MAJOR VEGETABLE CROP VARIETIES AND THEIR

PRODUCTION PRACTICES

Vegetable IPM Project (EARO/ICIPE)

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ICIPE

EARO
**Introduction**

The diverse climatic, soil and water conditions in the region favour the production of arrays of indigenous and exotic vegetable crops. Vegetable production is becoming a popular farming business in the region. It is produced in home gardeners and commercially under irrigated and rain fed conditions both for local use, processing and export market. They are cheap source of family nutrition, (vitamin and minerals). They are also good source of income for small farmers for their high market values or profitable compared to cereal crops. They give high yield per unit area, and they can easily be produced under different growing conditions in the region. For its various economic benefits, the production is increasing at a higher rate both in the farmer’s field and horticultural enterprises.

The Rift Valley region is climatically and physically fit for production of economically important vegetables: tomatoes (fresh and processing) onion, cabbages and *Capsicum* (Hot pepper). Provided that proper management high marketable yield and quality fruit is obtained in average growing temperature of 20-27/12-16°C day and night, respectively. Cabbage however is adapted well in the cooler season in the region. The crops perform well on well-drained sandy loam soil with pH of 6.5-7.5. The training focused on tomatoes, onion and cabbages, which are widely grown and important cash crops in the project area.

**Recently released cultivars**

It is important to produce cultivars that are known to be well adapted in the region and have high demand in the market as a fresh or processed products and that also premium a good prices.

**Tomatoes (*Lycopersicon esculentum* L)**

There are tall and short sets cultivators that differs in vegetative growth and fruit characteristic (round, globular, pear etc). Currently, cultivators with pear or cylindrical shaped and thick-skinned are becoming important for their storability and ease of transportation under local conditions.
High quality seed could easily be produced in the region provided that proper care is taken in fruit selection, fermentation and drying conditions (Refer. to seed production guide for tomatoes, *Capsicum* and onion).

**Melkashola:** Intermediate plant size, high fruit coverage, high fruit set, cylindrical fruit shape, medium fruit size (60-70g), resistant to cracking, thick skinned, tolerant to mechanical damages and easy for bulk storage and transportation. It has a yield potential of 180 - 270 q/ha under demonstration plots with farmers practices.

**Melkasalsa:** Pear shaped fruits, smaller in size (40-50g) than Melkashola. High yielder and most favoured for processing than the above cultivar.

There also round shaped cultivars which have long been produced in the country, but most of the currently produced ones are susceptible to complex diseases. It is high yielder of 200-250 q/ha in demonstration plots under farmer's practices in the Rift Valley.

Figure: 1 Recently released tomato cultivars

**Onion (*Allium cepa* L)**

Different onion cultivators of red, brown, white and yellow types are produced for local and export markets. The red ones are currently the most preferred ones. The recently released cultivars develop flower stalk and produce good quality seed in the region.
fall over and then cured In the soil till leaves dry off this is important either for immediate market or for bulk storage. As of cabbages ones the head is well-developed external leaves and is ready for sale Proper harvesting, grading, packaging, transporting and storage facilities contribute to high return per unit area.

Care in vegetable production

Get appropriate and high quality seed cultivar (90% germination), including (chemicals, fertilisers) and necessary implements. Know the production and handling requirement of each crop. There is a need for dependable water sources. Visit the field once in a day and take appropriate measure. Plan proper marketing/distribution channel in collaboration with development agents. Regular consultation with experts essential on latest recommended technologies
Irrigation

Vegetable crops have high water demand for good yield and quality produces. They are largely composed of water. The amount of water to be applied depends on the growth stage of the crop, soil and climatic conditions. However, there are critical growth stages for water application, for example flowering and fruiting in tomatoes, bulb formation and bulb enlargement in onion and heading stages in cabbages. Frequent application for the first one-month i.e. every 3-5 days to develop healthy and vigour seedling less frequent and heavy water should be scheduled in the rest of the growing period i.e. 6-8 days. Frequent application is common practices in the regions where tomato is produced in sandy loam soil in the dry season. Uneven moisture affects marketable yield and quality of produces.

Staking

Plant support (staking) is an important production practice used for tomato. It has the advantage of protecting the fruit from soil contact, ease of fruit harness, early yield and less fruit damage by wind and facilitates chemical spray against diseases and insect pest control measures. Individual or all plant could be stalked with horizontal support depending on availability of materials.

Harvesting

The stage of harvest depends on maturity and market prospects. Tomatoes could be harvested at turning stages so that fruit could be stored for long period in groceries and for ease of transportation. Tomatoes harvested 4-7 times after 75 days of transplanting whereas, onion and cabbages are harvested after 120-140 and 150-180 days transplanting respectively. Onion is mainly harvested when 50% of the leaves
Seedbed must be prepared in a convenient location for watering. Smooth seedbeds of about 1-m width by 5-m length will be prepared. Required amount of seeds will be properly sown. Care must be given on seedbed mulching, watering, thinning, fertilisation diseases and insect pest control inorder to get good seedling. Regular visits and care must be taken to produce health and vigourous seedling, which subsequently contribute to good stand and high marketable yield. Tomato is transplanted at 2-3 leaf stages or 28-30 days after seeding, and onion 40-45 days after transplanting where as head cabbage is transplanted at 13-15 leaf stages or at 30-40 days after seeding.

**Figure 3. Seedbed preparation**

**Field planting**
Good land preparation (ploughing, disking and harrowing) and cultivation are important for good yield and quality produce. Early and timely ploughing is needed to expose the soil to solar treatment that are useful for reducing soil borne diseases and insect pest incidences.

**Figure 4. Field transplanting technique**
Adama Red:
Dark red in colour, highly pungent, flat shape, bulb size of 65-80 g. It has susceptible to purple blotch disease and onion thrips, insect pest. Yield potential of in demonstration plots under farmer's condition was 200-235 q/ha.

Melkam: Light red in colour, high yielder than Adama Red bulb size of 85-100 g. It is also susceptible to the common onion diseases. However, yield potential in demonstration plots was about 224-270 q/ha which is higher than Adama Red.

![Melkam and Adama Red onions](image)

**Figure 2: Released onion cultivars**

Head cabbage (*Brassica* spp)
Leafy and head cabbages are commonly produced in the region. The head type has good market demand it is also preferred for its ease of management and ease of transportation for distance market. The two cultivators: Copenhagen Market which is round and hard headed, dark green leaves, Prize Drum Head which is flat and a loose headed are well adapted and produced in the region.

Production practices
Seedbed management
Seed must be collected from reliable sources and must have typical character of the variety produced. About 0.35 kg, 4.0 kg and 0.70 kg per hectare are required for tomato, onion and cabbages, respectively.
The growing field should be well prepared, free from clods to fine seed bed and ridged at recommended spacing. Spacing varies to the structure, and vegetative development of the variety. At transplanting, vigorous and healthy seedlings are selected and carefully pulled from the seedbed and transplanted to the field. Soil has to be pressed around the plant and watering followed immediately. This will prevent air pockets near the root and protect the plant from drying out.

<table>
<thead>
<tr>
<th>Cultivars</th>
<th>Seeding rate (kg/ha)</th>
<th>Spacing (cms)*</th>
<th>Growing period (days)</th>
<th>Potential yield q/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomato</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melkashola</td>
<td>0.35</td>
<td>100 x 30</td>
<td>80-100</td>
<td>450</td>
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<tr>
<td>Melkasala</td>
<td>0.35</td>
<td>100 x 30</td>
<td>80-100</td>
<td>400</td>
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<tr>
<td>Onion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adama Red</td>
<td>4.0</td>
<td>40x20x10**</td>
<td>120-130</td>
<td>300</td>
</tr>
<tr>
<td>Melkam</td>
<td>4.0</td>
<td>40x20x10</td>
<td>130-140</td>
<td>350</td>
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<tr>
<td>Head Cabbages</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Copenhagen</td>
<td>0.70</td>
<td>50x30</td>
<td>150-175</td>
<td>250</td>
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<tr>
<td>Market</td>
<td></td>
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<tr>
<td>Drum head</td>
<td>0.70</td>
<td>50x30</td>
<td>150-17</td>
<td>240</td>
</tr>
</tbody>
</table>

* = Spacing between rows and between plants, respectively. ** 40 cms, between row including the furrow, 20 cms between rows on the bed and 10 cms between plants.
Fertilisers

Chemical fertilisers, organic manure or compost provides nutrient for producing healthy and vigorous plants. Vegetables are high nutrient consumers. The type and amount of fertiliser to be applied can be determined by soil/plant tissue analysis. Farmers could prepare compost or get well-decomposed manure, which contribute to increased soil nutrient and water holding capacity of the soil and subsequently increased yield. In absence of soil analysis, blank fertiliser of about 500 g Urea and 100 g DAP is applied on seedbed size of 5m². Under field conditions about 150 kg/ha DAP (18/46, Nitrogen and Phosphorus) at planting and 100 kg/ha Urea (46% Nitrogen) side dressed at one and half months for all three crops. Additional 50 kg/ha Urea could further be side dressed at full fruiting for tall set tomatoes, which is harvest for at least 5 times. However, contact the research center for latest recommendation.

Crop rotation

In order to maintain soil fertility and to avoid disease and insect pest build up in the production field, it is important to rotationally plant unrelated crops (teff, beans, maize etc) at least for 2-3 years or 3-4 seasons before planting the same vegetable. This is a common problem in vegetable production farms in the region. Disease and insect pest control practises are presented in a separate hand book.