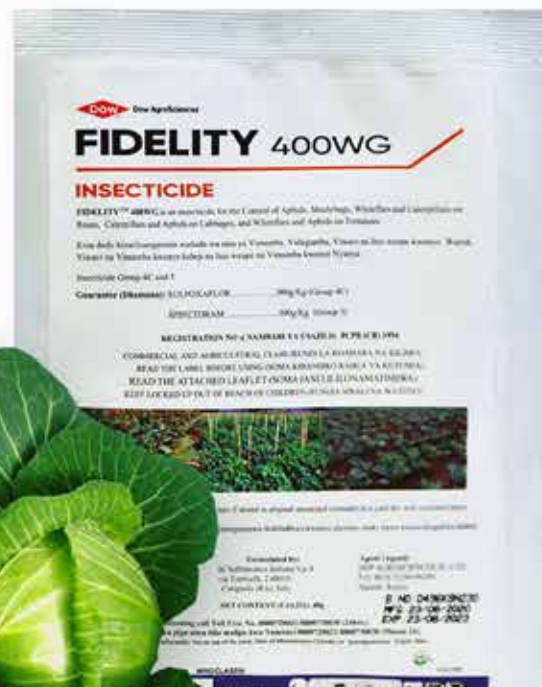
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# Flower Growing in Naivasha A Boom or Doom?



**L**ake Naivasha is a freshwater lake in the Kenyan Rift Valley. It is unique in that it is home to both an internationally renowned environmental treasure as well as a blossoming agriculture industry that exports high value fresh vegetables and cut flowers to European markets.

The Lake is currently under intensive scrutiny over concerns about how its environmental integrity can be maintained whilst still supporting a valuable and growing economy and society.

Agricultural activity in the basin has expanded dramatically in terms of both the rural smallholder farmers in the upper catchment and the high value exported commercial horticulture around the Lake. This sector anchors a local economy that supports almost 650,000 people.

The two most valuable crops in the Naivasha basin are cut flowers and vegetables. The vegetables grown in Lake Naivasha contribute approximately over Ksh6.65 billion to the Kenyan economy.

Whilst predominantly focused on producing for the local market, smallholders are increasingly able to access high value export markets through their association as “out growers” with the commercial vegetable farms.

Kenya is also one of the world’s largest exporters of cut-flowers. Lake Naivasha is at the heart of the nation’s floriculture industry, accounting to over 50% (App 30 billion) of the country’s cut flower exports. The Naivasha basin involves a broad group of stakeholders including large horticulture companies and their employees, the out growers and small holders, local government and basin inhabitants, and those dependent on the broader Kenyan economy and trade.

For an agriculture-based economy that is completely dependent on its water resources for economic production, the social, economic, financial (investment), regulatory and reputational risks associated with a deteriorating biophysical





environment are significant. Given its linkages to the national economy and the international export markets, these risks are not localized within the basin but extend through to the rest of Kenya.

One must ask what risks are for each of these groups and also highlight the commonalities between them, or in other words the shared risks between corporate, government and civil society stakeholders.

In so doing, these stakeholders can recognize the incentive for a common consensus in mapping out a path to achieving improved water resource management in the basin and the future economic and environmental sustainability of Lake Naivasha.

It is important to recognize that the shared risk framework is not linear and does

not fall within a conventional quantifiable cost-benefit metric. A reduction in abstraction for commercial farmers has knock effects in terms of employment; export earnings, livelihoods and social tensions. The manifestation of these risks is highly uncertain, but the implications are potentially significant.

Despite past severe droughts, it is unlikely that the water resources situation would cause such severe and sustained physical deterioration that major irrevocable economic impacts will be experienced in the local economy or that individual companies will fail financially, in the short term.

However, it is highly likely that some level of local economic and corporate financial impacts will occur during crisis periods of drought, water quality deterioration and/or wetland degradation.

In the future, increasing urban - agricultural abstraction and increasing temperature - climate variability, is highly likely to impact on the recurrence and severity of crisis periods. Similarly, the already significant

developmental pressures on this area will increase over time, due to population pressure and economic growth in the country as a whole.

Lake Naivasha provides an important opportunity to support social and economic development in Kenya in an ecologically sustainable manner, but these opportunities may be squandered without adequate engagement of the risks. Three areas of focus may be identified in responding to these risks and opportunities: Risk mitigation requires improved institutional arrangements, to support a clear definition and management of the availability of water and the rules for its use in the different parts of the catchment. Innovative partnerships between government, private sector and/or civil society organisations should be fostered to address problems in and around the lake.

Progressive horticulture companies should develop Naivasha specific water stewardship standards and gain both competitive distinction and reputational "immunisation" by gaining accreditation by a recognised body.

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### Cut-flower farming

The flower farms surrounding the Lake growing approximately 1,200 hectares of cut-flower of which approximately 800 are grown in greenhouses. Roses make up about 75% of Kenya's annual agricultural production, followed by mixed flowers (8%), hypericums (3%) and carnations (2%). The Naivasha basin accounts for 40% of Kenya's cut flower exports and generates approximately 9% of Kenya's total foreign exchange revenue.



It is estimated that 45% of the revenue generated by a typical cut flower farm is spent on production costs at the farm. This would imply that the contribution of the floriculture industry to Lake Naivasha's local economy is approximately KSh 12.6 billion (\$180 million). It is estimated that the flower industry employs approximately 40,000 people in Naivasha directly and over 350,000 indirectly.

### Institutional Arrangements

Through a combination of consumer and buyer pressures, the private sector has made some significant strides in self-regulating water use in commercial farming operations. The Lake Naivasha Growers Group (LNGG) is a commercial farming body that has its own code of practice relating to water use and environmental impacts that its members have to follow.

Given the greater consumer awareness in the international markets, many of the supermarkets and buyers make it compulsory for the commercial farmers to follow the

requirements of different certifications, which put down certain standards in terms of water use, environmental standards, operational health and safety and labour relations.

However, it is clear that upstream small holder farming has an impact on the hydrology of the basin, which is largely not addressed by these certification processes.

### Investment Risk

The increasing public awareness around water has contributed to investors considering water risk in their financing of equity and debt. Carbon Disclosure Project Water Disclosure initiative has been launched.

Some banks and fund managers may start to make investment decisions around water considerations.

The likelihood of this risk is quite high and is not directly linked to periods of crisis (as with the other risks), but is associated with investor perceptions around physical, social and institutional risks. In view of this, Naivasha is likely to be viewed as high risk in an international context and therefore financial institutions may place a premium on debt and equity associated with companies operating in Naivasha.



### Economic-financial Risk

The point has been made above that all of these other risk will eventually have economic consequences at a local economy, national economy or international trade economy level.

Horticulture and small-holder farming is the mainstay of the local economy, which is by far dominated by the cut flower industry. While Naivasha and the horticulture industry do have a national impact, this is relatively small (<3%).

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**From Page 8**

However, it does have a significant (>10%) impact on export earnings and thus the current account.

Any negative consequences for these exports related to the above risk areas, will have direct impacts on the country's foreign exchange, as well as possibly indirect investor perception issues.

From this perspective, the management of risk in Lake Naivasha must be taken seriously at a national political, economic and planning level. Similarly, any negative impacts on horticulture companies' operations associated with the above mentioned risks might have impacts on their financial position and profitability.

impacts on the local and national economy. Assessment of the economic risk is a synthesis of all the other risks, which in turn are largely dependent upon the physical risk.

It is unlikely that the current situation would cause such severe and sustained physical deterioration that major irrevocable economic impacts will be experienced in the local economy or that individual companies will fail financially.

are directly dependent upon the lake and its surrounding groundwater.

**Conclusion**

In conclusion, the shared risk of the private and public sectors around the water resources of Lake Naivasha has been reframed as a shared opportunity for future social and economic development of the basin in the interests of all the people in the region. It is through this lens that the lake is being reclaimed.



While these companies have made investments in the region, increasing risk may cause them to relocate to other regions with lower risks. This may have significant



However, there is highly likely that some level of local economic and corporate financial impacts will occur during crisis periods, largely due to reduced crop yields associated with reduced water abstraction and/or higher pumping costs from the farms that



Lake Naivasha is at the heart of the nation's floriculture industry, accounting to over 50% (App 30 billion) of the country's cut flower exports.



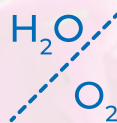
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# Reducing Humidity in the Greenhouse



## Introduction

Sunny days increase the transpiration of moisture from leaf surfaces and evaporation from soil. The warm air holds the moisture in the vapor form. At night as the air cools to the dew point, condensation occurs and water droplets are formed on cooler surfaces such as the leaves and glazing. This moisture promotes the germination of fungal pathogen spores such as Botrytis and powdery mildew.

Dripping water from condensation on the greenhouse covering also wets plant surfaces and spreads plant pathogens from plant to plant by splashing soil and plant debris. The key to successfully suppressing diseases is to keep the plant canopy dry, especially from dusk to dawn. This is accomplished through cultural practices and environmental control strategies.

## Relationship Between Temperature and Humidity

The amount of moisture in the air is generally expressed as relative humidity

(RH), which is the ratio between the weight of moisture actually present in the air and the total moisture-holding capacity of a unit volume of air at a specific temperature and pressure. This term can sometimes be misleading, because it is temperature-dependent. Warm air has a higher moisture-holding capacity than cooler air; therefore as the temperature of air increases, the relative humidity decreases even though the amount of water remains constant. Air at 70° F will hold twice as much moisture as air at 50°F. In the range of temperatures encountered in a greenhouse, for every 20° F rise in dry bulb temperature, the water-holding capacity of the air doubles, and the relative humidity is reduced by one-half. This relationship is important in managing humidity in the greenhouse.

Dewpoint temperature indicates the temperature at which water will begin to condense out of moist air. Condensation on plants occurs when leaf surface temperature is below dew point. This is when there is too much moisture in

the air to remain in the vapor state. The moisture will fall out and condense as free-moisture on surfaces that are at or below the dewpoint temperature. In other words, condensation will occur on the coldest surfaces first. The coldest surfaces will be the piping, door knobs, roof and eventually the plants. For example, when the greenhouse is 85% RH and 60°F, condensation occurs when leaf temperature is lower than 55°F. At 95 % RH and 60°F, condensation occurs when leaf temperature is only one degree lower than air temperature.

## How To Reduce Humidity

Proper watering and adequate plant spacing, having well-drained floors, warming plants, moving air and venting moisture are ways to reduce humidity in greenhouses.

The least expensive method is to keep the greenhouse dry, especially going into the night, when the temperature drops. Puddling water on the greenhouse floor and

water on leaf and growing media surfaces evaporate, which adds moisture to the greenhouse environment. Evaporation makes the environment humid and it takes away energy that is intended to keep a house warm.

#### Cultural Practices to Reduce Humidity

Cultural practices include watering just enough to prevent excess water on the floor, and watering early enough in the day to allow plant surfaces to dry before

inside plant canopies and will help to prevent condensation on leaf surfaces. The warm air that rises creates air movement around the plants. Bottom heat also keeps the plant surfaces warm, preventing condensation on the plants.

#### Anti-drip Plastic

The use of a wetting agent, either sprayed on the interior surface or as part of the formulation of the glazing on poly covered greenhouses can also help to reduce the humidity level. The moisture that condenses on the glazing will drain to the eave or foundation rather than forming droplets and dripping onto the plants.

Glass greenhouse with a steep roof pitch (6:12) will

would chill the greenhouse and the crop, and heating without venting the moist air would raise the temperature beyond optimum levels and result in excessive heating costs.

The method and time it takes for heating and venting will vary according to the heating and ventilation system in the greenhouse. To vent the humid air in greenhouses with vents, the heat should be turned on and the vents crack open an inch or so. When doing this the warmed air will hold more moisture (RH), escape from the greenhouse through the vents and be replaced with outside air of lower RH. This natural rising of the air will result in a greenhouse of lower relative humidity.

In houses with fans, the fans should be activated and operated for a few minutes and then the heater turned on to bring the air temperature up. The fans should then be shut off. A clock could be set to activate the fans. A relay may be needed to lock out the furnace or boiler until the fans shut off so that both the fans and heating system do not operate at the same time and flue gases are not drawn into the greenhouse.



evening. The highest relative humidity in a greenhouse is generally found inside plant canopies, where moisture is generated from transpiration and trapped due to insufficient air movement. Adequate plant spacing and mesh benches will help to improve air circulation at the plant level.

Weeds also contribute to high humidity by holding moisture in the leaf canopy and generating moisture through transpiration. Maintain well-drained greenhouse floors that are free from weeds.

#### Bottom Heat

Bottom heat will improve air circulation

allow moisture to run off without a wetting agent. More condensation will occur on single glazing than with double glazing since the dew point is reached sooner.

#### Ventilation and Heating

A combination of ventilation and heating is also very important for reducing humidity. Ventilation allows the exchange of moist greenhouse air with drier air from outdoors. Heating is necessary to bring outdoor air up to optimum growing temperature, and also increases the capacity of the air to carry moisture, thus avoiding condensation. Neither practice alone is as efficient as both combined. Ventilation without heating

The venting and heating cycle should be done two or three times per hour during the evening after the sun goes down and early in the morning at sunrise. The time it takes to exchange one volume of air depends on several factors including whether or not fans are used and, the size of the fans and vents. For some greenhouses it may take as little as 2-3 minutes air exchange. For greenhouses using natural ventilation, it may take 30 minutes or longer. Heating and venting can be effective even if it is cool and raining outside. Air at 50°F and 100% RH (raining) contains only half as much moisture as the greenhouse air at 70°F and 95% RH.



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#### Why Boveril

- Has a wide spectrum of action
- Ideal for Integrated Pest Management (IPM)
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- Not harmful to natural enemies of pests

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# A Fresh, New Look For Koppert

*How Koppert is pushing innovation the sustainable way*

**O**ur mission to contribute to the health of people and the planet by partnering with nature has led Koppert to where it is today:

A solid purpose-driven organization with strong core values. We work to make our world more sustainable, through collaborating and co-creating with partners in pursuit of our goal: 100% sustainable agriculture.

We are proud to present our new brand and Logo. Koppert has grown and evolved tremendously since we were founded. Therefore, after 30 years it was time for an update and a new branding that matches our ambition and reflects our connection to nature. We believe our new brand will open a world of opportunities, connecting customers and partners who are willing to contribute to a better world.

For over 50 years, we have been pushing agricultural innovation. We want to contribute to lead the world forward, that's why we partner with nature and never stop innovating.

For our planet to achieve sustainable agriculture, we need ways of growing that are both safe and healthy. Koppert has invested in research and we are purpose driven experts, with the urge to share our knowledge with the rest of the world.

We pride ourselves in providing effective solutions founded in nature, which helps us to pave the road towards a better health for people and our planet. We are excited to bring add to our portfolio and bring a new solution for Kenyan Growers in 2022!

## **Boveril: A new solution**

Koppert is proud to introduce Boveril to Kenyan growers. Boveril contains a unique strain PL 63 of the insect pathogenic fungus *Beauveria bassiana* formulated as wettable powder. The formulation has high solubility and suspensibility giving it excellent dispersion in water and field application conditions.



It comes as a great addition to our range of solutions that offer effective and sustainable control of Insect pests such as whitefly, which are increasingly difficult to control with the available chemical insecticides.

## **Mode of action**

The mode of action of the active agent *Beauveria bassiana* is an entomo-pathogenic fungus, which infects the insect by adhesion proteins and enzymatic activity through the production of a mucilage on the site of contact.

The fungus acts on different stages of host development, such as larvae, pupae, and adults.

The evasion of the immune system is mediated by the expression of Mcl1 proteins, the secretion of destruxins A and E, production of trehalase and expression of faith genes involved in the cycle cell, allowing rapid multiplication and differentiation of hyphae in the host's haemolymph, leading to

host mummification of the affected insect. The fungus completely colonizes the insect after 72 hours, leading to death.

## **Application**

Boveril can be applied via soil drenching or aerial spraying. The application must provide direct contact between product and target pests. Apply preferably in the late afternoon or on cloudy days, with temperature between 25 oC and 35 oC and minimum relative humidity of 60%. Perform prior cleaning of the spraying equipment and avoid ready mixture.

## **The Benefits of Boveril:**

- Is Ideal for Integrated Pest Management (IPM).
- Is Ideal for the management of insect pest resistance to chemical insecticides.
- Is not harmful to natural enemies of pests.
- Is compatible with other control methods.
- Is not toxic to the environment, people and animals.

## **Effective control**

Boveril has had success for the early adopter growers in Kenya who are already using it to control insect pests in their crops. Local experiences from Boveril show upwards or 80% whitefly control just after 2 applications. Our team technical consultants are excited to introduce it to more growers across the board.

## **A little goes a long way**

For best results, Koppert recommends an application rate of 2grams per Liter of water. In an effort to be accessible to all growers (large and small scale), Boveril comes in different pack sizes ranging from 1Kg to 75 grams.

## **Let's work together**

As we work toward our goal: 100% Sustainable Agriculture, we are aware of its magnitude: it's ambitious, and we cannot complete it on our own. This is why we team up with growers, partners, universities, research stations, and governmental bodies worldwide. Together, we are meeting the highest food safety demands. Together, we are helping our planet find its balance. So let's continue to move forward and Partner with Nature.



## Insects and Related Pests of Flowers and Foliage Plants

**A**n amazing variety of insects feed on flowering and foliage plants. Many field, fruit, and vegetable crop pests feed on ornamentals. Lush growth and sheltered growing conditions make ornamental herbs especially attractive to plant pests.

The routine use of insecticides usually eliminates predaceous insects and mites. However, pests remaining after treatment sometimes tolerate commonly used insecticides. To stay in business, most commercial flower and foliage plant growers must become fairly sophisticated in using various types of pest management practices, insecticide formulations, application equipment, and in rotating insecticides from one chemical group to another.

Commercial growers use a battery of general and restricted-use

pesticides. Although amateur gardeners battle the same pests, the most effective chemicals for control are often very expensive or are restricted so that homeowners are not allowed to use them. This puts a moral burden on the commercial grower to try earnestly to eliminate all plant pests from bedding, potted, and cut plants before selling them. Identification is important to assure proper control measures.

### Chemical Control

Total reliance on pesticides for pest management is labor intensive and sometimes very hard on the plants. Although there are numerous practical and philosophical problems with the chemical control of insect and mite pests in the greenhouse, pesticides will remain important in greenhouse pest management at least for the next few years.

Control of pests in the greenhouse is often difficult because of lush, sheltered growing conditions. In general, insects and mites reproduce more rapidly in warmer temperatures. Also, periodic use of pesticides in greenhouses often reduces parasites and predators of greenhouse pests because the pests tend to be more resistant to pesticides than their predators and parasites.

Application of pesticides is essential if one is to have right production. Eliminating weeds inside and outside the greenhouse reduces alternate hosts for ornamental plant

pests. Screen doors and vents make it harder for moths and beetles to fly in and lay eggs or feed. But, careful as the grower may be, sooner or later an insect or mite will come in on the clothes of workers, on cuttings, or in soil.

Many growers apply pesticides periodically as “insurance” against accidental infestations. Despite these precautions, however, insects or other pests may become established. Some growers treat whenever they discover pests. Growers should survey the plants on a daily or every-other-day basis to guard against extensive damage by insects and mites.

Since most pesticides are sensitive to ultraviolet rays, treatments made later in the evening will be more effective. After the waiting period specified on the label has passed, the structure must be well ventilated before workers can safely enter.

Apply granular insecticides with a handheld shaker or some other device that does not grind up the granules. Wear boots, long pants, a long sleeved shirt, rubber gloves, and a respirator. The plants and potting mix should not be handled until the granular pesticide has been washed from the foliage and watered in thoroughly.



### Screening

Although the pore sizes of some screening materials are large enough that the thrips are capable of wedging through, the screening still excludes many thrips. Evidently, these materials are not recognized by thrips as a suitable substrate to feed on. When the thrips probe the screening they may instinctively resume flight searching for a suitable plant.

### Integrated Pest Management

IPM uses all suitable methods to reduce insect and mite populations to the lowest acceptable level. IPM is a complex program as each crop must be considered individually. However, there are a number of basic practices that apply to most greenhouse crops.

### Quarantine

Before any plant material is brought into the greenhouse, it should be thoroughly inspected for insects, mites, and diseases. Furthermore, new plant material should be kept in a separate section for a week or more before such material is incorporated

### Pest Recognition

For proper management, it is important to be able to recognize the various kinds of pests in their various stages of development. Thus a grower can waste effort and pesticides trying to chemically

control irrelevant insects rather than trying to control key pests. Another example of misidentification is the assumption that parasitized aphids are some sort of new 'tan' aphid. Parasitized aphids adhere to the plant fairly tightly, so in spite of repeated applications, these 'tan' aphids seem to be impossible to kill.

### Monitoring

Constant vigilance for insects, mites, and diseases is required for effective pest management. An employee or certain employees should be assigned

the responsibility of scouting for insects and other pests on a regular basis. Written records of where various pests are found should be kept. Pests can be monitored by using yellow and blue sticky cards, by using yellow pan traps, and by examining the foliage, flowers, and occasionally the roots.



### Clothing

An effort should be made to avoid carrying insects into the greenhouse by wearing clothes that are brown, red, or black. Do not wear white, yellow, or green, as these colors are attractive to aphids, thrips, whiteflies and leafminers. Light to dark blues also are attractive to aphids and thrips.

into the production area. Such highly resistant pests as the western flower thrips, and whitefly move readily on plant material. The swapping of insects, mites, and diseases on infested plant material is without doubt the major way resistant thrips, aphids, and whiteflies are transported throughout the greenhouse industry.



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#### Record Keeping

A written log should be kept of pest type, locality, abundance, and all pesticides applied. Such records can be of long-term benefit as many pests tend to appear at about the same time each year. However, the short-term benefits of written records may be greater. Knowing what pests survive a pesticide application alerts the grower to the possibility of poor timing, poor application, or pesticide resistance in the pest population. A change in strategy, application technology, or type of pesticide can be made before the crops are significantly damaged.

#### Biological Control

Some growers use beneficial organisms for biological control where appropriate. *Encarsia formosa* parasitic wasps infest whiteflies to some degree and *Amblyseius predatory mites*, used for spider mite suppression, can feed on thrips. Bacterial and nematode organisms can be

readily integrated into a traditional pest management scheme, whereas others require a fairly high level management. *Aphytis wasps*, *Aphidoletes maggots*, and *green lacewings* are available for aphid suppression.

*Cryptolaemus* and *Delphastus* lady beetles can be used for mealybugs and whiteflies.

**Before any plant material is brought into the greenhouse, it should be thoroughly inspected for insects, mites, and diseases.**

Parasitic wasps are available for soft scale management and *predaceous mites* are available for spider mite suppression. *Encarsia formosa* parasitic wasps can be used especially for greenhouse whitefly suppression. Except for *Bacillus thuringiensis* pesticides, the use of biological organisms is usually not compatible with the use of chemical sprays.

#### Organic Control

Organic growers tend to be wary of relying on pesticides for routine pest management. Most organic growers are highly receptive to the basic integrated pest management practices (screening, biological control, and monitoring). The range of chemicals organic growers can use is limited to those that are certified to be “organic” by various organizations. Some of these chemicals work well and others are marginally effective. Finding formulations that are certified as organic and that are actually labeled for greenhouse use is sometimes a problem. Some organic growers use screening to exclude pests and methods such as irrigation to dislodge and destroy mites and aphids or washing the produce by hand at harvest to remove pests.

Organic Chemicals: Soaps, oils, and nicotine sulfate can be used for aphid suppression. Soaps, oils, neem extracts, and pyrethrum sprays and aerosols are moderately toxic to 3 whiteflies. The *Bacillus thuringiensis* pesticides and pyrethrum sprays, and aerosols are effective for caterpillar control. Soaps and pyrethrum pesticides suppress mealybugs. Spider mites are susceptible to soaps and oils. Pyrethrum sprays and aerosols help suppress thrips.

# Plant Nutrition Basics in Floriculture

*Plant nutrition is the study of the chemical elements and compounds necessary for plant growth, plant metabolism and their external supply. Without proper plant nutrition, plants tend to die off or produce little or no yield.*



By Ruth Vaughan



**I**n my line of work I visit hundreds of flower farms a year; the flourishing, the ticking over, and the ones in dire straits. A lot of my more demanding work is dealing with farms that suddenly run into problems. “Ruth, please come and visit our farm as soon as possible, our production has

suddenly dropped to half” is a common call. My advice to flower farmers on the critical issues in plant nutrition in floriculture would be as follows:-

## Start with The Basics

Start with the basics, understand your soil and water and know what you are dealing with. A solid ‘risk’ assessment before you even buy the farm is recommended.

- Dig soil pits to look for soil layers, compaction zones, soil depth, underground water or solid rock.
- What is your soil texture? Is it very sandy or a heavy clay? Is the soil type even across the farm? (Look at the existing plants / soil colour / soil texture)
- Where does the water go when it rains? Will it flood your farm or the neighbours’ farms?
- Does it hail in this area? Do you need to take special

precautions with plastic / hail net / gutters?

- What are the day/night temperatures and what is the annual rainfall? Are your crops suitable for the climate? Will you have enough water?
- Look at the aspect and slope of the farm, will you need special drip lines, non-return valves, air release valves?

Do a complete soil analysis, soil texture analysis, nematode count, pathology screen and irrigation water analysis. Now you know what you are dealing with and can work out the economics. It’s better to get a shock now than after your investment has already been sunk in land & greenhouse infrastructure.

## Know Your Soil

Before planting in the soil, balance the cations, pH, organic matter and phosphorous levels by adding scientifically calculated soil corrections from the complete soil analysis. Deep rip the soil to break up compaction zones and mix the soil correction in well. Do not turn the luscious topsoil over and bury your existing organic matter and microbes.

Good land preparation and soil correction will hold you in good

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stead further on down the line, when your beginner's luck is over. Put in place an annual SOIL HEALTH PROGRAM – to analyze and adjust cations, pH and organic matter for maximum soil & plant health and fertiliser efficiency.



Buy a fertigation system that is suitable for your water quality and can handle your gradients and can deliver the maximum water requirement on the hottest day. Plan a proper fertigation program based on the plant size, plant type, production, water quality and soil type. Take quarterly soil samples for a 1:2 SGF analysis so that you know what's happening in the soil and can deal with it before it becomes a problem. Back this up with leaf analysis to make sure there is no 'hidden hunger' in the crop limiting your production. Identify problems early before they hit your bank balance.

It's better to get a shock early enough than after your investment has already been sunk in land & greenhouse infrastructure

Media, Nematode & Pathogen Analysis Before planting in media, do a media analysis, nematode count and pathogen screen. The certificate of testing that comes with your coco-peat does not account for the conditions the coco-peat has traveled

or been stored in. The fine pumice or gravel from the nearby quarry could have sodium, toxic metals, silt and nematodes.

Do bi-annual nematode counts. You can't see nematodes with the naked eye, and by the time your plants go yellow, you will have lost much of your production and quality. It is also easier, cheaper and more environmentally friendly to treat low nematode levels with biological products. Once levels get out of control you may have to resort to more toxic and persistent chemicals. Nematodes severely affect plant nutrition and disease pressure.

#### Know Your Water

Water testing is crucial. Borehole water

tends to have a more constant quality and tests are advised twice a year. Surface water quality can vary dramatically depending on rainfall and evaporation. Rain water is best – plan to catch as much of this as possible. Water quality has a major impact on your plant production and health and the way you manage your irrigation. Common problems in Kenya are high sodium and high bicarbonates.

#### High Sodium in Water

If your water has high sodium reverse osmosis can reduce the sodium, this is expensive to install and maintain. Water can also be mixed with rainwater to bring the sodium down. If you use high sodium water you should monitor the sodium levels in the soil. Plants can grow along happily with a small amount of sodium in the soil but when it reaches a critical level you will get a rapid decline in production and plants will become very susceptible to diseases. As the sodium levels build up the soil structure deteriorates which becomes very difficult to fix.

Work with humic acids and calcium products in conjunction with leaching to flush the sodium out. This is where a good soil survey and land preparation hold you in good stead. Water saturated soil, bedrock, compaction layers and unbalanced cations will all impede successful leaching of saline soils.

#### High Bicarbonates in Water

Water can have high bicarbonates these bind with calcium and magnesium to create a free lime deposit in the soil that raises the soil pH and locks up phosphorous and micronutrients. Once the free lime has built up in the soil, it can be very hard to deal with. Much better to treat the problem at source and acidify the water.

Acidification can result in an increase in nitrates from nitric acid or phosphates

from phosphoric acid and the fertigation program should be adjusted to balance these. Quarterly drip analysis will check the Electrical Conductivity (EC), pH, nutrient, and bicarbonate levels of your drip water and ensure that everything is going to plan. On-farm daily EC and pH measurement are advised.

Sample irrigation water analysis report indicating irrigation water sample with high sodium & bi-carbonate levels

Many farms have tripped up due to water quality and fertigation system faults were not picked up soon enough.

Get a soil water meter, or go around the farm often with an auger to check soil moisture levels. Water you see on the surface is not what the roots see underground. Over and under watering affect nutrient uptake and production. Over-watering kills your plant roots, microbes and soils and causes leaching and loss of fertilisers. It can cost you unnecessary money and pollute the environment. Anaerobic cold wet soils really increase disease pressure on your plants. Sitting water on the soil surface (even for a few minutes) can spread diseases very fast through your crops. Underwatering, which is very uncommon, causes plants to wilt, which causes tissue damage and secondary infections (botrytis and downy mildew).

Be especially vigilant on soil moisture

money in the long run. Plan the analysis that you need and budget accordingly. Read, understand and benefit from your analysis results. Don't file them in the drawer until the next audit. Audits are meant to guide you and there is a reason they recommend you do these analysis! If you don't understand anything, just ask! Or get a professional consultant in.

Seek Independent Analysis and Advice  
The iron chelate salesman will most probably find an iron problem in your crop. The person selling nematicides will always find a few nematodes that need treating. That's their job.

Read and Follow Dosing Instructions  
The suppliers have done extensive tests on their products before they write the labels and take their products to the market. A little bit of product used properly can have a brilliant result. Don't be tempted to over-use or over apply products. I have seen some catastrophic results from product over use.

**Ditto underuse!**

If all goes well – analyze so that you know what you are doing right and can do it again (and again and again...). If all goes wrong – don't over complicate things, go back to the basics, call in the professionals, analyze, and recover faster!

**About Ruth**

*Ruth Vaughan is the Technical Director at Crop Nutrition Laboratory Services Ltd. (CROPNUTS). Ruth is also a contributing author to Kenya's leading horticulture magazines such as the HortFresh Journal, HortiNews and Floriculture. Ruth is a great believer in soil health, organic matter, biochar and carbon sequestration as a way to alleviate climate change and increase food security. Loves visiting farmers and seeing all the different farming methods*

very common cause of yield and quality collapse is water. Some farms very admirably collect rainwater, which has low salts and is fairly neutral. When the rainwater runs out the farm then changes to borehole water which may have a high EC, high sodium and high bicarbonates. As soon as the water source changes the fertigation recipe should change. By the time your plant shave gone yellow – you are already on a down hill production curve. Irrigate Sensibly

when the weather changes. We are on the equator and can have a very hot day in the middle of the cold season, where the water demand of the crops shoots up for a few hours and plants wilt. Like wise we can have a few rainy days in the middle of the hottest season, the plants water requirement shoots down and the soils get waterlogged.

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### Products

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in the appearance and development of Botrytis. The fungus thrives on both living and dead plant materials. The infection starts when miniscule mould spores, spread through the air. Starting as a small speck ('pock') on the flower petals, it spreads right to the bottom of the flower.



It gradually changes its colour to brown and becomes moist and finally makes the petals fall off. Unfortunately, Botrytis is an irreversible condition. Whilst infected flower petals are often removed by hand, there can be no guarantees that the fungal infection has not already damaged the rest of the petals.

For more info please contact us at: [info@chrysal.co.ke](mailto:info@chrysal.co.ke)

**CHRYSLAL**

# Bigot Flowers (K) Ltd:



Mr. Kakasaheb Jagtap in the farm

## ‘Two Decades of Bliss and Blossom’

By Mary Mwende Mbithi

**T**wo decades may simply mean twenty years, but do you know that it is not only time that has elapsed? If you come to think of it, is that not time long enough for a farm to weather the storms of starting out and to stand unwearied solely focused on success? Well, that sounds hyperbolic, right? But for Bigot Flowers, it has been a season of grandeur and just pure blossom.

### The Journey

In the year 2002, on the shores of Lake Naivasha, around 80 kilometres from Nairobi, Bigot Flowers was established. On a twenty hectares piece of land, forty Spanish green houses were laid with

each greenhouse covering half a hectare. In 2004, eight hectares of tunnels were added. Again, in 2005 Bigot Flowers added twelve more hectares of Azrom type green houses. By the year 2006 Bigot Flowers spanned on a forty hectare flourishing chunk of land.

Since establishment Bigot Flowers stood on leased land. Therefore, in 2009 they bought the land and replaced the initial land covered with Spanish greenhouses and tunnels with Azrom type of greenhouses an activity that went up to 2013. In 2014 an additional fifteen hectare piece of land was acquired which pushed Bigot Flowers to the current span of Fifty-five hectares which has two sections, one called Tritop section which is twenty-six

hectares and another twenty-nine hectares section called Beatrice. As of today, 50% of the farm is in hydroponics system and the other 50% is in soil.

### Choice of Location and Affiliation to Other Farms

Bigot Flowers was set up in Naivasha because the weather is most suitable for growing flowers at an altitude of 1900m above sea level. Again, the proximity of Naivasha to the airport was a factor to consider. Bigot Flowers Kenya is a French company with the parent company as ‘Bigot Roses’ which is based in France, Europe.

### Varieties, Marketing strategy and Market share

Bigot Flowers grows thirty-seven different varieties of roses with the major ones as the red coloured, orange coloured, yellow coloured, pink coloured, red-u coloured, white bi-colour, cerise coloured and white coloured roses. The roses are all

companies.

### Production processes

#### Breeding, Trials and propagation

Bigot has a trial house where trials are done on different varieties of flowers/ roses for a couple of years after which they scrutinize the productivity, pest and disease resistance as well as the market demand. The farm obtains the rights of planting a certain variety from the breeders through payment of royalties. Then they use a third-party propagation company for grafting their planting materials which is done with a lot of emphasis on quality.

#### Planting and harvesting

After propagation, the young plants are delivered to the farm using trucks by the propagation entity for planting. Thereafter, the young plants are planted on the already prepared greenhouses for commercial purposes. The young plants take about 90 days to produce the first harvest and thereafter between 45 to 52 days depending on the variety for subsequent harvests.

#### Grading and value addition

It is at the grading hall where processing and value addition of the flowers takes place and the final quality control point. In the pack house, there are two massive cold rooms; one is the Receiving cold room and the other is the Holding cold room. There are also the chillers and three A/C trucks for transporting the flowers to the airport, thus a strict adherence to the cold chain.

#### Water Management

Bigot Farm has two rainwater harvest dams which have 100% water collected from the rain through the roof of the greenhouses and from the surface. The rain water collected covers about 65%-70% of the annual water requirement within the farm. The drain water which comes from the hydroponics system in green houses is collected, treated in UVA machine and then releases for 100% reuse in irrigation.

#### Pest and disease control

The farm has well-trained pest and diseases scouts on location who help in identification of pests and diseases. The greenhouse attendants have also been trained on pests and diseases and act as the first line of defense.

The farm has invested in a Scarab scouting system which helps in sending real time data on pests and disease scouting to the production managers for appropriate action. Again the farm has developed pest and disease threshold levels which guide on appropriate actions to be taken. There is also a dedicated spray team on board which applies chemicals on the flowers where the levels of infestation exceed the threshold.

The farm has also incorporated various IPM strategies such as

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intermediate varieties with a head size of about 4.2 cm and above. Bigot exports eighty-six to ninety-two million stems annually to markets in France, Germany, Switzerland and the United Kingdom. Bigot Flowers also grows Ruscus and Eucalyptus in a small area within the farm which they use as filler.

Unlike most flower farms, Bigot makes 100% bouquets using the Ruscus and Eucalyptus, a marketing strategy that helps in attracting customers. Bigot is into 100% direct market share. They sell their flowers directly to supermarkets in UK and Europe. None of their flowers goes to flower auctions which makes the price more competitive for other

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Sticky traps, pheromone traps, showering, weeds and debris removal, use of physical barriers like nets and the use of bio-pesticides.

**Human Resource**

Bigot's main operations are growing, packaging and exporting freshly cut flowers to clients in accordance to their specifications. Bigot Flowers has a dedicated team which takes care of all the facets of rose production and value addition to ensure delivery in accordance with customer specifications. The farm employs over a thousand employees who tend to the flowers from planting stage up to export level.

**Bigot Flowers Organogram:**



**Customer relations**

Bigot not only boasts of strong customer relations but also customer satisfaction that has led to customer retention for over sixteen years with each client taking an annual contract. Each customer has their own quality specifications. Bigot's mandate is to receive the weekly customer specifications and ensuring they give the desired specification. For Each customer there is Quality Control which is monitored closely on a daily basis and a weekly report is generated.

**Workers Interests and Welfare**

Bigot Flowers has a myriad of workers committees in the farm that champion for workers interests and welfare; for instance the Shop stewards (union), safety & health committee, gender committee and also the peer educators. All committees are trained on their roles and allowed space to deliver.



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The farm has also developed workplace policies which tackle issues of workers welfare and interests and are strictly adhered to. To ensure they remain committed to the success of the farm the management has an array of incentives which range from; overtime incentives, performance bonuses and security incentives.

**Corporate Social Responsibilities (CSR) programme**

Bigot Flowers has put in place an elaborate CSR programme which encompasses improving the social economic standards of the employees, their dependants and the surrounding communities within the region where the farm operates with the main focus as education, capacity building, skills enhancement, home improvement and environmental protection.

Some of the running projects include; payment of 90% school fees to employees' children in secondary schools, colleges and universities, construction of classrooms in nearby public schools, construction of ablution blocks in nearby public schools, donation of desks to nearby public primary schools, environmental projects such as tree



planting in nearby public schools and dustbin distribution, home improvement projects like providing construction materials, electronics, water tanks, sewing machines, hairdressing equipment among others, offering short courses like computing and skills training such as tailoring, driving and catering.

**Environment conservation**

Bigot Flowers has a waste management plan implemented within the farm with

an inventory of all farm wastes, location, source, disposal methods and reduction targets. Waste is segregated and stored appropriately at designated places awaiting official disposal in accordance with the waste management plan. The farm has contracted a third-party hazardous waste collection and incineration company accredited by NEMA to handle all our hazardous waste produced in the farm. Farmyard waste is shredded and composted for use as compost manure.

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Currently the farm is gradually moving from planting directly onto the soil media to hydroponic systems which reduces soil contamination with synthetic fertilizers. As of now 50% of the farm is in hydroponic system and the other 50% is in soil. Waste water from the farm is collected in a beautiful wetland. So far farm has planted over 1500 trees all over the farm.

**On Health and Global Trends**

MRLs, carbon emissions, botrytis- Bigot Flowers has put in place a vibrant compliance team that keeps

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themselves abreast with all relevant regulations and requirements that directly affects business to ensure they are strictly adhered to and followed to the latter.

**Covid-19 Pandemic-** at Bigot Flowers, the Covid-19 period was characterized by strict adherence to the Ministry of health guidelines. The season also saw reduction of workforce by sending 50% of the staff on 15 days rotational unpaid leave for two months.

**Russia-Ukraine war**

- The ongoing Russia-Ukraine war has adversely



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affected business in terms of running costs due to increased cost of fuel which translates to increased costs of inputs like fertilizers, chemicals, packaging materials among other inputs, thus making the cost of production to escalate thus affecting the profit margins.

The war has also weakened the Kenyan Shilling against the major currencies like the Dollar and the Euro thus lowering the flower industry earnings due to foreign exchange rates. Also as a result of the war, freight charges have also gone up due to increased fuel costs as well as logistical challenges.

**Challenges and Successes**

The flower sub-sector's bottlenecks as outlined by Bigot Flowers have always been; unsteady markets, unhealthy competition, increased costs of production, shortage of farm inputs like fertilizers.

**Bigot Flowers gladly measures**

Its success through the ability to offer employment to over a thousand employees therefore supporting livelihoods of the immediate community. Being a source of revenue for the government through payment of taxes, rates and fees/levies applicable to the industry. Expansion of the farm from forty hectares to the current fifty-five hectares and currently the 50% transformation from growing directly on soil medium to the hydroponic system.

**Future Prospects**

Bigot Flowers envisions the expansion and diversification of the farm in the near future. In order to remain competitive the farm also strategizes on majorly focusing on sustainability which will be achieved through; Efficient use of the available resources, modernization/ automation of processes and exploring their niche market.

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# Developing a Management Plan for Irrigation Runoff

**F**loral and farm producers rely heavily on fertilizers and pesticides for producing high quality crops. Runoff from rain and irrigation can concentrate these chemicals in small collection points where they can enter surface or ground water.

Injurious effects such as fish kills, reproductive failure in birds and acute illness in humans and animals have been correlated with chemical contamination of water. The potential for these chemicals entering surface and ground water poses a serious threat to the environment.

Recently, many growers have had to face the challenge of developing a management plan for handling contaminated irrigation runoff. This is no small task, considering that non-compliance with water quality standards can result to deaths.

Unfortunately, few growers take the time required to develop such a plan until their operation has been found in violation. When this situation occurs, time is usually critical, and costly decisions are often made in haste.

A management plan is relatively inexpensive to develop, and implementation costs can be phased in over a period of time. These plans can be extremely flexible, and as simple or as complex as needed. Regardless of how extensive, your plan will be a clear indication that you are working toward managing runoff and will serve as a useful tool in developing control measures.

## Monitoring Water Quality


Global standards for irrigation runoff are not always easy to

identify or understand.

The first step in developing a management plan is to determine what standards apply to your location(s).







Once you have this information, it is advisable to submit runoff samples for analysis. A simple test for nitrates, as well as other nutrients, is usually inexpensive. A complete analysis, including pesticides, can be costly.

If you decide to conduct a thorough analysis, first inventory the chemicals used in your operation and then determine the chemicals to include. Be aware that the sampling technique, as well as the analytical methodology, can both affect the results. Consult water testing lab or chemist if in doubt.

After reviewing results from these tests, as well as local water quality standards, it should be apparent if you have a problem or not. Excessive nitrates and phosphorus are the most common problems.

Check pesticide concentrations carefully to determine if any are above acceptable limits. Monitor on a regular basis and maintain careful records to track water quality.

### Developing Cultural Practices

Many of the production techniques used for floral and greenhouse crops can be easily modified to reduce the potential for contaminated runoff. Most of these

decisions will have to be made on a case-by-case basis, but the following are some general suggestions that may be implemented.

Capturing and recycling runoff can be very expensive and requires careful management. Toxic levels of salts and pesticides can accumulate in surface basins and careful monitoring is essential. Many operations must also be equipped to capture up to the first 2 inches of runoff from rainfall.

Improved irrigation management reduces runoff by reducing the volume of irrigation water used. Therefore, optimizing irrigation



frequency is important. Also, drip irrigation is much more effective in reducing the volume of water used than overhead systems.

Optimizing fertility regimes means reducing excessive fertilizer applications, an important means of managing runoff. Carefully evaluate the role of soluble and slow release fertilizers, as well as the sources of raw materials from which they are formulated. Determine the fertilizer concentration that provides optimum plant quality.

Reducing pesticide applications dictates that you apply pesticides as needed and

eliminate routine or maintenance programs. Rely on close inspection and scouting to determine when pesticides are to be applied. Be familiar with chemicals before using them (read the label) and stay at the low end of recommended rates when possible. Alternate pest control products to avoid insect resistance and try to use resistant plant varieties if available.

Improving application techniques makes the most of the chemicals you apply. Direct pesticide applications to the target area using as precise a method as available. Be sure all sprayers are calibrated correctly and that chemicals are mixed accurately. Avoid spills and back siphoning into water

supplies. Dispose of empty containers and chemical wastes properly. Many of these activities are probably already a part of your cultural program, but document them carefully in the management plan, along with those changes to be implemented.

### Categorizing Pesticides

**The following factors are considered in classifying pesticides:**

#### *Formulation type*

The long-term (weeks to months) life of a pesticide is a function of its physical properties and persistence, but its initial life

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(hours to days) is strictly a function of its formulation. For example, about 30 times more wettable powders than emulsified concentrates will be lost if both are applied and are immediately subjected to rain or irrigation.

#### The solubility of pesticides

In water at room temperature is given in parts per million (mg/1). This is the solubility of pure active ingredient and not the formulated product. Solubility is a fundamental property of a chemical and strongly affects the ease of washoff and leaching through soil. In general, pesticides with solubilities of 1 part per million or less tend to stay at the soil surface and are washed off in the sediment phase of runoff.

#### Half-life

Given in days, is the time required for pesticides in soils to be degraded so that their concentration decreases by one-half. Pesticide degradation can be fairly accurately described by assuming that each successive half-life decreases the pesticide concentration by half. For example, a period of two half-lives reduces a soil concentration to one-fourth of the initial amount.

#### "Persistence times"

Often reported in scientific literature, are the times required for a pesticide to degrade to the point that it is no longer active.

#### Soil sorption index

Is measured by the Koc value. The Koc measures a pesticide's tendency to be strongly attached, by chemical or physical bonds, to soil particle surfaces.

Higher Koc values (1,000) indicate a stronger attachment to soil and a lesser tendency for the pesticide to move, except with sediment movement. Conversely, pesticides with lower Koc values tend to move with water and have a potential for deep percolation below the root zone or being carried away in runoff water.



Many of the production techniques used for floral and nursery crops can be easily modified to reduce the potential for contaminated runoff. Most of these decisions will have to be made on a case-by-case basis

#### Runoff potential

Indicates the tendency of a pesticide to move with sediment in runoff. A large rating means the pesticide has a high tendency to move with sediment, while a small rating means the pesticide has a low potential to move with sediment. The leaching potential indicates the tendency of a pesticide to move in solution with water and leach below the root zone into deep percolation.

#### The ratings of large, medium, small and total

Describe the potential for leaching. A large rating means the chemical has a high potential for leaching. The total use rating means the pesticide shouldn't leach with percolating water.

Unfortunately, little is known about the leaching capacity of most pesticides in soil mixtures or soilless growing media. Since a portion of applied pesticides will first move through these substrates, it is important to consider their interaction.

It is safe, however, to assume that producers should try to reduce the application of pesticides with high surface loss and leaching potentials. This is not to say that these chemicals should be eliminated from the inventory, but that their use be limited to an "as needed" basis.

#### Common Sense is the Key

Many aspects of dealing with runoff are really nothing more than common sense. But organizing your thoughts in a water management plan can greatly assist in identifying where more than just good judgement may be required.

Water quality is a sensitive, emotional issue that is going to become increasingly important. A proactive approach in developing sound management practices for your operation now may prove to be a much more efficient use of time than responding to a crisis situation later.



# Greenhouse Site Selection



Careful planning prior to construction is an essential first step in the development of a successful, profitable greenhouse production system. Before anything else, the site of the operation must be chosen. When selecting a proper site for the greenhouse a number of “location factors” must be taken into consideration before a final decision on the greenhouse site is made.

## Microclimate

Climatic conditions have dictated worldwide geographical shift in horticulture. Such forces are also at work within local regions. The primary limiting

factor to crop production in greenhouses is low light intensity. Areas having frequent fog, inclement weather, or shadows cast by trees or tall mountains are poor for crops in general.

## Water Availability and Quality

Water is one of the most frequently overlooked resources in the establishment of a greenhouse business. A sufficient quantity of high quality water is extremely important for the production. The need for frequent irrigation requires careful planning and management, to ensure that operations have sufficient water to maintain adequate supplies for crop production. Water is usually obtained from rivers, dams and boreholes.

## Topography

The topography of the site affects where a growing structure is built. (Topography refers to the shape of the land, e.g., hilly, steep, rocky, flat.) The surface of the ground of the greenhouse should be level. Placing a growing structure on a flat surface is efficient because it facilitates easy adjustments to various mechanical controls in the greenhouse, which is economical. The site should be well drained.

## Windbreaks

Outside the greenhouse, a windbreak can

reduce infiltration of cold air and convection of heat away from the greenhouse. Wind speed greatly affects infiltration rates; 15 mile-per-hour winds can double heat loss in a greenhouse. Well-designed windbreaks can reduce wind speeds by 50 percent, reducing heat losses by 5 to 10 percent compared to an open area. They can also reduce snow accumulation on roofs.

## Room for Expansion

A parcel of land larger than the grower’s immediate needs should be acquired. The ultimate size of the range should be predicted. Area should then be added to this predicted figure to accommodate service buildings, storage, access drives, and a parking lot. Additionally, extra space should be allotted to cover unforeseen needs. To meet the environmental codes of some municipalities, it is necessary to use holding ponds for water effluent from the range in order to reduce nutrient release into streams. Doubling the area covered by greenhouses would constitute a bare minimum land requirement.

## Availability of Labour

Present and future labour needs should be assessed and should be in accord with the labour supply in the area. Procurement of a labour supply can be a perennial problem in the horticulture industry. While the solution appears to rest on locating close to rural area, this brings on a problem of quality labour. The greenhouse owner must also determine if labour is available to perform both routine and harvest-time duties.

### Infrastructures

Proximity to transport networks (e.g. roads, airport), access to communication systems (e.g. telephone, internet) and availability of energy (e.g. diesel, electricity) must all be considered. Greenhouses also need convenient access to materials for growing plants (growing media, fertilizers, pesticides, etc.). Transportation requirements to the greenhouse site relate directly to the intended operation's size and marketing arrangements.

### Market Accessibility

Locating near the market is very important for retail growers who rely on customers getting to the greenhouse. The market potential should be explored before building. The competition should be scouted out and surveys conducted (if possible) as to the greenhouse market demands of the local area.

### Legal Considerations

Site selection involves various legal considerations. Permits, licenses, and zoning regulations govern where a greenhouse may be built and often even dictate what type of building materials

may be used. Selecting an appropriate site also involves how the greenhouse operation affects its neighbors. If the proposed site is near a school, hospital, or residential community, the greenhouse must cooperate with the zoning rules of these entities. If water from the site drains into parks, farms, or ecological areas, the

“The need for frequent irrigation requires careful planning and management, to ensure that operations have sufficient water to maintain adequate supplies for crop production. Water is usually obtained from rivers, dams and boreholes.”



land may be subject to various regulations. Some require the owner to obtain certification to purchase restricted-use pesticides. In addition, the greenhouse owner must also be aware of relevant mandates that ensure employee safety.

### Greenhouse Orientation

Quite possibly the largest design consideration when planning a greenhouse is determining the orientation and angle of glazing for the structure. In the orientation of multi-bay greenhouses structural components come into play.

### Angle of Incidence

The pitch of a roof means the degree of slant or the angle of divergence from the horizontal. The glass of the roof not only allows the light and heat rays to pass through it, but it also acts to some extent as a mirror, thus reflecting a part of the rays. The amount lost by reflection is proportional to the angle of incidence. Thus, if the sun's rays fall upon the roof at right angles, little or none is lost by reflection; but when they fall at a less angle, the amount reflected increases as the angle of incidence increases.



# How Flowers are ‘Put to Sleep’ For Long Sea Voyages

By Andrea Dijkstra

**O**n arrival at Kenya’s biggest seaport, Mombasa, the container is loaded onto a ship for a voyage to Europe of around 30 days. Despite their lengthy journey, they will still be sold to European shoppers with a vase-life of about a week.

So, how is this possible?

“The flowers will be kept at a temperature of 0.5 degrees celsius throughout the journey,” says Elizabeth Kimani, the manager of quality and standards at Sian Flowers. As well as controlling the temperature,



the elaborate process of preserving the blooms for as long as possible.

“Through this [system] you stop all activity in the flowers that, as a result, go into dormancy,” Ms Kimani says, explaining that the flowers are put to

But flowers destined for such a long voyage need extra attention to prepare them, as soon as they are picked.

“We harvest them early in the morning, when it’s still cool and they will be the first to go into the cold room,” explains Linda Murungi from Sian Flowers.

Freshly-harvested roses, for instance, are then dipped into a chemical mixture to protect them from the fungus, botrytis.

After that, the stems are put into buckets to absorb a hydration solution so they can survive the thirty days without water. They are also put in a solution

that curbs the growth hormone, ethylene, which causes the ageing of the flowers.

Once that process is completed, the flowers are then packed into cartons with holes on the top and bottom, which allow air from the container’s system to circulate.

Kenya has become one of the world’s biggest flower exporters thanks to its equatorial location, high altitudes and relatively cheap labour, it competes for dominance in the market with Colombia and Ecuador.

For years, the two Latin American countries have been exporting about 10% of their flowers by sea freight to North America and Europe.

As these flowers are at sea for a much shorter period of time, firms exporting from Latin America do not use controlled atmosphere, or post-harvest treatments.

Kenyan exporters however, have to be extra-careful. There is no direct shipping route to Europe, instead, containers are transferred in the Middle East from smaller vessels to much larger ones.

“All processes around sea freight require extreme precision - there’s no room for shortcuts,”



the atmosphere system in the container reduces the oxygen level from 20% to 4%, while increasing the carbon dioxide level from 0.4% to 4%. This technology is all part of

sleep.

A sophisticated tracking system allows staff from the shipping company to monitor the temperature, oxygen and CO2 levels throughout the journey.

says Jeroen van der Hulst, chief executive at consulting company, FlowerWatch. “One mistake and your flowers might arrive as compost in Europe.”

The Kenyan flowers’ complex journey involves a higher risk of delay, as containers occasionally miss their transfer window.

The port of Mombasa has also been known for delays and bureaucracy. Another challenge is, it also lacks a so-called ‘green line’ for perishable products - flowers have to queue up with all the other containers.

Due to these challenges, Kenya’s flower farmers have, in the past, been wary of sea freight preferring to



transport their flowers by air but shifted during the pandemic.

The farmers saw the price of air freight soar from around \$1.80 per kilo, in January 2020, to around \$2.80 per kilo in June 2022, according to Harm-Jan Mostert commercial manager for Africa at Royal FloraHolland, the Dutch company behind

the world’s biggest flower auction.

The transport situation became so difficult that some growers even resorted to destroying parts of their harvest. “Only this year, more than three hundred containers with ten tons of flowers each have been exported from Kenya by sea”, Mr Van der Hulst says. “That’s a substantial saving of thirty full cargo aircrafts.”

In addition to being cheaper, using sea freight can cut carbon emissions by between 84% and 95% respectively, according to a study funded by the UK government in 2021.

Although, clearly if you are worried about the carbon footprint of cut flowers, then it’s probably best to buy a seasonal bouquet grown closer to home. Walking through his green house in Naivasha, Robin

Letcher from Royal De Ruiter East Africa, explains

that rose breeders are also trying to develop new varieties.

Pointing at some red roses he says: “This variety, for example, has firmer petals that are less sensitive

to botrytis [fungus], which is good for sea freight.”

In the future, this could potentially reduce the need for chemicals during post-harvest treatments, although it could take seven to ten years to develop successfully so, “is something for the longer term”, he adds. Many flower producers remain nervous

about switching over to sea freight.

“A stupid mistake, a port strike or bad weather at sea can really get you in trouble with sea freight,” Mr Letcher explains.

Last year, for example, a container accidentally went to Singapore. “It [eventually] arrived in the Netherlands after 53 days. So, all the flowers had to be destroyed, which was a disaster for the producers,” he says.

Growers also need to contend with the perception in the industry that flowers sent by sea freight have a shorter shelf life, particularly at the world’s largest flower auction in the Netherlands.

Customers do not notice much of a difference, according to Ms Kimani who says the sea freight blooms are indistinguishable from air freight flowers, adding that some of their roses even travel better by sea, than by air.

“Although air freight only takes around 12 hours, we sometimes witness enormous temperature peaks during the journey... which obviously has a negative influence on the flowers,” she explains. “With sea freight, however, our flowers are continuously in dormancy.”

The logistics of moving these flowers is not a simple decision, as prices are constantly changing. Shipping prices have also been rising closer to air freight costs.

But in the longer term, Mr Mostert forecasts sea freight will account for at least 20% of Kenyan flower exports - a sector worth \$934m per year. “Air freight prices probably will never fall back to the level of before the Covid-19 crisis, so also from a cost perspective sea freight remains interesting,” Mr Mostert says.

*Courtesy: BBC through FLOWERWATCH*

# Becoming A Flower Grower

## and Other Lessons Awaiting You at Horticulture Fair

**Richard McGonnell, the chairman of the Naivasha Horticultural Fair, which will be held at the Naivasha Sports Club between 16 and 17 September 2022.**

### **In Summary**

- **Knowledge of the types of cold storage rooms, conditions for cultivation and understanding the market market are vital.**
- **The biggest challenge currently is the high cost of investment. Cost of land has become a prohibitive factor for new investors coming on board.**
- **NH Fair started some 20 years ago with 30-40 stands.**
- **All the information of how to contact us and what is needed is available on the website.**

**I**n September, the country will hold the Naivasha Horticultural Fair, a key event in the sector's calendar. We spoke to Richard McGonnell, the chairman of the event on what farmers should expect and how small producers can make money from the industry.

**What is your assessment of the horticulture industry in general? Is the country doing better?**

Climate change has severely impacted business. Many flower farms are currently counting losses due to water shortage meaning they have to reduce their acreage. The tough economic times caused by corona virus, war in Russia, our own elections and current drought are also biting.

Some farms have closed down while others have laid off workers as they battle prolonged effects. Other farms are struggling due to increased costs.



**Mr. Richard McGonnell**





**What challenges should farmers expect when they join the sector?**

The biggest challenge currently is the high cost of investment. Cost of land has become a prohibitive factor for new investors coming on board.

It is time the government began leasing out land similar to the way it is done in Ethiopia, otherwise there will be few investors coming in.

Besides, electricity and freight costs are also far too high and salaries are climbing too quickly. The government recently announced 15 per cent salary increment.

Workers expect a pay rise immediately they hear about this yet the environment of doing business remains the same.

**Floriculture remains a preserve of big farmers who can access the export market. How can smallholder farmers be encouraged to join the sector?**

It is difficult for small-scale farmers to make money in this sector especially in the international market unless they are tied to a good marketing outlet.

New farmers can find it a big struggle

to make a breakthrough in the market due to capital and marketing challenges. But smallholder farmers can as well net profit by being sub-contracted by big established farms.

**Tell us about the Naivasha Horticultural Fair (NH Fair) and what does it involve?**

NH Fair started some 20 years ago with 30-40 stands. Exhibitors pay some entry charges at the gate as we believe that people exhibit to do business. Contrary to what many people think that it is a flower event, the fair is open to all horticultural farmers such as those growing fruits and vegetables.

**What does it take to participate in the fair?**

All the information of how to contact us and what is needed is available on our website. In short, however, the fair will be held at the Naivasha Sports Club between 16 and 17 September.

We welcome everyone, especially agri-entrepreneurs who would like to gain knowledge about the industry, including those growing vegetables and other horticultural produce.

**What advice would you give to anyone keen on venturing into flower farming, with regards to how the flower value chain works?**

They should do their homework properly and diligently. Among the things one needs to know include the types of cold storage rooms they need, conditions for cultivation, where and how you will acquire farm inputs, plant health requirements, harvesting and storage and make sure you have a market for your produce. Such analyses are very critical for the prosperity of a flower venture.

If possible, hire a consultant or someone who has knowledge of the industry to help you design a well-functioning plan to run the farm sustainably.



“It is difficult for small-scale farmers to make money in this sector especially in the international market unless they are tied to a good marketing outlet.”

# Horti Fair Promotes Knowledge Exchange in Horticultural Industry

Horticulture is a significant 'manufacturing' industry. But where would horticulture be without knowledge exchange? This rhetorical question is the starting point for the Naivasha Horticultural Fair, which was initiated twenty years ago. The knowledge from these exchanges has been of help to many businesses.

Horti Fair is one of the biggest regional trade fairs for Technology, Innovation and Inspiration in Horticulture. Horti Fair starts where the chain starts: plant breeding, greenhouse technology and cultivation technique. In addition, the Horti Fair showcases the solutions that horticulture offers for global challenges relating to water, food, clean energy and well-being.

NHFair 2022 will be taking place from 16th -17th September in Naivasha. Many Horticultural companies will participate. Horti Fair 2022 expects hundreds of exhibitors and thousands of attendands.

## Knowledge exchange

In 2019 Horti Fair had visitors from around 20 countries. Over the course of two exhibition days. A survey done by *Floriculture Magazine* showed that, of all the visitors, 62 % found the fair to be 'successful' to 'very successful' in promoting and exchanging knowledge.



That knowledge exchange also took place during the face to face engagements "Knowledge exchange is one of the most important aspects, which is why we started Hortifair.

Visitors were able to get answers to important and current production issues."



Both parts of the fair will be repeated in 2022. The support to charity from the proceeds and knowledge exchange during the exhibition.

The programme of the fair is developed in consultation with stake holders, with the aim of informing visitors concisely on current horticultural issues. In 2019, for example, among the items on the agenda were Supply Chain, doing business in China and sustainable floriculture.

*Floriculture Magazine* has decided to collate the knowledge that will be exchanged during the fair, and at the end an article 'Knowledge Review: Towards Sustainable Horticulture' will be done. On the one hand, we are documenting the knowledge for growers and suppliers, for example for horticultural professionals who could not attend.

On the other hand, the Knowledge Review is an excellent snapshot of the current situation: what are the issues that are now relevant to horticulture as an important manufacturing industry, and what questions remain to be answered?"

## Even better

Preparations for Horti Fair 2022 are now fully underway. Says McGonnell: "In 2019 we redesigned the exhibition, among other things by developing and supporting many new initiatives. Horti Fair 2019 therefore focused on the 'new'. We will carry on with this innovation and Horti Fair 2022 will focus on the 'improved'. We will accordingly make it an even better exhibition."

# FLOWER & VEGETABLE FARMS IN KENYA

FARM NAME	PRODUCT	LOCATION	CONTACT PERSON	TELEPHONE	E-MAIL
AAA- Flowers-Simba	Roses	Rumuruti	Anil	0758349471	anil@aaagrowers.co.ke
AAA- Flowers -Chui Farm	Roses	Timau	Phanuel Ochunga	07522506026	fanuel.ochunga@aaagrowers.co.ke
AAA-Simba Farm	Roses	Rumuruti	Anil	0758349471	anil@aaagrowers.co.ke
Across Agriculture Ltd	Herbs	-	Emily Chepkemoi	0729080186	chep28@gmail.com
Africalla Kenya Ltd	Cuttings	Eldoret	Meindert	-	meindert@africalla.com
Africa Blooms	Roses	Salgaa	Ramnath Sarbande	0798190511	ramnath.sarbande@xflora.net
Afriscan Kenya Ltd	Hypericum	Naivasha	Charles Mwangi	-	-
Agriflora (K) Ltd		Nakuru, Njoro	Charles Mulemba	0721311279	cmulemba@sianflowers.co.ke
Aquila Development Co	Roses	Naivasha	Prashant Takate	0799356002	gm@aquilafowers.com
Baraka Roses/ Mumi Flora	Roses	Ngorika	Simon Blinco	0723234927	simon@barakaroses.com
Batian Flowers	Roses	Nanyuki	Rakesh	0724631299	
Beautyline	Flowers	Naivasha	Peter Gathiaka	0721392559	peter@beautyli.com
Big Flowers	Roses	Timau	Gideon Waweru	0721178974	gideon@fontana.co.ke
Bigot Flowers	Flowers	Naivasha	Kakasaheb Jagtap	0722205271	jagtap.kt@bigotflowers.co.ke
Bila Shaka Flowers	Roses	Naivasha	Joost Zuurbier	0722204489	bilashaka.flowers@zuurbier.com
Black Petals	Roses	Limuru	Nirzar Jundre	0722848560	nj@blackpetals.co.ke
Bliss Flora Ltd	Roses	Njoro	Appachu Sachin	0789101060	appachu7@yahoo.com
Bloom Valley	Roses	Salgaa	Ramnath Sarbande	0798190511	ramnath.sarbande@xflora.net
Blooming Dale Roses Kenya Ltd	Roses	Nanyuki	Sunil	0718991182	info@bloomingdaleroses.com
Blooming Africa	-	Gilgil	Bert	0722204309	bert@blooming-innovations.com
Buds and Blooms	Roses	Nakuru	Shivaji Wagh	0720895911	shivaniiket@yahoo.com
Carzan (K) Ltd KS	Summer flowers	Salgaa	Stanley Rotich	0721931710	stanley.rotich@marginpar.biz
Carzan (K) Ltd ST	Hypericum, solidago	Sobeia	Thaddeus Adung'o	0716019094	thaddeus.adung'o@marginpar.biz
Carzan - Molo	Carnations	Molo	Charles Chelule	0728784081	charles.chelule@marginpar.biz
Charm Flowers	Flowers	Athiriver	Ashok Patel	020 352583	ashki@charnflowers.com
Chestnut	Vegetables	Naromoru	Gabriel Kiai	-	gabriel.kiai@aaagrowers.co.ke
Colour Crops	Hypericum	Nanyuki	Kennedy Wanyama	0716389472	colourcrops@tmu.com
Colour crops	Summer Flowers-	Bahati	Patrick Kipkurui	0727806184	bahati@colourcrops.com
Colour crops	Flowers	Naivasha	Geoffrey Mwaura	0722200972	nva@colourcrops.com
Credible Blooms	Flowers	Rumuruti	Eliud Njenga	0722382859	eliud@pigeonblooms.com
Dale Flora	Roses	Mogotio	Ajay Sutar	0711102266	ajay.sutar24@gmail.com
Desire Flowers	Flowers	Isinya	Rajat Chaohan	0724264653	rajatchaohan@hotmail.com
De ruiters	Breeder Roses	Naivasha	Fred Okinda	0722579204	Fred.okinda@deruiter.com
Double Dutch	Cuttings	-	Pharis Wainaina	0728207661	
Dummen Orange	Flowers Breeders	Naivasha	Bart Engels	0759069896	b.engels@dummenorange.com
Eco Roses	Roses	Salgaa	Madhukar Bhalerao	0799555440	Mbhalerao.eco@btfgroup.com
Elbur flora- kimman	Roses	Nakuru	Daniel Moge	0721734104	kimmanexp@gmail.com
Enkasiti Thika	Flowers	Thika	Tambe Sabaji	0734740202	enkasiti@gmail.com
Equinox	Flowers	Nanyuki	Harry Kruger	0707266956	harry@equinoxflowers.com
Everest Flowers Ltd	Flowers	Mt. Kenya	Victor Kibore	0700416334	-
Everflora Ltd.	Flowers	Thika	Ghanshyam Dusang	0721638005	manager1@everflora.co.ke
Evergreen Crops		Nairobi	Arun Singh	0721941009	arun@evergreencrops.com
Exotic Peninah	Roses/ Carnations	Athiriver	Dan	0734626942	dan@exoticfields.com
Fairy Flowers	Flowers	Limuru	Sylvester	0753444237	sylvesterkahoro@yahoo.com
Fairy Flowers	cutings	Limuru	Kennedy Kamau	0712204894	kenreal07@gmail.com
Fides Kenya Ltd	Cuttings	Embu	Bernard Marindany	0726 366 752	B.Marindany@DummenOrange.com
Finlays- Lematit	Flowers	Kericho	Japhet Langat	0722 863527	japhet.Langat@finlays.co.ke
Fontana Ltd - Akina farm	Roses	Njoro	Mahendra Patil	0798254199	mahendra@fontana.co.ke
Fontana Ltd - Ayana Farm	Roses	Mau Narok	Osman	0712933710	osman@fontana.co.ke
Flamingo Horticulture Farm	Flowers	Naivasha	Peter Mwangi	0722204505	peter.mwangi@flamingo.net
Flamingo -Kingfisher Farm	Flowers	Naivasha	Elijah Getiro	0722873539	elijah.getiro@dudutech.com
Flamingo - Osprey		Naivasha	Jacob Wanyonyi	0722773560	jacob.wanyonyi@flamingo.net
Flamingo -Siraji Farm		Nanyuki	Peris Muturi	0729050116	Peris.Ndegwa@flamingo.net
Flamingo -Ibis	summer, vegetables	Nanyuki	Margaret Mumbi	-	-
Flamingo Flora	Roses	Njoro	Sam Nyoro	0721993857	s.ivor@flamingoflora.co.ke
Flora ola	Roses	Solai-Nakuru	Lucas Choi	0721832710	lucas.choi@floraola.co.ke
Flora Delight	Summer flowers	Kiambu/ Limuru	Marco	0710802065	marcovansandijk@yahoo.com
Florensis Ltd	Cuttings	Naivasha	Simon Mwangi	0721519470	simon.mwangi@florensis.com
Florenza Ltd	Roses	Solai	Yogeesh	0737453768	farm.florenza@megaspingroup.com

# FLOWER & VEGETABLE FARMS IN KENYA

FARM NAME	PRODUCT	LOCATION	CONTACT PERSON	TELEPHONE	E-MAIL
Fresh Gold Flowers Ltd	Flowers	Mt. Kenya	John Karimi	0721622294	karimi@freshgolgkenya.co.ke
Gatoka Roses	Roses	Thika	Herman Njuguna	0728 854 844	info@gatokaflowers.com
Golden Tulip	Roses	Olkalao	Umesh Choudhery	0739729658	umesh.gftl@btfgroup.com
Groove	Flowers	Naivasha	John Ngoni	0724448601	groovekenya@gmail.com
Hanna Roses Ltd	Roses	Thika	Kadlag Palaji	0723149968	kadlag.paraji@hannaroses.com
Harvest Ltd	Roses	Murungaru	Julius Oloo	0721465853	oloo@harvestflowers.com
Harvest Ltd	Roses	Athiriver	Julius Oloo	0721465853	oloo@harvestflowers.com
Harvest Ltd	Roses	Olkalou	Julius Oloo	0721465853	oloo@harvestflowers.com
Heritage Flowers Ltd	Roses	Rumuruti	Sailesh Kumar	0722203750	hfl.srk@gmail.com
Highland plantations	Cuttings & Herbs	Olkalou			production@highlandplants.co.ke
Imani Flowers	Summer Flowers	Kabarak, Nakuru	Raphael Otieno	0792302466	raphael@imaniflowers.co.ke
Interplant Roses	Roses	Naivasha	Gavin Mouritzen	0733220333	info@interplantea.co.ke
Isinya	Flowers	Isinya	Rajesh	-	pm@isinyaroses.com
Karen Roses	Flowers	Nairobi	Peter Mutinda	0723353414	pmutinda@karenroses.com
Kariki Ltd- Thika	Flowers	Thika	Miriam	0720674307	kariki.production@kariki.biz
Kariki Ltd - Nanyuki	Eryngiums	Nanyuki	Richard Fernandes	062-31023/6	bondet.production@kariki.biz
Kariki Ltd - Naivasha	Summer	Naivasha	Esau Onyango	0728606878	hamwe.production@kariki.biz
Kariki Ltd - Molo	Fowers	Molo	James Oluoch	0716333717	jame.oluoch@kariki.biz
Kenflora Limited		Kiambu/ Limuru	Abdul Aleem	0722311468	info@kenflora.com
Kentalya	Cuttings	Naivasha	Lynette	0733549773	lynette@kentalya.com
Kikwetu Flowers	Roses	Mt. Kenya	Rathan	0787266007	
Kisima Farm Ltd	Roses	Timau	Craig Oulton	0722205828	craig@kisima.co.ke
Kreative	Roses- Breeders	Naivasha	Bas Smit	0733607755	info@kordes-ea.com
Kongoni River Farm - Gorge Farm	Roses	Naivasha	Anand Patil	0728608785	anand.patil@vegpro-group.com
Kongoni River Farm - Liki River	Flowers	Nanyuki	Madhav Lengare	0722202342	madhav@vegpro-group.com
Kongoni River Farm - Star Flowers	Roses	Naivasha	Jagtap Shahaji	0792547633	jagtap@vegpro-group.com
Kongoni River Farm - Kongoni	Flowers	Timau	Kadam	0721274413	--
Kongoni River Farm - Bemack	Flowers	Timau	Balasaheb Ingwale	0717181102	balasaheb@vegpro-group.com
Kongoni River Farm - Galaxy	Roses	Naivasha	Chandrakant Bachche	0724639898	chandrakant.bachche@vegpro-group.com
Kongoni River Farm- Longonot	Roses	Naivasha	Ravi Sathe	0715173603	ravi.sathe@vegpro-group.com
Lamorna Ltd	Roses	Naivasha	Mureithi	0722238474	admin@lamornaflowers.com
Lathy Flora & Fairy	-	Kiambu	John Mbaoni	0753888126	info@lathyflora.com
Lauren International	Flowers	Thika	Dilip	0720796629	laurenflowers@accesskenya.co.ke
Laurel Investment	Roses	Olkalou	Ravindra Palshikar	0740569286	ravi.lil@btfgroup.com
Livewire	Hypericum	Naivasha	Esau Onyango	0728606878	management@livewire.co.ke
Lolomarik	Roses	Nanyuki	Topper Murry	0715 727991	topper@lolomarik.com
Lobelia	Roses	Timau	Ken Mwiti	0722475785	info@lobelia.co.ke
Maridadi Flowers	Flowers	Naivasha	Jack Kneppers	0733333289	jack@maridadiflowers.com
Maua Agritech	Flowers	Isinya	Kori	115355251	kori@mauaagritech.com
Mau Flora	Roses	Nakuru, Turi	Manju	0748254171	manju@mauflora.co.ke
Milenium Growers	Summer Flowers	-	Sushant Wankara	0731316000	sushant@marvelgreens.com
Molo Greens	Solidago, carnations	-			
Mt. Elgon Orchards	Roses	Tran Nzoia	Bob Anderson	0735329395,	bob@mtelgon.com
Mt. Kenya Alstromeria	Alstromeria	Meru	Miriam	0716162671	miriam@mountkenyaalstromerialtd
Mzuurie Group	Roses		Andrew Wambua	0724256592	awambua@moloriverroses.co.ke
Mzuurie Flowers - Maji Mazuri	Roses	Moi's Bridge, Eldoret	Mark Juma	0727471034	mjuma@majimazuri.co.ke
Mzuurie Flowers - Molo River Roses	Flowers	Kilelwa	Paula Koros	072241436	pkoros@moloriverroses.co.ke
Mzuurie Flowers - Winchester Farm	Roses	Karen		-	-
Mzuurie Flowers - Winchester Farm	Flowers	Bahati	Joseph Kasoso	0725696509	jkasoso@winchester.co.ke
Nini Farms	Roses	Naivasha	Vijay Bhosale	0702662297	vijay.bhosale@herburgroses.nl
Nirp East Africa	Roses	Naivasha	Danielle Spinks	0702685581	danielles@nirpinternational.com
Ol Njorowa	Roses	Naivasha	Charles Kinyanjui	0723986467	mbegu@olnjorowa.com
Oserian-Bohemian	Flowers	Nakuru	Chakravarthi Yashmith	0786143515	chakra.kuppusamy@oserial.com
Panda Flowers	Roses	Naivasha	-	-	gm@pandaflowers.co.ke
Panocol International	Roses	Eldoret	Mr. Paul Wekesa	0722748298	paul.wekesa@panocol.co.ke
Penta	Flowers	Thika	Tom Ochieng	0723904006	tom@pentaflowers.co.ke
Pendekeza	Roses	Nanyuki	James Kiiru	0708124381	tambuzi.sales@tambuzi.co.ke
PJ Dave Flowers	Flowers	Isinya	Pravin Yadav	0708920202	gm@pidave.com

# FLOWER & VEGETABLE FARMS IN KENYA

FARM NAME	PRODUCT	LOCATION	CONTACT PERSON	TELEPHONE	E-MAIL
Pj Dave	Roses	Timau	Ashok Everlyn Ladkat	0702000341	fmringsun@pjdave.com
PJ Flora	Roses	Isinya	Santos Kulkarni	0738990521	santosh@pjdaveflora.com
Plantech Kenya Ltd	Propagators	Naivasha	Idan Salvy	0702187105	idan@plantechkenya.com
Porini Flowers	Roses	Molo	Shakti Vanjimuthu	0739676998	shakti@poriniflowers.com
Primarosa Flowers Ltd	Roses	Ol njororok, Nyandarua	Peter G. Njagi	0723575461	opm@primarosaflores.com
Rain Forest Farmlands Ltd	Roses	Naivasha	Boniface Kiama	0722780811	bkiama@fleurafrica.com
Ravine Roses Flowers	Flowers	Eldama Ravin	Peter Kamuren	0722205657	pkamuren@karenroses.com
Redland Roses	Flowers	Thika	Aldric Spindler	0733609795	aldric@redlandsroses.co.ke
Redwing Flowers	Flowers	Nakuru	Simon Sayer	0722227278	sayer@redwingltd.co.ke
Rift Valley Roses (K) Ltd	Flowers	Naivasha	Peterson Muchiri	0721216026	fm@riftvalleyroses.co.ke
Rimi Flora Ltd	Hypericum	Njoro	Richard Mutua	0722357678	richard@rimiflora.com
Riverdale Blooms Ltd	Flowers	Thika	Antony Mutugi	0202095901	rdale@swiftkenya.com
Roseto	Roses	Salgaa	Aravindra Hirario	07417791483	gm.roseto@megaspingroup.com
Sandpro Growers	Gypsophylla	Meru	Elly Okech	0727580266	elly.okech@sandprogrowers.com
Savannah international	Geranium	Naivasha	Ignatius lukulu	0728424902	i.lukulu@savanna-international.com
Selecta Kenya		Thika	Robert Khamala	0727 467 464	r.khamala@selectakenya.com
Sojanmi Spring Fields	Roses	Njoro	Senthil	0791184851	senthil.adhikesavan@bidcofrica.com
Sunripe Farm		Naivasha	Antony	0711827785	naivasha@sunripe.co.ke
Schreus	Roses	Naivasha	Haiko Backer	-	-
Shades Horticulture	Flowers	Isinya	Ashutosh Mishra	0722972018	info@shadeshorticulture.com
Shalima Group (k) Ltd	Flowers	Nairobi	Natarajan	0738 999149	natarajan@eaga.co.ke
Shalimar Shalimar	Flowers	Naivasha	Dinkar Wandhekar	0702418174	dinkar@eaga.co.ke
Shalimar- Kabuku Farm	Flowers	Thika	Mohan Raj	0724265777	kabukufm@eaga.co.ke
shalimar- Mahee Farm	Roses	Olkalou	Natarajan	0738999149	natarajan@eaga.co.ke
Shalimar- Mwanzi Farm	Flowers	Rumuruti	Ram	0797185821	mwanziflowersfm@eaga.co.ke
Sian Flowers - Maasai Flowers	Flowers	Isinya	Nancy Kurgat	0720780322	nkurgat@sianflowers.co.ke
Sian Flowers - Agriflora (K) Ltd	Roses	Nakuru	Charles Mulemba	-	cmulemba@sianroses.co.ke
Sian Flowers - Equator Roses	Roses	Eldoret	Nehemiah Kangogo	0725848910	nkangogo@sianflowers.co.ke
Sierra flora	Roses	Njoro	Oppaso Bandgar	720070053	farm.sierra@megaspingroup.com
Simbi Roses	Roses	Thika	Karue Jefferson	0733771652	simbi@sansora.co.ke
Sirgoek Flowers	Flowers	Eldoret	Andrew Keittany	0725 946429	sirgoek@africaonline.co.ke
Solai Milmet/Tindress	Flowers	Solai, Nakuru	Vinoj J. Kumar	0737801646	solairoses@gmail.com
Sololo Agriculture	-	Eldoret	Andrew Tubei	0722728364	atubei@sianflowers.co.ke
Subati Flowers	Roses	Subukia	Naren Patel	0712 584124	naren@subatiflowers.com
Subati Flowers	Roses	Naivasha	Naren Patel	0712 584124	naren@subatiflowers.com
Subati Flowers (Suera)	Roses	Nyandarua	George Kimathi	0724622638	gkbuuri@gmail.com
Sunfloritech-Blue Sky	Gypsophilla	Naivasha	Patel Sushant	0725622333	info@blueskykenya.com
Sunfloritech -Tulaga	Roses	Naivasha	A Duzai Rajan	0794572232	farmmgr.tulaga@btfgroup.com
Stockman rozen	Roses	Naivasha	Julius Muchiri	0722200890	julius@srk.co.ke
Syngenta Flowers - Kenya Cuttings	Flowers	Thika	Kavosi Philip	0721225540	philip.munyoki@syngenta.com
Syngenta Flowers - Pollen	Flowers	Thika	Joseph Ayieko	0733552500	joseph.ayieko@syngenta.com
Tambuzi	Roses	Nanyuki	Benard Maina	0721860080	tambuzi.sales@tambuzi.co.ke
Terrasol	Cuttings	Limuru	Benard Adwarh	0753444230	adwarh@terrasolkenya.com
Timaflor Ltd	Flowers	Nanyuki	Simon van de Berg	0724443262	info@timaflor.com
Transebel	Flowers	Thika	David Muchiri	0724646810	davidmuchiri@transebel.co.ke
Uhuru Flowers	Flowers	Nanyuki	Ivan Freeman	0713889574	ivan@uhuruflores.co.ke
Utee Estate	Chrysanthemums	Nairobi	Appaso Mane	0737 513 844	mane.uel@btfgroup.com
United Selections	Roses -Breeder	Ngata, Nakuru	Jeroen Van Marrewijk	700176556	jvanmarrewijk@united-selections.com
V.D.Berg Roses	Flowers	Naivasha	Johan Remeuus	0721868312	johan@roseskenya.com
Valentine Ltd	Roses	Kiambu/Limuru	Joseph Kariuki	0728 093 379	joseph.kariuki@valentinegrowers.com
Van Kleef Kenya Ltd	Roses	Njoro	Judith Zuurbier		roses@vankleef.nl
WAC International	Breeder	Naivasha	Richard Mc Gonnell	0722810968	richard@wac-international.com
Waridi Ltd	Roses	Athi River	-	-	farmmanager@waridi.com
Wildfire	Roses/summer	Naivasha	Patrick Mbugua	0721639306	patrickmbugua@wildfire-flowers.com
Wilfey	Gypsophila/hypericum	Subukia	Sammy Ndung'u	0720467551	-
Wilmar Agro Ltd	Summer Flowers	Thika	Alice Muiruri	0722 321203	alice.muiruri@wilmar.co.ke
Windsor	Roses	Thika	Pradeep Bodumalla	0736 586 059	farm@windsor-flowers.com
Xpressions Flora	Roses	Njoro	Brijesh Patel	0715469732	brijesh.patel@xflora.net
Zena - Asai Farm	Roses	Eldoret	Japhet Chelal	0721770597	japhet.zenaroses@gmail.com
Zena Roses - Sosiani Farm	Roses	Eldoret	Francis Kariuki	0725444515	fkariuki@zenaroses.com

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