



**ENVIRONMENTAL GUIDELINES**  
for agricultural raw  
materials in Colombina S.A.

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Aiming to integrate the various links of the supply, production and distribution chains, the Colombina S.A. Group has been working on the development of Good Agricultural Practices (with clean crop management) that contribute to mitigate or to off-set environmental impacts related to agricultural production derived both from our own operations and from third party operations. For this purpose, we have done significant work over the past five (5) years with the farmers of the region who grow one of Colombina's most important raw materials.

Hot pepper farming has become very important for Colombia and Valle del Cauca given the size of its domestic and international markets.

# INTRODUCTION

There are markets for the different hot pepper products (pulp, preserves, dehydrated (dried) or bottled hot peppers). Colombina exports 95% of the production of Hot Peppers from its Preserves Plant located in the city of Tulúa, Valle del Cauca to more than 28 countries. The remaining 5% is sold inside Colombia.

Given the growing demand of this type of food product, Colombina provides direct support to the farmers of the region in several areas aiming to strengthen them. These agricultural guidelines have been prepared for that purpose. Their objective is to provide farmers with technical knowledge, good agricultural practices management, and motivate them in their commitment to protect resources such as water, soil, and biodiversity; In general, to promote sustainability which must be adopted by every member of the productive chains.





**Global food company** that wants to attract consumers through innovation and the taste of its products.



Supported by a strong umbrella brand, well known brands with high perceived value, **commercialized efficiently to be affordable to all.**



**Committed** with a sustainability scheme that involves all of its stakeholders.

# SUSTAINABILITY IN COLOMBINA

# OVERVIEW

## Origin

The Capsicum genus includes approx. 25 species and originated in the tropical and subtropical area of America, in the area of Bolivia and Perú.

The species include: Capsicum Annum, Capsicum Pubences, Capsicum Pendulum, Capasicum Frutescens, and Capsicum Chinense. At least five of its species are grown to a greater or lower extent, however, worldwide, almost all of the production of hot pepper comes from one single species, Capsicum Annum, which has become the main specie or seasoning for typical foods in many countries. This specie leads to certain confusion because two different products for the consumer originate in it: Hot peppers and Bell Peppers.



## Botanical Description

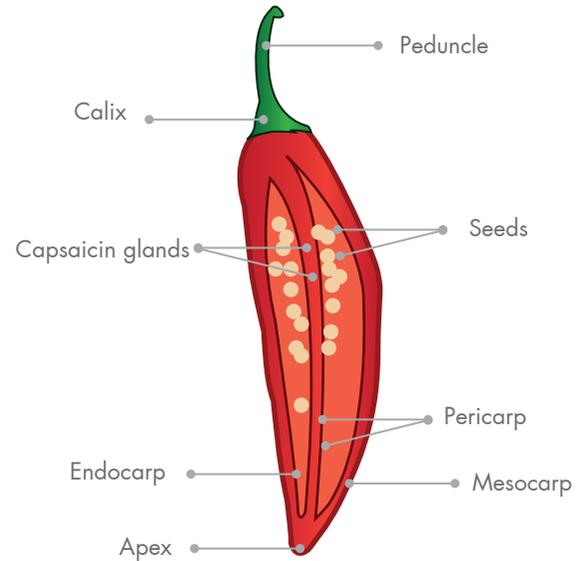
- ✔ Hot peppers are herbaceous plants that might become woody under proper conditions.
- ✔ It has a highly developed pivoting root system that produces numerous adventitious roots. The erect stem having a limited growth becomes woody at the end of the cycle.
- ✔ The leaves have a long petiole and are entire and smooth (hairless), the flowers self-pollinate and appear isolated in the leaf axils. The fruit is a berry, the size and shape and color of which varies depending on the variety and the harvesting time.

## Nutritious Value

Hot peppers have a great genetic variability which allows using them in many ways. It is consumed raw, in salads, as a spice or as an ointment, or as a patch for muscular pains. Some varieties have high carotene contents and are used as colorants.



Amount of water	93%
Carbohydrates (g.)	5.40 g.
Protein (g)	1.35 g.
Calcium (mg.)	5.40 mg.
Phosphorus (mg.)	21.6 mg.
Iron (mg.)	1.20 mg.
Potassium (mg.)	194 mg.
Sodium (mg.)	10.80 mg.
Vitamin A (mg.)	526 mg.
Thiamin (mg.)	0.08 mg.
Riboflavin (mg.)	0.05 mg.
Niacin (mg.)	0.54 mg.
Ascorbic acid (mg)	128 mg
Energy value (mg.)	127 calories



## Types of Hot Peppers

### Very hot hot peppers

The measurement of pungency or spiciness is between 80,000-1,000,000 Scoville units.

#### JOLOKIA, HABANERO

The fruits ripen from green to red in a period of 90-100 days after transplantation.

It is generally used for Paste, Sauces or Dehydrated.

### Hot hot peppers

The measurement of pungency or spiciness is between 5,000-50,000 Scoville units.

TABASCO: between 60,000 and 100.00 units

The fruits ripen from green to red in a period from 80-90 days after transplantation.

Generally used for Paste and Sauces.



### Medium hot hot peppers

Between 3,000 and 6000 Scoville units.

### JALAPEÑO AND CAYENNE

The plants produce fruits with a very uniform shape and length; they ripen from green to red, have medium walls and a rounded tip. This variety is perfect for industrial processes and for the fresh produce market.

# HOT PEPPER CROPS

## Planning

**1** The first step for any hot pepper farmer is to ensure the market for his crop, therefore enter into a sales-purchase agreement with the buyer.

**2** Choose the variety according to the climate, soil, elevation above sea level, market needs and the quota allocated.



3

Choose the most adequate plot considering its fertility, water availability, good road accessibility , and the area available.

4

Determine when to sow so that the harvest coincides with the delivery dates agreed on the purchase-sale agreement.

If you are small hill side farmer, form associations and program the planting together.



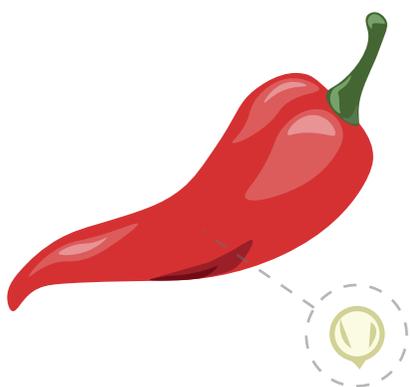
5

Verify the list of inputs required and the possibility of procuring them in the area.



## Seed Selection

If you buy the seed, make sure it is certified. In this way you will guarantee its genetic and sanitary quality.



The seeds can be obtained at the farm itself or from other farmers. These seeds must come from healthy plants and fruits that correspond to the variety selected.

## Plant in a Nursery or in a Greenhouse:

There are nurseries or greenhouses that plant them and deliver them ready for transplanting at 30 days.



# Land Preparation

## Climate Requirements

The average daily temperature needed by the plant ranges from 18°C to 29°C. If the temperature is below 15°C, growth will be poor.

## Soils

The crop adapts to different types of soils, but the most adequate are deep soils, with a depth of between 30 and 40 cm and if possible loamy, well drained, with high organic material and calcium contents.

Hot peppers grow well in soils that have a pH between 5.8 and 7.0. Lime must be added to soils having a pH below 5.5 to correct them.

# Land Preparation

## To plant in flat soil:

Pass the chisel plough twice in a cross-wise manner.

Pass the disc harrow once or twice to break down the soil.



With the rotavator finish soil preparation and levelling.

Build the cambered beds (raised beds) at the distances recommended, a way to do this is:

1.5 m between furrows, with a height of 40-50 cm

\*Use planting densities of between 16,000 – 40,000 plants per ha. (1-1.15 pounds of seed depending on the variety to plant)-

A recommendation is to have deep soil in the land where the transplanting is going to be done to prevent problems with the normal development of roots. Soil must be ripped , harrowed and ploughed while the plants are in the seedbed.

## Planting System

For Cayenne and Jalapeño Hot Peppers:

Single furrow:

1.20 m between furrow

20 cm between plants

For Habanero, Tabasco and Jolokia Hot Peppers:

1.50 m between furrows

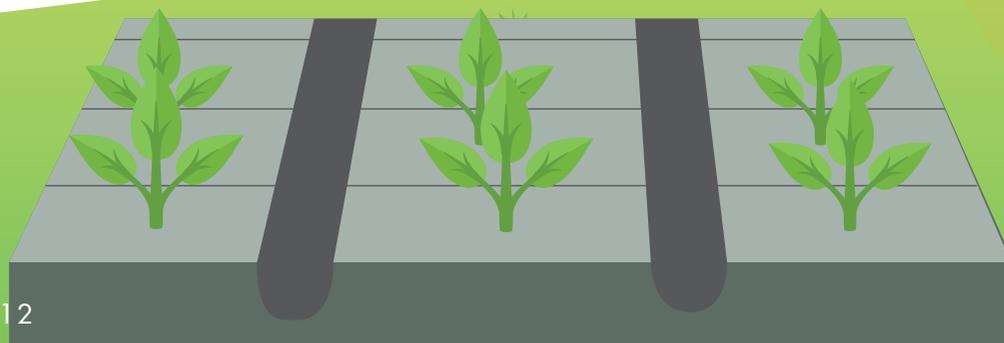
50 cm between plants

Double furrows

1.20 m between furrows

20 cm between plants

In a triangular manner (pategallina)



# Transplanting

- ✔️ Moisten well the trays with the seedlings in a solution or preventive vaccine and irrigate the plot or the soil where the transplantation is going to take place or where the seedlings are going to be planted.
- ✔️ Open the holes in the plastic and in the soil at the distances agreed beforehand.
- ✔️ Place a seedling in each hole and press softly.
- ✔️ Lastly, irrigate immediately.



## Harvest

Harvest very healthy fruits, free of disease or mechanical damage, malformations or with other defect that might impair the quality of the product.

Collect the fruit harvested in plastic baskets, trying to keep them away from direct sunlight.



Since hot peppers are a very perishable product, it must be sent for processing on the same day it is harvested.



Determine the sowing time in such a way that the harvest coincides with the delivery dates agreed upon in the purchase-sale agreement.

## Post Harvest

**1** The harvested fruits are delivered to the processing plant to verify its weight and quality.

**3** For milling, you calculate the % of salt or acetic acid that will go into the paste depending on the requirements of the buyer.

**2** Fruits are first pre-washed and then they are crushed or pickled.

4 The salt is added as it is milled, and the processed product is stored in silos, bins or plastic containers in a fresh and well-ventilated place. It must be checked regularly to detect changes in its organoleptic qualities.

5 Lastly, the packaged product is shipped.

## PROTECTING THE ENVIRONMENT

### Reducing water consumed in agricultural production

When cultivating hot peppers, optimizing the use of water is essential, using drip irrigation systems because an excess of water causes fungal diseases in the roots or in the leaves, while a water deficiency limits productivity.

#### Drip Irrigation

Allows considerable water savings, because of the reduction in evapotranspiration and of water losses in the lines during irrigation, and also because of high irrigation uniformity.



## Recommendations for Water Optimization.

1. Have the legal permits or water concessions for the use of water.
2. Do not use waste water, domestic or industrial.
3. Use the water needed according to the crop requirements.
4. Use low water consumption irrigation systems (for example drip irrigation)
5. Make proper management of the water used in the crops.
6. Avoid contaminating the rivers, creeks or water springs.



## Protecting Soil Fertility

Fertilization contributes to better plant growth, it helps to prevent exhaustion of soil nutrient reserves, and produces better profits due to the high harvest yield.

The function of soil conservation practices to control runoffs is not only to check the speed of the water running off the surface of the soil, its effect is also linked to the improvement of infiltration by increasing soil moisture.

For this it is important to consider the following systems that prevent erosion and soil wash off.

- Trace the mother line
- Trace the contour lines
- Using stone barriers
- Using terraces
- Using living barriers
- Ditch locks TRINCHOS
- Infiltration ditches

#### Recommendations to Protect Soil Fertility

1. Make drains and ditches.
2. Rotate the crops.
3. Minimal tillage.
4. Living barriers.
5. Prevent erosion and soil compacting.
6. Incorporate harvest residues and organic matter into the soil.
7. Harvest residues must not be eliminated by burning.

## Protecting Biodiversity

Biodiversity is the basis of agriculture. Its conservation is essential for the production of food and of other agricultural products, and for the benefits they provide to humanity, including food security, nourishment and sustenance.



Recommendations to protect biodiversity.

- Control of pests and diseases
- Preserving the nutrient cycle, such as decomposition of organic matter and the accumulation of biomass.
- Control of organic matter in the soil and retention of water in the soil.
- Conserving soil fertility and biota.
- Crop rotation
- Reducing the use of agrochemical applications.
- Pollination by bees and other animals.
- Protection of native flora and fauna.
- Isolation and protection of water sources with plant materials.

## Restricted use of pesticides (Pests and Diseases)

Strict management of agrochemicals must be exercised to control pests, diseases and weeds, respecting the doses recommended, the lag periods, using products allowed by the FDA and the European Union. They must be combined with biological and organic products, aiming for clean crop management.

Recommendations to protect Biodiversity.

- Plant health must be managed throughout the crop cycle and the plot must be kept free of weeds.
- Cover the crop furrows with plastic to reduce the application of herbicides and protect the life of soil microorganisms.
- Use microorganisms, fungi and beneficial insects (bacillus sp., Trichoderma).
- Use plant extracts and trappers.
- Conservation of soil organisms such as mycorrhizas.
- Do not use any chemical product container to repack food.

## Restricted Use of Pesticides (Pests and Disease)

Solid waste is defined as the surplus or the leftovers of human, industrial or agricultural processes.

Agriculture generates significant amounts of by-products or residues that are hard to degrade in the environment, derived from the use and maintenance of agricultural exploitations. Among them the following stand out:

- Plastic residues.
- Plant residues.
- Pesticide container residues.
- Other: (wire, wood, cord).

The issue originates in the uncontrolled discharge of waste and surpluses generated in the rural areas, as well as their elimination by burning, generating problems such as:

- Ecological imbalance
- Important source of infection for crops
- Uncontrolled pesticide container residues.
- Contamination of water sources, soil, flora and fauna.

## Clean Management (Solid Waste)

Recommendations to protect Biodiversity.

- Separate plastic containers, glass, bags containing hazardous substances.
- The pesticide storage area must be separate from the area where fertilizers and bio inputs are kept. The residues generated by those products must be stored and disposed of as hazardous waste. We recommend you contact the environmental authorities (secretariats) or the UMATA (Municipal Unit for Agriculture and Livestock Assistance).
- Dispose of solid waste in plastic containers with a lid; additionally, they must be protected from water and sunlight.
- Do not burn residues in the premises.

## Clean Management (Solid Waste)

Recommendations to protect soil fertility.

- Manage harvest residues adequately, guaranteeing their disinfection to prevent the proliferation of pests and diseases.
- Do not discharge solid or liquid waste into water sources.
- Properly separate, store and dispose of the ordinary waste generated in the houses at the premises.
- Do not use food leftovers from the kitchen or restaurants to feed animals grown for food of species weighting less than 250 kgs. such as pigs, chickens, rabbits or goats.
- Recover waste by reusing and recycling them to reduce their generation and to exploit waste adequately.



# GOOD AGRICULTURAL PRACTICES

Good Agricultural Practices is the name given to a series of activities and practices used in the production of fruits, vegetables and other crops, aimed to ensure the quality of the product delivered to the consumers. GAP are associated to sustainable development and for agricultural production to be friendly with the environment.

In addition, their objective is to improve agricultural production methods by emphasizing product safety, and by having the lowest possible impact from production practices on the environment and health of the workers. (In Colombia Resolution 474-2009).



# Principles of Good Agricultural Practices

1 Increase consumers trust in the product's quality and safety.

2 Reduce the environmental impact on water sources.

3 Rationalize the use and application of (phytosanitary products).

4 Rationalize the use of natural resources (soil and water).

5 Assume a responsible attitude in relation to worker's health and security.



# Advantages of having Good Agricultural Practices

## WITH GAP

- ✔ Suitable products having an excellent quality for people to have a proper diet.
- ✔ Personnel enjoy good health
- ✔ Children are interested in studying
- ✔ Products that stand out in the market, and market sustainability.

## WITHOUT GAP

- ✘ Products that spoil faster, in a more conspicuous manner, and which might affect your health.
- ✘ Personnel might acquire virus.
- ✘ Children have no interest in studying or have student aspirations.
- ✘ Non-profitable products; their quality is insufficient for the market.



# Technical elements and recommendations from the GAP Protocol



## Recommendations For Good Agricultural Practices

- Every farm must have a sustainability and environmental approach,
- Have basic sanitation,
- Integrated pest, disease and fertilizer Crop management.
- Consumer Health and Protection.
- Safe and responsible application of pesticides.
- Food safety by controlling chemical, physical and biological hazards.
- Have storage areas for agricultural inputs (herbicides, insecticides, fungicides, etc.) separate from the housing areas, and from the food and packaging materials areas.

## TRAINING

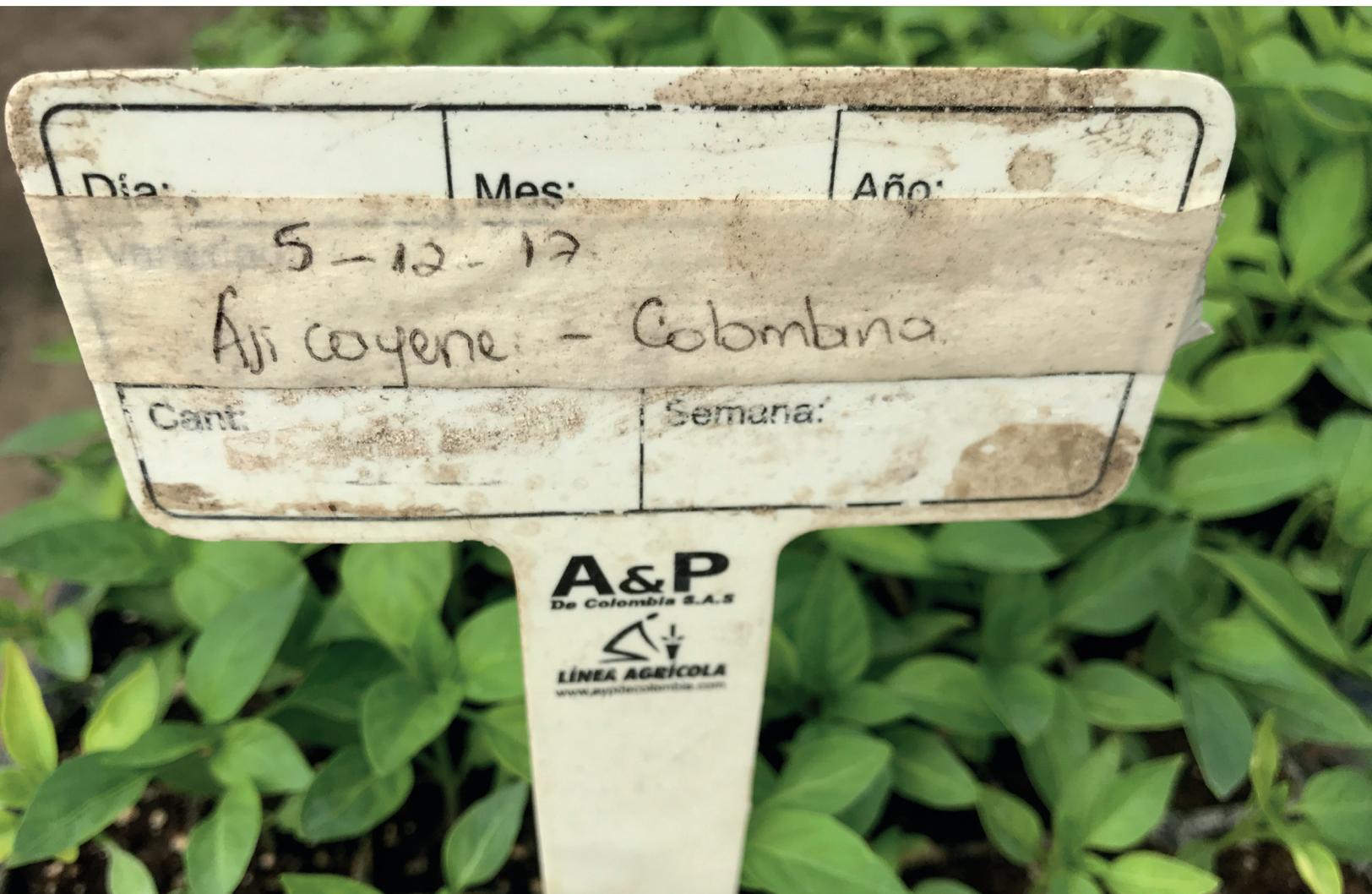
Each farmer must be trained by suitable and competent personnel from (ICA (Colombian Agricultural Institute), from the UMATAs (Municipal Unit for Agriculture and Livestock Assistance), from the SUPPLIERS OF CHEMICAL PRODUCTS). The most important subjects to address are:

- Handling and use of Biosafety elements (waterproof suit, goggles, gloves, anti-gas masks, and boots).
- Health care and accident prevention for people applying chemical substances.
- Hygienic handling of food and personnel must use good hygienic practices.
- Medical tests for health care (i.e. Cholinesterase) .
- Calibration and maintenance of the equipment used for agricultural product application.
- Reading and interpreting agricultural product labels.
- Dosage of fertilizers and pesticides.
- Consumer Health wellbeing .
- Emergency management plan.
- Economics, family wellbeing, social wellbeing, the environment and sustainability.

Traceability is the ability to follow the movement of food (Product) through one or several specific production, processing and distribution stages (For Colombia: NTC-5400).

Traceability system that allows to perform a follow up of the product to the farm where it was grown.

- **Field identification** system (plots and/or lots).
- **Activity Log.**
- Identification of harvested plots.
- System to **identify equipment.**



## Type of records:

- Field activities
- Harvest activities
- Packaging activities
- Input control
- Monitoring

## Efficient Traceability

### Fertilization and Fumigation Program.

- Type of equipment used
- Number of application equipment
- Trade and technical name of the product
- Amount and volume of the product applied.

## Field Activity logs

- Every activity carried out in a production lot.

Soil preparation

Cultural practices

Agrochemical applications

- Be able to make a physical positioning

Of these tasks to the production site where they took place.

Pests, Disease or Weed it controls.

- Days to harvest.
- Time to reenter the area.
- Name of people doing the application.
- Signature of the farm supervisor.



# Accepted



## QUALITY DEFECTS



Turning color with Excess maturity



**NO**



With peduncles



**NO**



Too green



**NO**



With foreign matter



**NO**



Stained



**NO**



Black or Rusty



**NO**



Stunted (dwarf)



**NO**

Manual Técnico y de Proceso del Cultivo del Ají. Adriana Tafur Uribe y otros. Santiago de Cali – Noviembre del 2004.

Buenas Prácticas Agrícolas. Fundación Social y Ambiental del Pacífico. Minagricultura. Primera Edición año 2015.

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