



## **MAIZE PRODUCTION, Grower's Guide**

### **1.1 INTRODUCTION**

There are varied agro-ecological zones in Kenya, in which different hybrids are grown. We have maize hybrids bred to suit the prevailing climatic conditions. It is therefore paramount that farmers get correct information on which hybrid(s) is suited for their region.

### **1.2 GROWING CONDITIONS**

It is critical to have a good understanding of:

#### **a) Environment**

This includes:

- history of the farm – previous cropping pattern, fallow, virgin land etc.
- agro-ecological zone (altitude)
- rainfall (pattern & amount) - planting season
- ambient temperatures
- soil characteristics - soil temperatures, soil pH, fertility & nutrition, moisture levels etc
- weeds, insect and disease prevalence

#### **b) Seed Maize attributes**

This gives you an insight into the features of the seed you intend to plant. For instance, are you looking for high yields? Are you looking for lodging resistance? Are you looking for disease and pests tolerance? The answers (attributes) to such questions will assist a farmer decide on which hybrid to plant.

#### **Land preparation**

It involves land clearing, where non-selective herbicides are used, followed by one harrowing. This is referred to as minimum tillage. In the absence of use of herbicide, farmers plough twice with the second being done just before onset of rains followed by harrowing (where the initial plough was done very early). The second option is usually expensive and laborious.

Timely land preparation is encouraged. Lateness leads to a sizeable loss of yields due to diseases, pests and inadequate moisture at critical crop stages. Ensure land is well prepared and weeds controlled.

#### **Primary purpose of land preparation**

- Create soil structure that is favorable for crop growth
- Incorporate residues
- Control weed and diseases

#### **Weed control**

##### **Non-selective herbicide**



- **Glyphosate:** minimum tillage

#### Selective herbicides

- Pre-emergence/ early post emergence chemical application. Identify suitable herbicides.
- Post emergence with activity on broad-leaf weeds e.g. **2,4-D amine**

#### Manual weeding

This is a cumbersome activity, time consuming and expensive than where agrochemicals are used to control weeds.

With chemical, one needs to only weeds once. Where manual weeding is practiced, one needs to weed twice i.e. 1 month after germination (depending on weed pressure) and at knee-high in preparation to top dress.

#### **Planting (Spacing & Sowing)**

A good planting method is one that allows seed to be placed at the correct depth and provides good contact between seed and the soil.

##### Factors to note:

- Land preparation may or may not be cultivated properly so that clods or crusts prevent planting at a uniform depth and even germination
- Preparation is too long or patchy so that weeds have an advantage over the crop
- Seeds are placed at the wrong depth

The correct depth is deep enough to allow seed to take up water, to protect it from desiccation or birds and to prevent germinating with light rains, but shallow enough to allow the seedling to reach the surface before depleting its food reserves.

Planting depth of 2.5 - 5.0 cm should be uniform throughout the field. However it is recommended that a planting depth of about 5.0cm be used when dry planting to avoid germination due to false rains.

Spacing is important as it determines plant population hence the final desired yields. Appropriate row spacing makes more efficient use of light leading to faster canopy establishment, thus reducing soil moisture evaporation and weed growth.

Highland market, Medium altitude wet and medium altitude moist, the recommended spacing is 75 x 25 cm (50,000 plants per Hectare) one seed per hole. Under good agronomic practices, particular hybrids can be planted at 75cm x 22cm (60,000 plants per Hectare) in the highland and medium wet regions.

#### **Notes:**

- Dry planting is recommended for mechanized planting since in wet conditions the chances of the plates and other relay parts clogging due to mud are high.



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- Plant spacing precision is well achieved with mechanized planting. You will be able to get the desired plant population. Even in mechanized planting, pneumatic planters have the best precision than plate.
- Particular seed companies have classified seeds into Round or Flat with various sub-classes of Small, Medium and Large so that they easily fit your preferred planter plate.
- The ministry of agriculture has taken the initiative of calibrating planters so that farmers can achieve desired plant populations.
- Use 20,000 kernels or 8 to 10 Kg of quality hybrid seed maize per Acre. Kernel packaging is preferred since the farmer can easily calculate number of packs required per given unit.
  - Seed purity (devoid of broken seeds and inert material) is paramount. Where seeds are packed by weight and purity compromised, then the impurities tend to add weight thus reducing the number of seeds in a pack.
- 1 Ha  $\equiv$  2.47 Acres
- Side-band placement is the best practice for fertilizer placement. Same as that realized in mechanized planting.

### **Fertilizer Recommended Rates of Application**

Application of fertiliser when planting and top dressing (between V6 & V8) at required rates is important.

#### Fertilizers applied at planting (Basal fertilizers)

- Mono-ammonium phosphate (MAP) 12-50-0, di-ammonium phosphate (DAP) 18:46:0, Compound fertilizers, (NPK) 20:20:0, 17:17:17
- Single super phosphate (SSP) 0:20:0 and triple super phosphate (TSP) 0:46:0

#### Highland markets of Rift valley and western Kenya

A rate of 75Kg of DAP & CAN is recommended at planting and topdressing respectively. Place 5 grams per hole. You can use a bottle-top equivalent per hole.

### **It is recommended that farmers carry out Soil analysis which will provide the best guidance on the types and rates of fertilizers that will be most effective**

Soil fertility and nutrient status can be tested in various soil testing laboratories throughout the country.

#### **NB:**

- The above fertilizer recommendations are general guidelines, for appropriate, fertilizer types, application rates, and times consult the local extension personnel from the Ministry of Agriculture.
- Application fertilizers should be done judiciously. Too much fertilizer especially MAP, DAP, Urea and ASN can lead to increase in soil acidity.



Use of foliar fertiliser is also recommended.

### **Weed Control**

Competition is critical between V3 and V8 stages of maize crop. Weed competition in maize depends on these factors:

- The crop growth stage
- The amounts of weeds present
- The degree of water and nutrient stress
- Weed species

High weed competition is as a result of:

- Poor manual weed control.
- Weeding too late
- Ineffective herbicide application.
- Planting delayed after land preparation
- If the land has been used for continuous maize cropping for many years, the load weed seeds may be very high.

### **Pests & Disease control**

Stalk borers are the most common pests. Insecticide applied 3 weeks after plant emergence can control stalk borers. For effective stalk borer control, spray the crop with *Dimethoate* at the rate of 20ml per 20 Litre.

Diseases such as MSV (maize streak virus) are spread by vectors especially aphids. Hence, the most effective control strategy would be to control the aphids with *Danadim 40EC* at 30-40mls in 20lt of water.

For armyworm infestation, use 20-40ml of *Jawabu48EC* per 20L knapsack sprayer.

There are hybrids bred to avoid drought, resist and/ or tolerate diseases and insect attacks.

**NB:** Diseases can cause up to a yield loss of 80%.

### **pH**

The maize crop generally grows well over a pH range of 5.5 – 7.8. The effect of pH outside this range is usually to make certain elements less available, so that toxicity or deficiencies develops. Avoid use of excess fertilizer especially those mentioned above.

## **1.3 HARVESTING**

### **Maturity & Harvesting**

It is from the attributes of your seed suitable for a given agro-ecological zone that you will be able to determine the maturity period. More often maize seed companies usual



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provide literature that details suitability of a seed to its agro-ecological environment to farmers and distributors.

There are hybrids seeds in the market meant for high altitude (over height of 1800 Metres above sea level), medium altitude (1000 – 1700M) and low altitude (less than 1000M).

Indicators of maturity such as the black layer at kernel base or the use of a moisture meter should be used to determine physiological. Monitor drying to avoid weevil infestation. Grain should be dried to 13-15% moisture content, dusted with insecticides and stored.

Particular hybrids have the stay-green characteristic hence can be used as animal feed.

Storage structures and containers/bags must also be treated with insecticides before storing maize grains.

Yields of more than 50 bags/ acre or more have been realised with some hybrids. On average farmers get 15 bags/ acre. This depends on locality and management the crop was accorded.