



REQUIREMENTS FOR THE GROWTH OF PLANTS



Introduction

Plants are living things and must be provided with the basic requirements and conditions to achieve maximum growth and yield. The following are essential for proper growth of plants:-

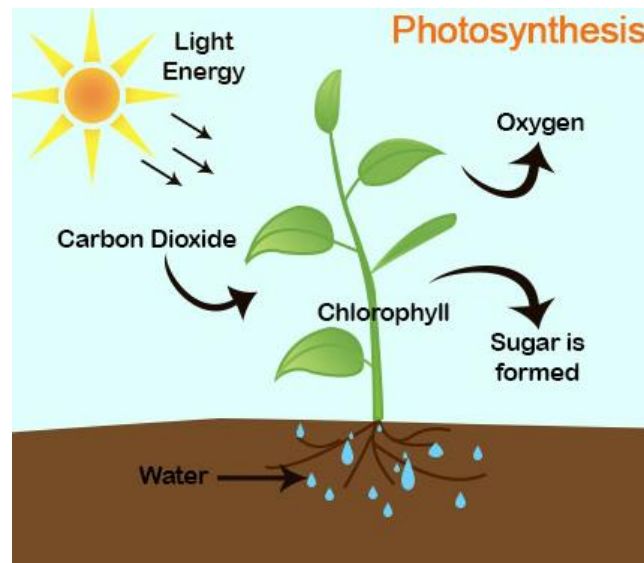
- Air
- A Balanced Nutrition
- Sunlight
- A Suitable Growing Medium
- Water
- Weed Control
- Drainage
- Pest and Disease Control
- Good Management

Air

Air is a mixture of gases mainly carbon dioxide (CO₂) and oxygen (O₂). Plants use oxygen to respire and carbon dioxide to produce food.

Sunlight

Vegetable plants need six continuous hours of sunlight per day in order to grow and produce well. Chlorophyll is the green pigment present in leaves. It changes sunlight into available energy which plants then use to produce food. Photosynthesis is the process by which a plant produces "food energy" and oxygen as shown below. Sugars produced are converted to carbohydrates, or utilized by the plant.



Water

All living things need water. A plant uses water for the following reasons: -

- To support its tissues (turgidity)
- For the internal transport of substances
- As a raw material for food production

Water is also needed to dissolve mineral salts (nutrients). They are then taken up in solution by the roots of the plant.

Drainage and Irrigation

While all plants require water, if they are given too little or too much, they may eventually die. The addition of water to the growing medium is called irrigation. Its removal is called drainage.

A Balanced Nutrition

For proper plant growth two classes of nutrients are needed in the correct proportions. They are:

1. **Major Elements.** Major nutrients are classed into two groups: a) Primary b) secondary
2. **Minor/Trace Elements.**

1. Major Elements

Primary Elements are required in large amounts. They are Nitrogen (N); Phosphorus (P) and Potassium (K), Fertilizers containing all three elements are termed "complete fertilizers" or NPK fertilizers.

Secondary Elements are required in medium or average amounts. They are Calcium (Ca); Magnesium (Mg) and Sulphur (S).

2. Minor/Trace Elements

are needed in very small amounts and are sometimes referred to as trace elements. They include Iron(Fe); Boron (B); Manganese (Mn); Copper (Cu); Zinc (Zn); Molybdenum (Mo) and chlorine (Cl).



Roles of N, P and K



Nitrogen is the element responsible for the vegetative development of the green part of the plant; especially good leaf and shoot development.



Phosphorus ensures the development of a good rooting system.



Potassium is required for flowering and fruit set. Plants generally obtain most of their nutrients, from the medium in which they are growing. If the medium is deficient in any way, the imbalance can be corrected by the application of commercial fertilizers and/or organic matter. However, some elements are almost always supplied by the soil e.g., magnesium and sulphur.

A Suitable Growing Medium

- will supply the plant with all the essential elements
- has a pH of 5.5 – 6.5
- is free – draining, but will retain enough water for use by the plants.



Weed Control

A weed is a plant growing where it is not wanted. Any medium which supports the growth of plants will also support weeds. Weeds compete with cultivated plants for nutrients in the soil. Weed control is therefore very important. Weeds can be controlled by mechanical means and hand-weeding



Pest and Disease Control

Pests and disease left unchecked reduce the plant's ability to be good producers of food. They can be controlled by the use of cultural practices, (including tolerant/resistant varieties), biological agents, or a combination of these, otherwise called Integrated Pest Management (IPM).

For example, a cultural practice is the staking of tomatoes which facilitates air circulation, thereby reducing the threat of a fungal attack especially in the wet season.

Biological control involves the use of one or more organisms (the natural enemy/enemies) to keep the pest population in check. Organic Pesticides can also be bought at Agro-shops. Always follow the instructions on the label!

Nutritional Deficiency

Uneven watering and calcium deficiency of tomatoes predispose fruits to Blossom End Rot, and thus affect the quality of the harvest. To control Blossom End Rot, tomato plants should be well watered at all times.

Good Management

A good manager ensures that all the conditions described above are satisfied. If you attend to your plants regularly, and see that all their needs are met; they will mature and produce well. However, if you neglect them, production wanes. You may even get no produce at all. It is advised that all factors outlined above should be practiced to maximize plant growth and yield.

Adapted from the Extension, Training and Information Services Division Ministry of Food Production Land and Marine Affairs Trinidad and Tobago, Home Gardening Series

