Green beans (Phaseolus vulgaris) are a legume that has been used as food for centuries, and is today still one of the most important foodstuffs utilized by mankind. The pods contribute vitamins such as vitamin C, and minerals such as calcium, iron, folic acid and riboflavin (vitamin B2) to the human diet. Green beans are a popular vegetable and are grown in home gardens. Green beans are a tropical crop and consequently sensitive to low temperatures. In general farmers plant both bush as well as runner varieties.

**Soil**

Green beans can be successfully cultivated in soils which range from sandy to reasonably heavy clay soils. They prefer deep, well-drained soils, with good water retention ability. The best yields are achieved in medium loam soils. Avoid soils making a crust, as this will have a negative effect on emergence of seedlings. A soil pH of 6.0 to 6.5 is recommended.

**Climate**

Because of its tropical origin, green beans cannot be successfully cultivated in areas with temperatures below 10°C and they are very sensitive to frost. The optimum temperature is between 16°C and 24°C. Temperatures above 35 °C, if accompanied by dry winds, may cause the flowers and tender pods to abort resulting in poor yields.

**Cultivars**

Bush beans: Wintergreen, Contender, Class Act, World Cup, Imali, Malelaan, Star 2000, Star 2052

Runner beans: Witsa, Lazy Housewife

**Crop rotation**

Green beans should be rotated with other non-leguminous crops to avoid possible transmission of diseases such as bacterial blight, anthracnose and fusarium-wilt. As a result of their nitrogen-fixing ability, green beans help to build up the soil nutrient status.

**Propagation**

Green beans establish well by direct sowing.

Local names: Green beans

Sesotho: Dinawa
Swati: eenabhontjisi
Xitsonga: Tinyawa
Thsivenda: Nawa
Sepedi: Dinawa
Setswana: isiXhosa” limbotyi
isiZulu
IsiNdebele
### Spacing

Plants are established from seeds. The optimum spacing for bush beans is 60cm between rows and 5cm between plants in a row (32 plants/m²). For runner beans a wider spacing is used: rows 1m apart and plants spaced 10cm apart in the row. To reduce costs of trellising, 3 plants can be trellised to one support.

### Soil Preparation

Loosen the soil thoroughly by either ploughing or using a hand hoe, fork or a spade. All clods should be smashed by using a rake until you obtain a deep fine bed. Old manure, compost or fertilizer should be incorporated thoroughly into the soil during soil preparation. Cover crops (green manure) can be planted and worked into the soil 4-6 weeks before establishing the crop.

### PLANTING TIME

<table>
<thead>
<tr>
<th>PRODUCTION AREA</th>
<th>BUSH BEANS</th>
<th>RUNNER BEANS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highveld (heavy frost in winter) of Gauteng, North-West &amp; Mpumalanga.</td>
<td>Middle September to January</td>
<td>Middle September to December</td>
</tr>
<tr>
<td>Middleveld (light frost in winter) of Gauteng, Northern Province, Mpumalanga &amp; KwaZulu-Natal.</td>
<td>September to February</td>
<td>September to February</td>
</tr>
<tr>
<td>Lowveld (cooler areas of Mpumalanga, Northern Province &amp; KwaZulu-Natal).</td>
<td>August to September &amp; February to March</td>
<td>August to September &amp; February to March</td>
</tr>
<tr>
<td>Lowveld (with very hot summers &amp; frost-free winters) of Mpumalanga, Northern Province &amp; KwaZulu-Natal.</td>
<td>March to August</td>
<td>March to August</td>
</tr>
<tr>
<td>KwaZulu-Natal Midlands</td>
<td>September to January</td>
<td>September to December</td>
</tr>
<tr>
<td>Free State &amp; Northern Cape</td>
<td>October to January</td>
<td>October to December</td>
</tr>
<tr>
<td>Eastern Cape</td>
<td>October to February</td>
<td>October to December</td>
</tr>
<tr>
<td>Western Cape</td>
<td>September to February</td>
<td>September to January</td>
</tr>
</tbody>
</table>

**Summer Vegetables**

- ARC LNR Excellence in Research and Development
- 35 Summer Vegetables
**Fertilization**

General fertilizer recommendation:
Before planting, approximately 1000 kg/ha or 100 gram/ m² 2:3:4(27) must be applied and worked into the top 10 cm of the soil.
After planting, apply a top dressing of 10 gram LAN/ m² at 2 and again at 4 weeks after planting. Be careful not to apply LAN or any other nitrogen fertilizer directly onto the plants, because this will burn the leaves. Apply 5-10 cm away from the plants at both sides. Water the plants immediately after the fertilizer has been worked into the soil.
Or use organic fertilizers before planting e.g. compost or manure (4 handfuls of manure/ m²). Cover crops (green manure) can be planted and worked into the soil 4-6 weeks before establishing the crop.

**Irrigation**

Roots will develop and utilize water and nutrients up to 400 mm down into the soil. Approximately 450 mm of water is required during the growing season including rainfall. A general guideline is 35 mm per week.
Green beans dislike water on the seed while germinating (5-7 days after sowing). After sowing water properly and wait for emergence. From the flowering stage, green beans are very sensitive to lack of moisture, so it will be necessary to apply 35 mm per week until the pods have been harvested.

**Harvesting**

Green beans generally take 60 – 90 days to mature. Repeated harvests when the pods are still young, will induce the formation of new flower buds which will result in a higher yield of young pods.
It is important to harvest at the right stage and the following method can be applied:
When the pod is cut open lengthwise, the seed must be well developed, but be careful because the seed can harden very quickly. Beans ripen very quickly in warm weather and therefore it is necessary to harvest every day to get good quality pods. It is important to harvest early in the morning, and pods must not be left in the sun as they wilt quickly (within 2 to 4 hours).

To ensure good keeping quality for the fresh produce market, green beans must be cooled and stored at 4 to 7 °C. Estimated yield: 100 kg/100m².

**Pests**

- **Bean seed beetle**
  Damage the seed during storage.
- **Seed bean maggot**
  This pest causes poor seedling emergence. The maggots feed on the young seedlings. A sporadic pest.
- **CMR-beetle**
  Feeds on all above-ground parts of the plant especially the flowers.
- **Brown beetle**
  Active at night and cause damage to the leaves.
- **Thrips**
  Damage young developing pods.
- **African bollworm**
  The caterpillar penetrates the pods and continues feeding inside.
- **Plusia looper**
  Damage pods in the field.
- **Tip wilter**
  Flat-backed, blackish, insects. They attack soft growth points by sucking out plant sap and injecting toxins that causes the plant to wilt. Damage is similar to that of the green vegetable bug.

**General control measures for the above insects:**
Scout regularly
Apply pesticides. Consult your agricultural supply outlet for recommendations.
Apply insect repellent sprays e.g. onion and garlic mixtures.

- **Aphids**
  Suck sap from plants, and transmit virus diseases.
  Control: Spray with soapy water. Spray repellent mixes e.g. onion and garlic mix.
- **Red spider mite**
  Present on the underside of leaves where they feed on plant sap and spin silk threats and webs. Small light yellow specks appear on the upper leaf surface.
  Control: Regular scouting is very important. Spray with registered miticides.
**Root knot nematode**  
Infested plants show signs of retarded growth. The roots are malformed with small growths on the roots. Infested plants can die before they start to produce fruit.  
**Control:** Fallowing. Practice crop rotation. Cropping with marigolds, castor beans, chrysanthemums. Soil solarisation – cover tilled, slightly moist soil with clear plastic sheeting for 6-8 weeks in sunny areas.

**Diseases**  
**BACTERIAL DISEASES**  
**Bacterial blight**  
Caused by Xanthomonas phaseoli. Small to large brown spots with yellow margins occur on leaves. Water-soaked spots occur on the pods.  
**Control:**  
Use disease-free seed  
Chemical control  
Crop rotation  
Sanitation practices

**FUNGAL DISEASES**  
**Anthracnose**  
Caused by Colletotrichum lindemuthianum. Reddish-brown leaf spots and sunken lesions on the fruits.  
**Control:**  
Use disease-free seed  
Chemical control  
Crop rotation  
Ashy stem blight
This is caused by Macrophomina phaseolina. Stems and pods are grey / white and contain small black bodies called sclerotia..  
**Control:**  
Use disease-free seed  
Optimal fertilization and irrigation  
Crop rotation  
Plant in well drained soil  
**Fusarium root rot**  
Caused by Fusarium spp. Stems show a brown rot at soil level, and roots are brown.  
**Control:**  
Chemical seed treatment  
Optimal fertilization  
Good drainage  
Crop rotation.  
**Rhizoctonia root rot**  
Rhizoctonia solani causes this disease.  
Stems show a dark brown, lower stem rot and root rot.  
**Control:**  
Chemical seed treatment  
Pre-plant chemical drench  
Shallow planting  
Crop rotation with non-host crops

**Rust**  
Caused by Uromyces appendiculatus. Leaves are covered with round, reddish-brown powdery spots.  
**Control:**  
Use disease-free seed  
Crop rotation with non-host crops  
**Scab**  
Caused by Elsinoë phaseoli which attack leaves, stems and pods showing raised red/brown necrotic areas.  
**Control:**  
Use disease-free seed  
Crop rotation with non-host crops  
Chemical seed treatment

**VIRAL DISEASES**  
**Bean mosaic virus**  
The margins and tips of the leaves curl down. The leaves show a typical yellowish-green mosaic; dark-green bands along the veins show up against the lighter green of the leaf. This is a seed-borne virus.  
**Yellow mosaic viruses**  
This group of viruses causes bright yellow spots on the leaves. Infected leaves are often misshapen. The disease can cause considerable crop losses.  
**Necrosis viruses**  
This group of viruses causes dwarfing of infected plants. Leaves, stems and other organs become completely or partly brown and die. This disease can cause severe damage.
<table>
<thead>
<tr>
<th>Crop</th>
<th>Sowing time</th>
<th>Transplanting time</th>
<th>Harvesting time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potatoes</td>
<td>Aug.</td>
<td>Thin out at a later stage</td>
<td>Nov./Dec.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nov./Dec.</td>
</tr>
<tr>
<td>Beetroot</td>
<td>Jan./Feb.</td>
<td>Thin out 5 — 7 days after germination</td>
<td>May./Jun.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dec./Jan.</td>
</tr>
<tr>
<td></td>
<td>Jan.</td>
<td></td>
<td>Apr.</td>
</tr>
<tr>
<td></td>
<td>Feb./Mar.</td>
<td></td>
<td>May./Jun.</td>
</tr>
<tr>
<td>Carrots</td>
<td>Feb.</td>
<td>Thin out 5 — 7 days after germination</td>
<td>May./Jun.</td>
</tr>
<tr>
<td></td>
<td>Aug./Sept.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweet</td>
<td>Oct.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>potatoes</td>
<td>Nov.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dec.</td>
<td></td>
<td>Feb./Mar.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mar. — May</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>May — Aug.</td>
</tr>
<tr>
<td></td>
<td>Jan.</td>
<td></td>
<td>Apr./May</td>
</tr>
<tr>
<td>Lettuce</td>
<td>Feb.</td>
<td>Thin out 5 — 7 days after germination</td>
<td>May./Jun.</td>
</tr>
<tr>
<td></td>
<td>Dec.</td>
<td>Jan.</td>
<td>Apr./May</td>
</tr>
</tbody>
</table>

*Please consult the seed company in your region regarding cultivars, which vary from area to area.*