



# AGRICULTURE AND FOOD AUTHORITY

## HORTICULTURAL CROPS DIRECTORATE

Nairobi Horticultural Centre next to JKIA; P.O. Box 42601 – 00100; Telephone: 020-2088469, 020-2131560  
Email: [directorhcd@afa.go.ke](mailto:directorhcd@afa.go.ke), [directorhcd@agricultureauthority.go.ke](mailto:directorhcd@agricultureauthority.go.ke) Website: [www.afa.go.ke](http://www.afa.go.ke)

### CORIANDER (*Coriandrum sativa*) GROWERS MANUAL.

## PREFACE

Kenya has been endowed with an enabling environment for production of horticultural crops that attracts high demand both in the domestic and international markets. Production is mainly by smallholder farmers, many of whom require skills and knowledge on good agricultural practices (GAP) to produce and handle the fresh produce. According to the Economic Survey 2022 published by the Kenya National Bureau of Statistics (KNBS), horticulture is among the leading sub sectors in agriculture. Therefore, enhancing the capacity of these producers could be of immense beneficial to the Kenyan economy.

Agriculture and Food Authority – Horticulture Crops Directorate (HCD) is a government agency mandated to Regulate, Promote and Develop the horticulture industry in Kenya. In carrying out its mandate, the Directorate through the Technical and Advisory Services department (TAS) has developed this grower's manual for its stakeholders. The manual has been designed with a simple language and where necessary photos have been used to highlights all processes from plough to plate. HCD envisages that by using this grower's manual, its stakeholders especially the smallholder farmers, extension staff and trainers would upgrade their knowledge and skills to enable them increase production of the crops thereby improving on food security, household health, as well as create employment and generate income.

The content has largely been developed from the TAS field staff experiences in the 26 stations spread across the country (*Collins & Dinah – Nairobi [NHC], Antonina – Nakuru, Miriam - Nandi, Grace – Homabay, Barnabas- Eldoret & Iten, Carol - Bungoma, Peter- Busia, Charles -Kisumu, Irene - Narok, Lal – Kisii, Victor – Mombasa, Crispin – Kibwezi, Esther Ngutho– Kitui, Esther Kabatha – Nyandarua, Susan – Taveta, Syphrosa – Machakos, Catherine – Yatta, James – Kitale, Julius – Kajiado, Amedeo & Brenda – Meru, Mary – Kericho, David & Delphina – Mwea, Fridah – Nyeri, Emma – Sagana, Sarah – Limuru*), some content were reviewed from literature and images used properly acknowledged. Technical editing and reviewing of the manuals were done by Mary Chacha, Syphrosa Wanyama, Barnabas Kiptum, Antonina Lutta, Carol Soita, Amedeo Muriungi, Peter Mwanja, Victor Omari, Emma Ndirangu, Esther Kabatha, David Makori, Dinah Karimi, Collins Otieno, Dr Jacqueline Oseko the acting Deputy Director, Technical and Advisory Services department and Director Benjamin Tito all of Horticulture Crops Directorate.

## **CORIANDER (*Coriandrum sativa*) GROWERS MANUAL.**

**Common Name –Dhania (Swahili)**



### **Introduction**

In Kenya coriander is one of the most important spicy crop grown in both warm and cold regions, for its attractive spicy leaves that are used to season foods and salads. Its pungent seeds are processed into mixed spices and curry powder.

There are two main types grown: Cutback and Uproot type.

Cilantro: Has flat toothed leaves. Seed coriander, grown for its seeds. Leaf cilantro, resembles parsley and has a strong and sharp smell. Vietnamese coriander has narrow smooth-edged and darker leaves.

In Kenya the Counties leading in coriander production are Murang'a, Nakuru, Trans-nzoia, Uasin Gishu, Nyandarua, and Kiambu.

### **Ecological Requirements**

**Soil:** It thrives in well drained clay, loam, sandy loam soils rich in organic matter with soil pH is 6.5- 7.5.

**Temperature range:** 18°C -25°C

**Rainfall:** Annual 75mm-100mm is ideal.

## **Good Agricultural Practices**

Horticulture industry in Kenya is guided by a code of practice (KS1758-2016 part II) which is standard for vegetable, fruits, herbs and spices for both local and export market. The standard aims at ensuring food safety, environmental sustainability and social accountability by following Good Agricultural practices from production, processing, transportation and marketing of fresh produce. Hence, coriander production process should comply with all the guidelines in the standard. Documentation and record keeping of all farm operations for easy traceability.

### **Soil analysis**

Soil testing is recommended before planting to guide on fertilizer and manure application.

### **Land Preparation**

Site should be flat and where crops of the same family have not been grown in the previous season. Cultivate to fine tilth. Raise planting beds 1 metre apart with spacing of 45cm between beds.

### **Propagation**

Use certified seeds at the rate of 5kgs per acre.

### **Sowing and spacing**

Drills are done in lines 30cm apart at a depth of 2.5cm, direct seeding is done. Avoid deep sowing of the seeds for better germination.

Germination is after 5 -10 days. For quick germination soak seeds in water for 6-12hrs before planting to ensure uniform germination. Thinning is done to avoid overcrowding and competition for nutrients.

### **Mulching**

Cover the entire bed with a net or thin mulch to improve the survival rate of seedlings as shade will prevent damage from heavy rains.

### **Weed management**

Weeds pose a significant problem at initial stages and therefore it is recommended to keep the crop weed free.

### **Fertilizer**

Fertilizer with NPK is ideal and should be applied every two weeks during active growth mixed with 1 ton of manure for proper root development and improve the soil structure.

## Irrigation



Ensure enough moisture in the soil. Over watering encourages disease development.





## Pests Management

Use of Integrated Crop Management (ICM) is a more recommended strategy for pest and disease control in Coriander. ICM strategy integrates use of biological (resistant/tolerant varieties, predators, and parasitoids), mechanical (mass trapping, screen house, hand picking and ploughing), and cultural (field sanitation, crop rotation, and solarization) practices.

Crop rotation replenishes soil nutritional status and prevents pest and disease build-up. It is recommended to rotate coriander crop with crops from different families.

## Major Coriander Pests

<b>Common Coriander Pests (Insects)</b>	<b>Symptoms</b>	<b>Control</b>
<p>1. Cutworms. <i>Agrotis</i> spp.</p>  <p>Cutworms</p> <p><a href="https://plantvillage-production-new.s3.amazonaws.com">https://plantvillage-production-new.s3.amazonaws.com</a></p>	<p>These are brown chewing pests which are often found in the soil near the plant root zone. They cut down young and tender stems, destroying the crop.</p>	<p>Remove all plant residues from soil after harvest or at least two weeks before planting.</p> <p>Hand-pick larvae/ adults after dark; spread diatomaceous earth around the base of the plants (this creates a sharp barrier that will cut the insects if they try and crawl over it).</p> <p>Apply imidacloprid products to infested areas of the garden or field if not growing organically.</p>
<p>2. Aphids. <i>Cavariella aegopodii</i></p>  <p><a href="https://plantvillage-production-new.s3.amazonaws.com">https://plantvillage-production-new.s3.amazonaws.com</a></p>	<p>They are found on the underside of leaves and stems. Infestation causes the leaves to turn yellow and become distorted. They also secrete honeydew as they feed which encourages the growth of sooty mould on the plant.</p>	<p>-Plants can be sprayed with a strong jet of water to knock aphids from leaves.</p> <p>Insecticides are generally only required to treat aphids if the infestation is very high. Plants generally tolerate low and medium level infestation; insecticidal soaps or oils such as neem or canola oil are usually the best method of control.</p>

<p>3. Root Knot Nematodes. <i>Meloidogyne spp.</i></p>  <p><a href="https://www.google.com/url?">https://www.google.com/url?</a></p>	<p>-Galls on roots which can be up to 3.3cm in diameter but are usually smaller -reduction in plant vigor; yellowing of plants which wilt in hot weather.</p>	<p>Solarizing soil can reduce nematode populations in the soil and levels of inoculums of many other pathogens.</p>
<p><b>Common Diseases.</b></p>		
<p>1. Powdery mildew: Caused by fungus <i>Erysiphe heraclei</i>.</p>  <p><a href="https://agritech.tnau.ac.in/crop_protection/coriander_diseases_2.html">https://agritech.tnau.ac.in/crop_protection/coriander_diseases_2.html</a></p>	<p>Infected plant show patches of white powdery fungal growth on leaves. Discoloring of leaves.</p> <p>Dropping of leaves if untreated.</p> <p>Fluffy white growth on the leaves, petioles and flower stalks.</p>	<p>Use sulphur foliar sprays.</p> <p>Use of organics, garlic and clove spray.</p> <p>Grow under sunny spot and avoid dampness.</p> <p>Use carbendazim products.</p>
<p>2. Bacterial Blight. Caused by bacterium <i>Pseudomonas syringe</i>.</p>  <p><a href="https://agritech.tnau.ac.in/crop_protection/coriander_diseases_1.html">https://agritech.tnau.ac.in/crop_protection/coriander_diseases_1.html</a></p>	<p>Black necrotic spots on plants with water-soaked margins.</p> <p>Infected seeds fail to germinate.</p> <p>Yellowing and browning of the leaves.</p>	<p>Use of certified seeds</p> <p>Avoid overhead irrigation</p> <p>Disinfect working tools</p> <p>Hot water seed treatment</p> <p>Rogue infected plants</p> <p>Mancozeb and copper sulphate</p>
<p>3. Damping Off: Caused by fungus <i>Pythium Spp.</i></p>  <p><a href="https://s3-us-west-1.amazonaws.com/">https://s3-us-west-1.amazonaws.com/</a></p>	<p>Roots rot and plant dies</p> <p>Seeds become rotten and fail to germinate.</p> <p>Water-soaked red spots on the stems of newly emerging seeds.</p>	<p>Avoid over watering and overcrowding of plants.</p> <p>Allow good drainage and air exchange between plants.</p> <p>Use of certified seeds for planting.</p> <p>Use of fludioxonil.</p>

## **Maturity:**

Coriander plants are ready to be harvested after about 25-35 days. However, different varieties have varied maturity days. After (4 -6) weeks depending on the variety observe tender leaves and shoot as key maturity indices. All parts of coriander are edible but the fresh leaves and the dried seeds are the most preferred. The shiny green-coloured leaves are plucked, or the entire plant pulled, unless one wants to harvest the seeds. Leaves begin turning feathery and yellow-coloured flowers develop. This is followed by formation of seeds, which are harvested a week later.

## **Harvesting**

Harvesting is by uprooting of the entire plant at maturity. Some varieties are cut back and left to rejuvenate for the next harvesting. For seed, harvest, when the capsule is mature. Done by cutting the heads when the leaves turn brown.



Source: Victor Omari HCD 2023. Fresh harvested coriander crop.

**Post-harvest activities:** To maintain freshness harvest in the morning and late evening. Sorting and grading are done to remove the weeds and foreign matter. Wash and tie in bunches ready for market.

## **Transport**

Packing and transportation of coriander should be done to maintain quality as per the Crops (Horticultural crops) regulations 2020.

## **Storage**

Freshly harvested leaves can be stored for a few days by placing them in a jar of water or refrigerated. For seed production, allow the plant to bolt and grow seed. Snip off the stems from seed heads, hang stems upside down in a paper bag in a cool dry place. When the seeds are ripe, they fall into the bag.

**Yield** – Expected yield 2 - 2.5 tons / acre.

## GROSS MARGIN ANALYSIS FOR CORIANDER PER ACRE 2023.

1 acre with expected yield of 8-10t	UNIT	PRICE	QUANTITY	TOTAL
Seeds	Kgs	200	10	2000
Fertilizer				
DAP	Bag	6,000	1	6,000
CAN	Bag	4,000	1	4,000
Pesticides				
Fungicides	Kgs	1500	1	1,500
Insecticides	Litres	2000	1	2,000
Land preparation				
	1 <sup>st</sup> ploughing	3000	1	3,000
	Harrowing	2500	1	2,500
Weeding	Man hours	500	3 x5	7,500
Harvesting	Man hours	500	6x5	15,000
Transportation	Trips	1000	6	6,000
Drying	Man hours	500	7	3,500*
<b>Total Variable Costs</b>				<b>49,000</b>

Total yield: 3-4 tons/acre (Fresh coriander leaves).

: 1.5 - 2.0 tons/acre (Dried coriander seeds)

Total sales: 3000 Kgs x 80/=.....Kshs. 240,000(Fresh leaves)

: 1,500 Kgs x 150/=.....Kshs. 225,000(Dried seeds)

**Net returns:** 240,000/= - 49,000= .....Kshs. 191,000(Fresh leaves)

: 225,000/= - 52,500=.....Kshs. 172,500(Dried leaves)

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