Matière 2 Cultures pérennes

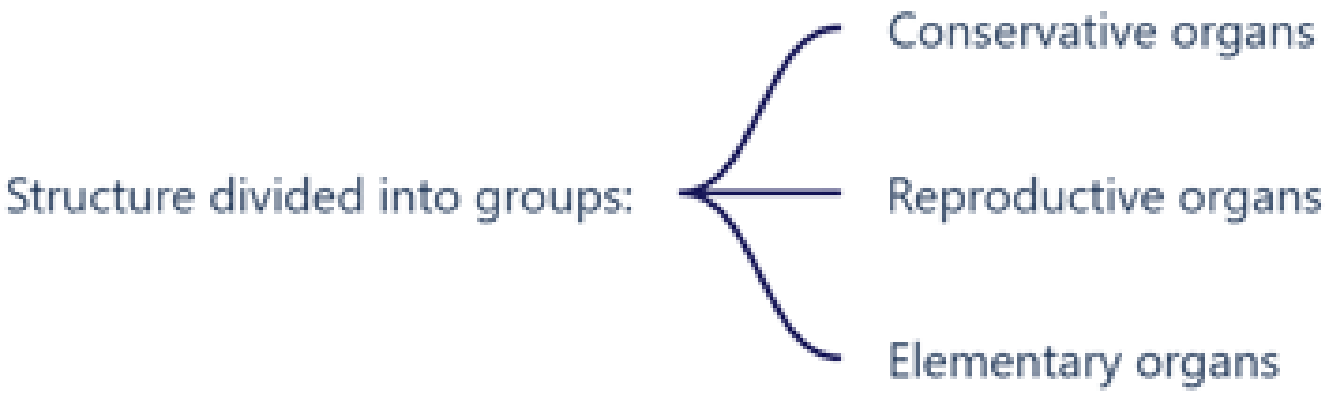
PART 1 : Arboriculture

Chapter 1

I.General information

Anatomy of Trees

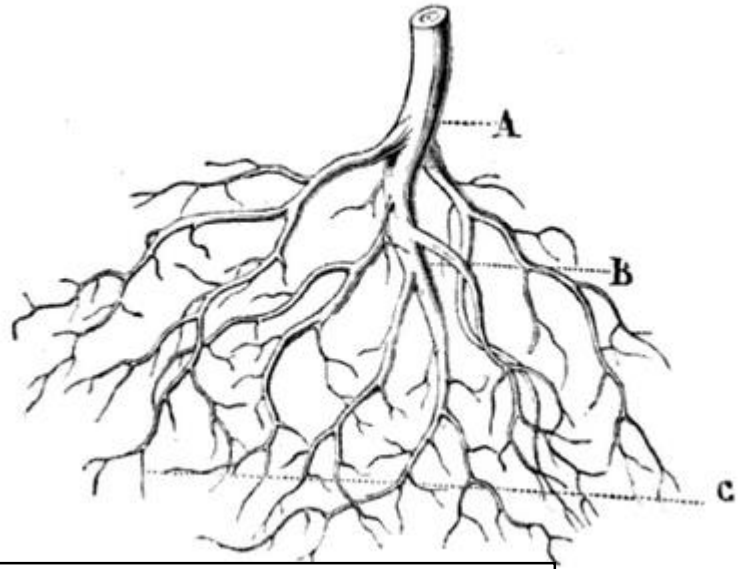
Trees have a number of parts in their structure that divided



Conservative organs provide each individual with the means to sustain its **existence** and **preservation**.

The most obvious are the **root, stem, buds**, and **leaves.**

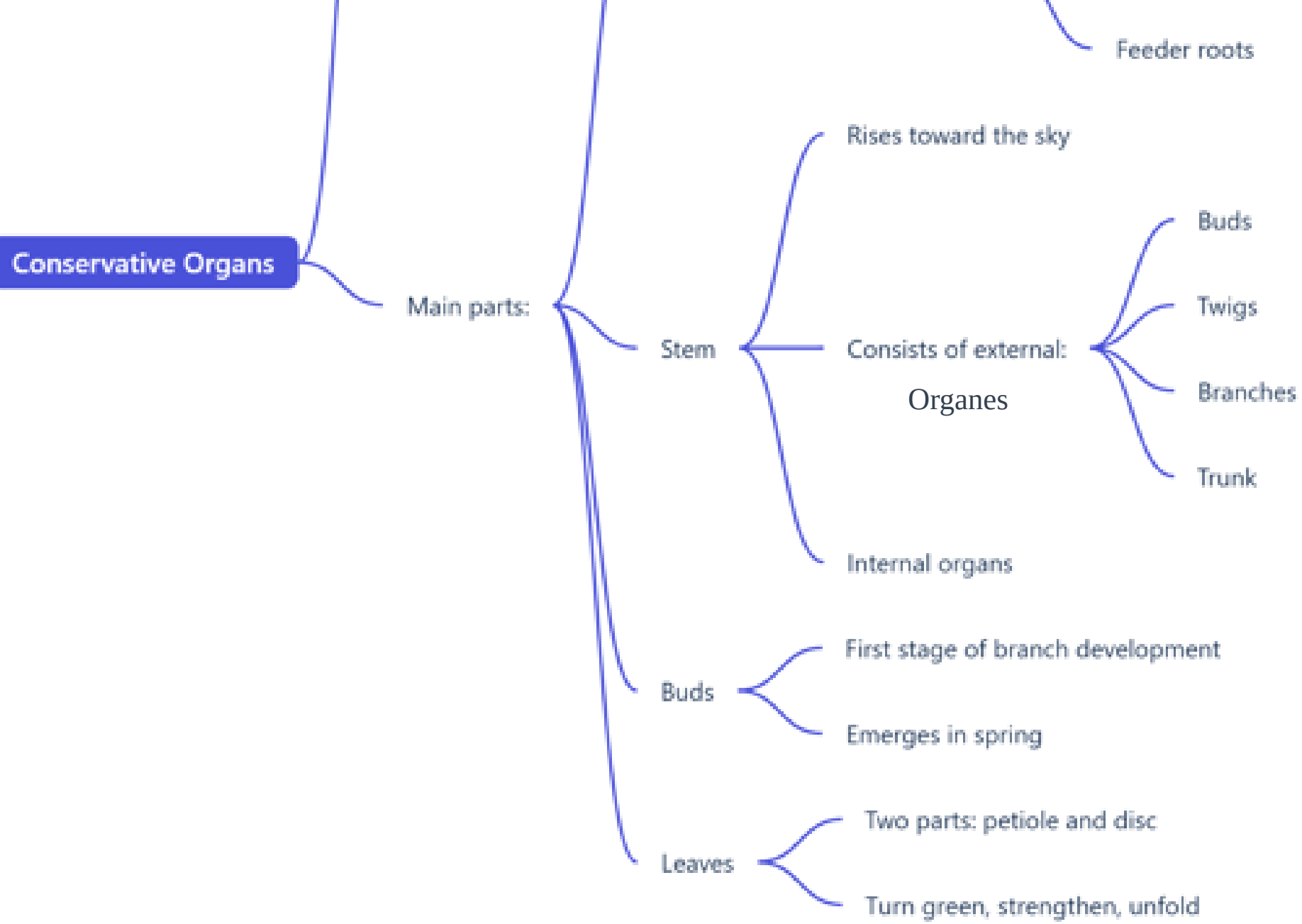
- Conservative Organs
  - Main parts:
    - Root
      - Storage organ
      - Hidden in soil, grows toward earth
      - Divided into:
        - Root collar
        - Body
        - Feeder roots
    - Stem
      - Rises toward the sky
      - Buds
    - Buds
    - Leaves
      - Two parts: petiole and disc
      - Turn green, strengthen, unfold



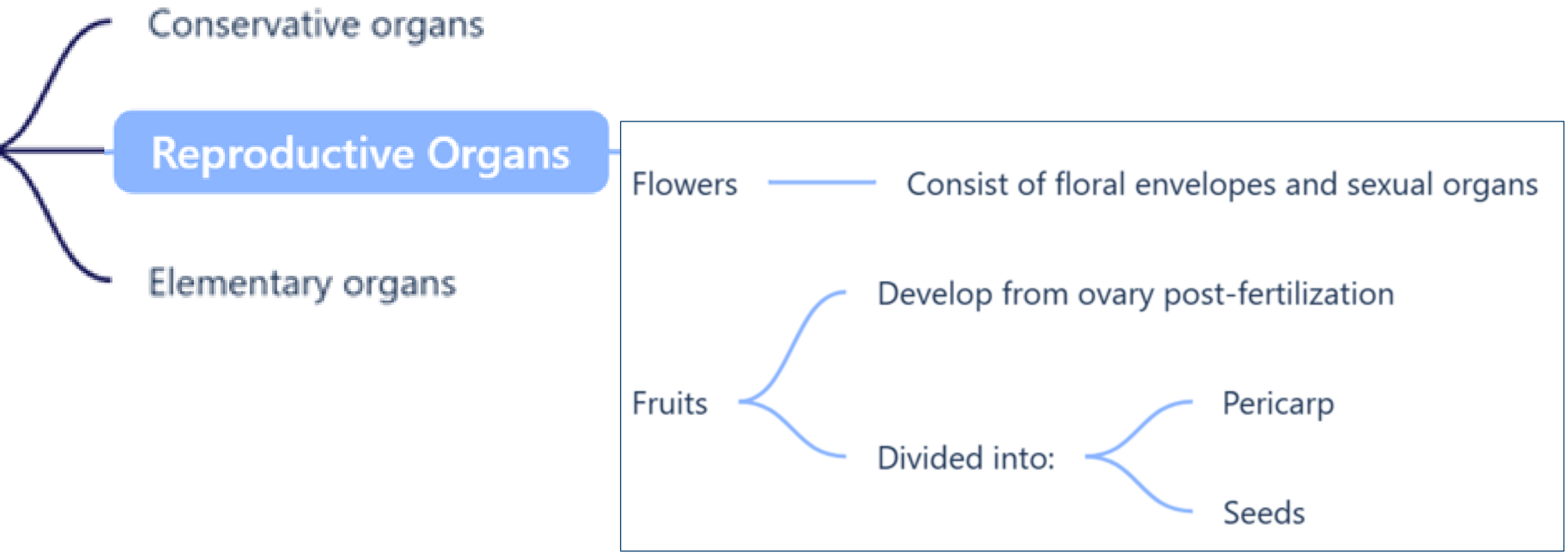
⇔ **The root collar:** This is the point between the root and the stem. It is from this point that the two organs originate and develop in opposite directions.

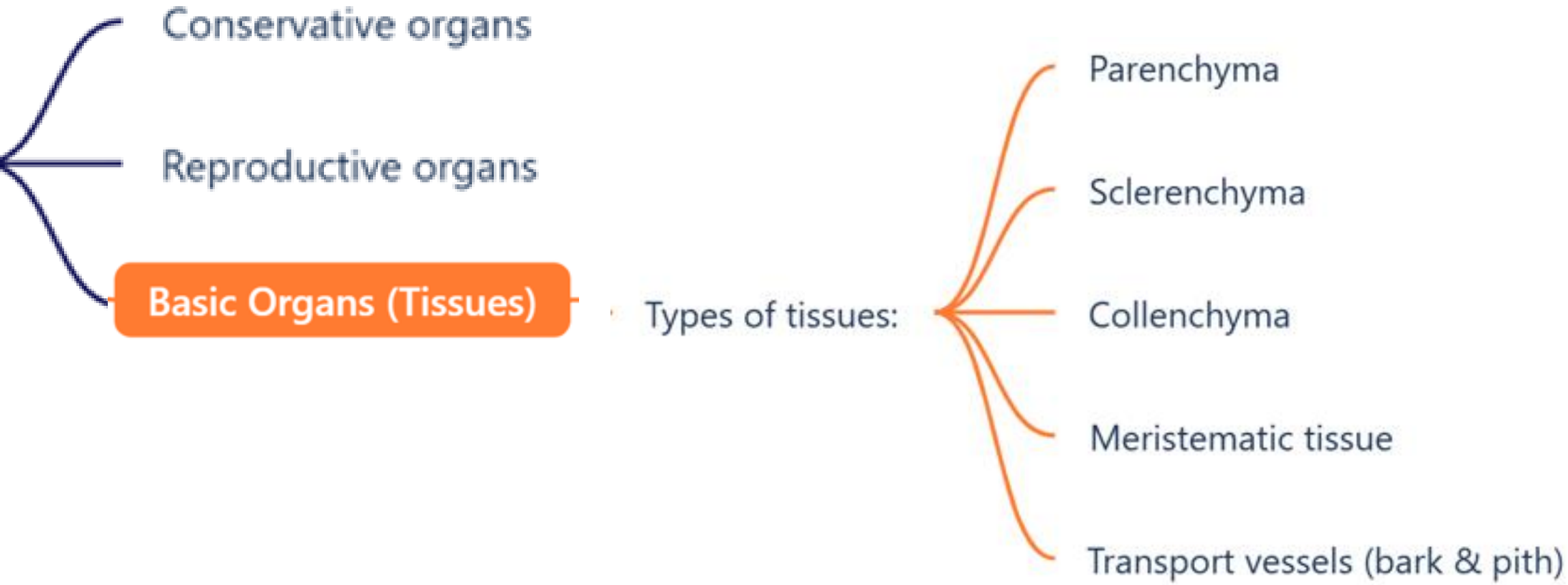
⇔ **The Body:** This is the main part of the root. It originates at the root collar and extends into the ground.

⇔ **The Feeder Roots:** which the tree uses to draw the fluids it needs for its existence from the soil.



At budding time


Conservative organs
Reproductive Organs
Elementary organs
Flowers
Consist of floral envelopes and sexual organs
Fruits
Develop from ovary post-fertilization
Divided into:
Pericarp
Seeds


Conservative organs
Reproductive organs
Basic Organs (Tissues)
Types of tissues:
Parenchyma
Sclerenchyma
Collenchyma
Meristematic tissue
Transport vessels (bark & pith)

Arboriculture

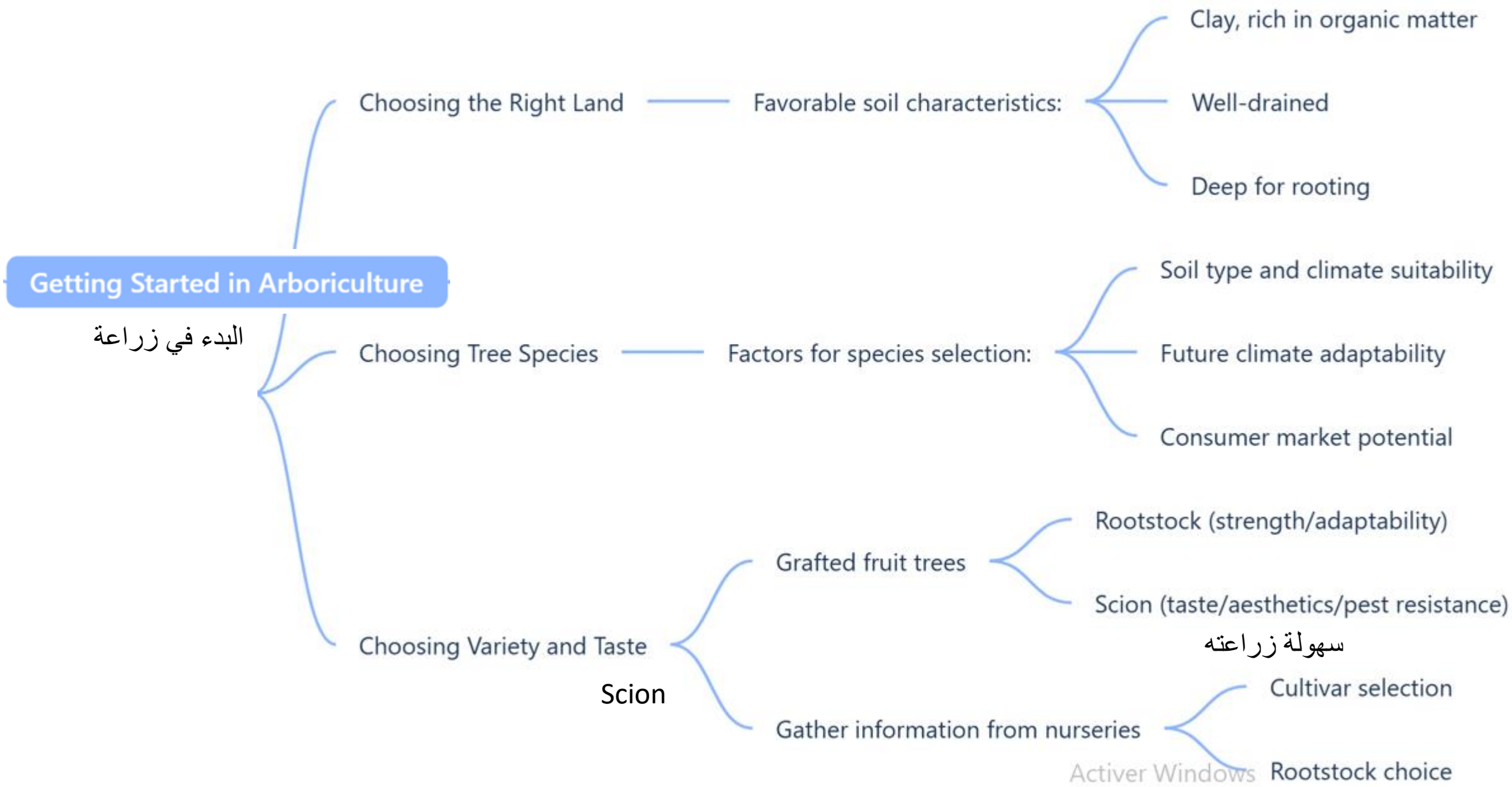
Definition of Arboriculture

- Arboriculture is the cultivation of **ornamental** or **fruit trees.**
- Fruit tree cultivation can be for conservation purposes to grow old and rare varieties or for production.

Characteristics of Arboriculture

- Perennial crop معمّر
  - Long lifespan (20+ years) 100+
  - Careful planting phase
- Requires patience and cash flow الصبر
- Profitable but risky مربح لكنه محفوف بالمخاطر
  - Frost risk during bloom طور الإزهار
  - Need for late-flowering species

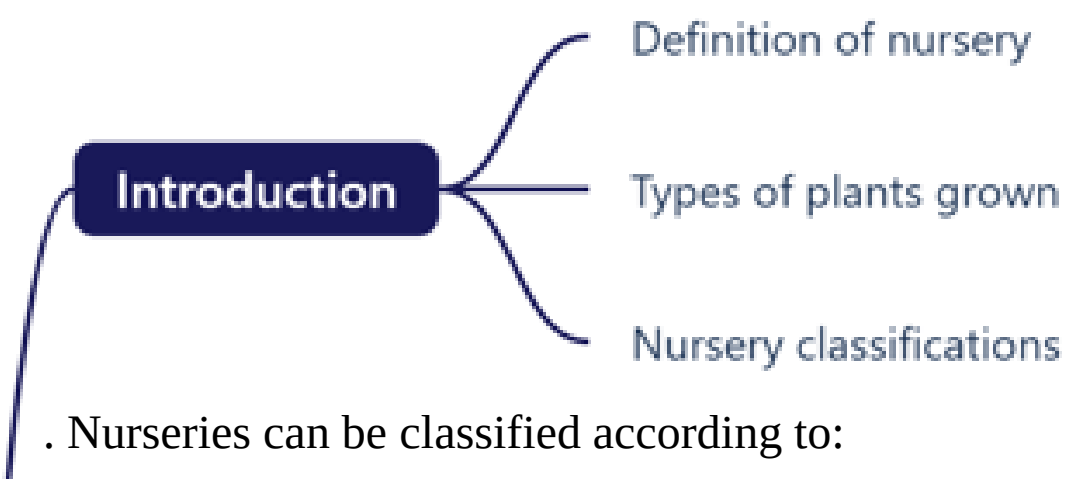
Fruit tree cultivation involves creating and maintaining an orchard of fruit trees



PART 1 : Arboriculture

Chapter 2

2.Creation of a fruit tree nursery



A nursery is a place or plot of land reserved for the production, propagation, and cultivation of plants until they are ready to be planted elsewhere

In nurseries, woody plants (particularly trees and shrubs), hardy herbaceous plants (perennials), and vegetable plants are grown

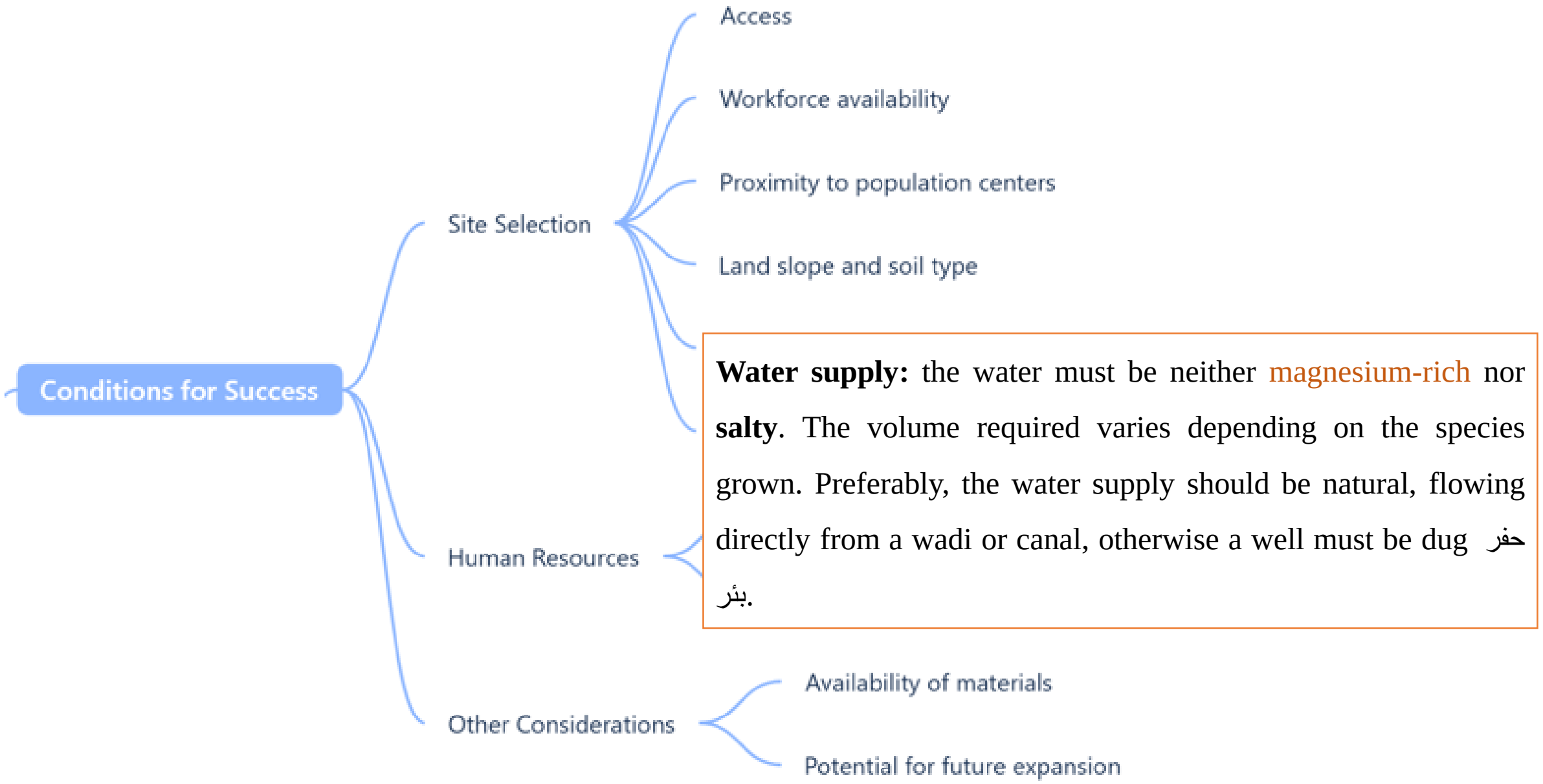
. Nurseries can be classified according to:

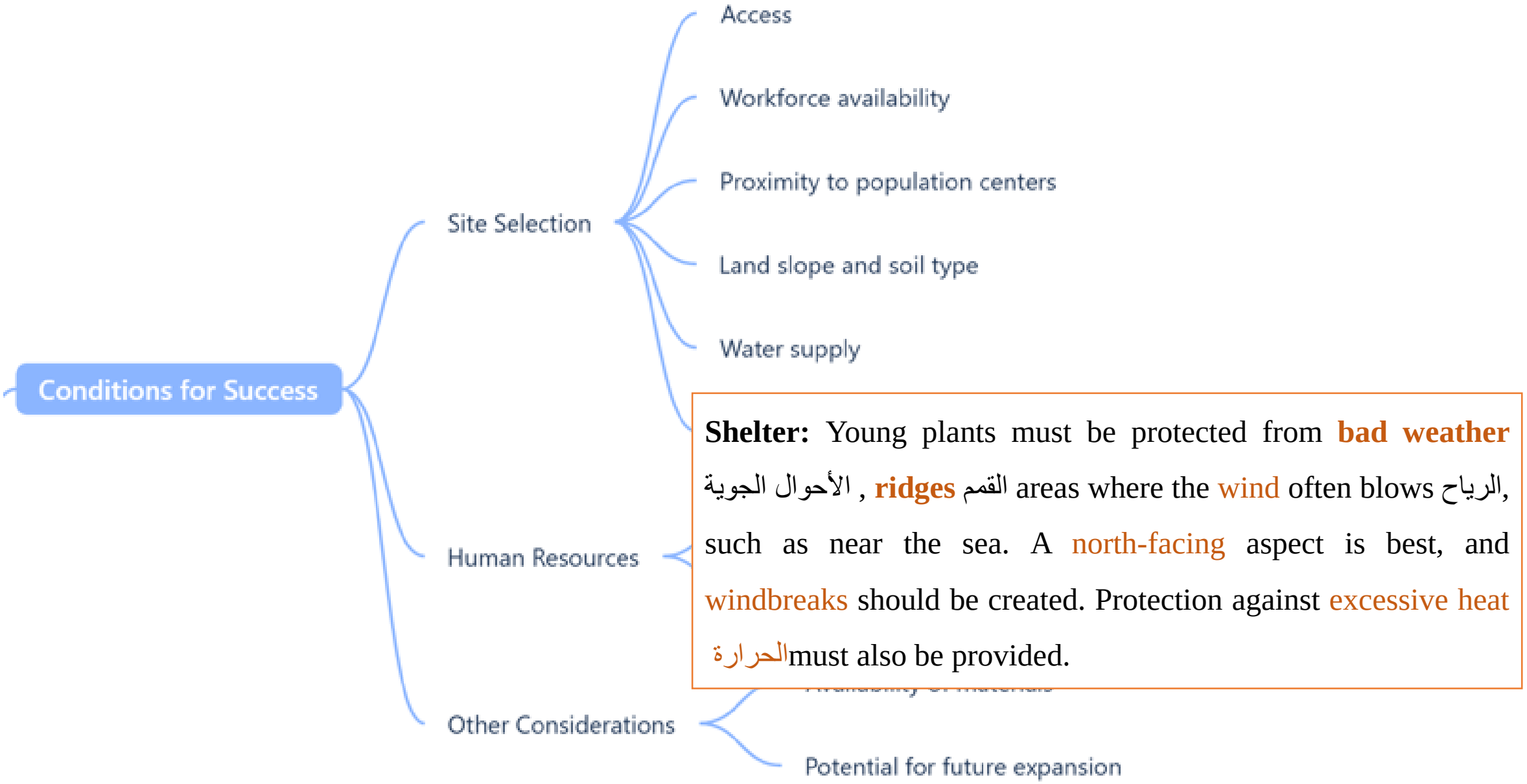
- **Type of production: specialized nurseries**, **mixed nurseries** that simultaneously produce forest, fruit, and ornamental seedlings, and **general nurseries** that produce a wide range of fruit trees, ornamental trees, shrubs, and climbing plants, requiring cycles ranging from three to eight years.
- **duration of existence: Mobile or temporary nurseries** are small and located near cultivation areas to avoid large investments and transportation costs, ensuring successful cultivation. **Permanent nurseries** are considered seedling production factories and require large investments to meet the continuous cultivation program for a large area.
- **Depending on their function Propagation, nurseries** reproduce and multiply all species and varieties and supply nurseries with young seedlings. **Nurseries grow** young seedlings from propagation nurseries until they reach a marketable size.

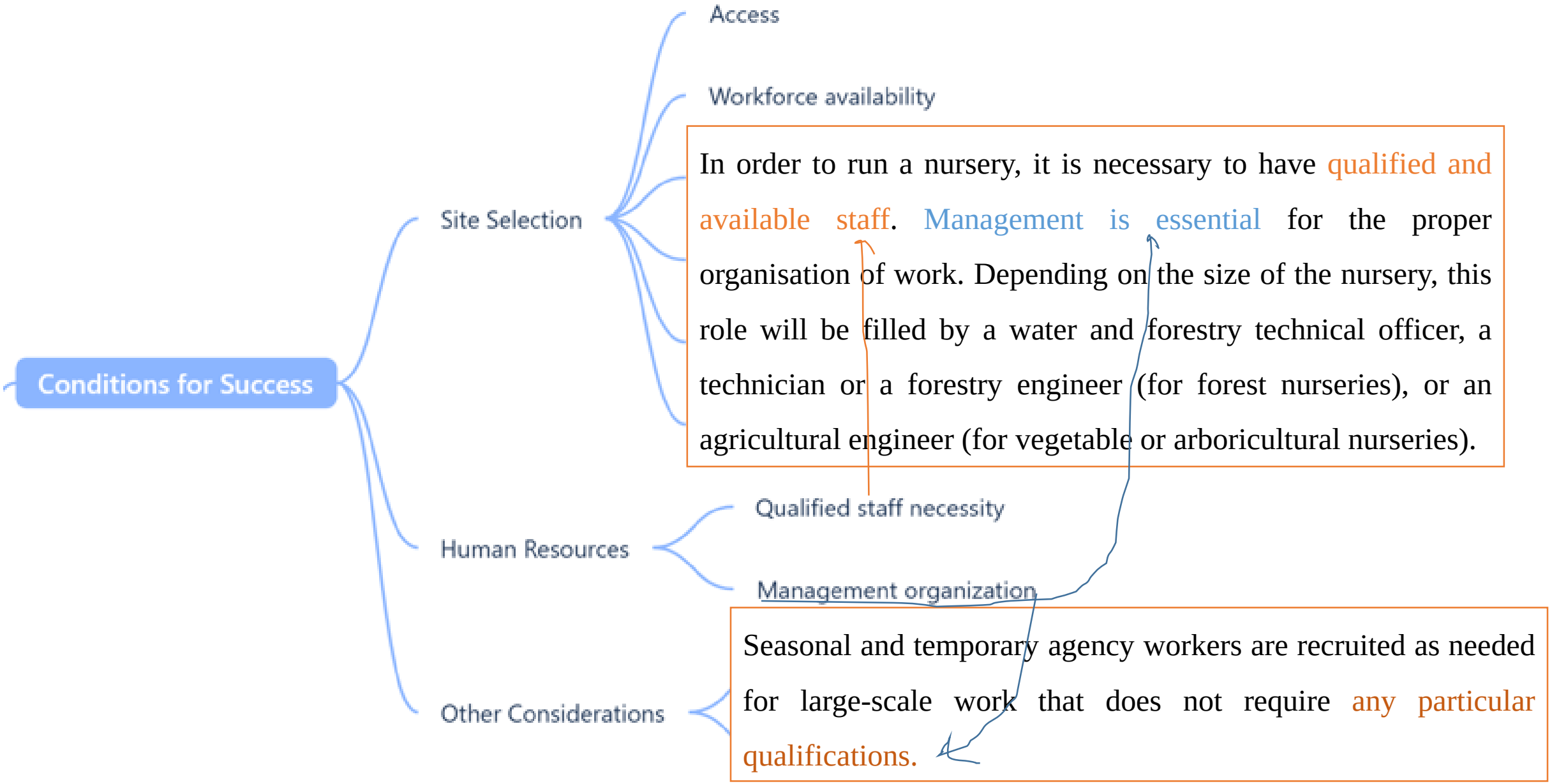
The nursery must be easily accessible by road to allow for the easy delivery of necessary products (sand, manure, fertilizer, etc.) and convenient shipment of plants.

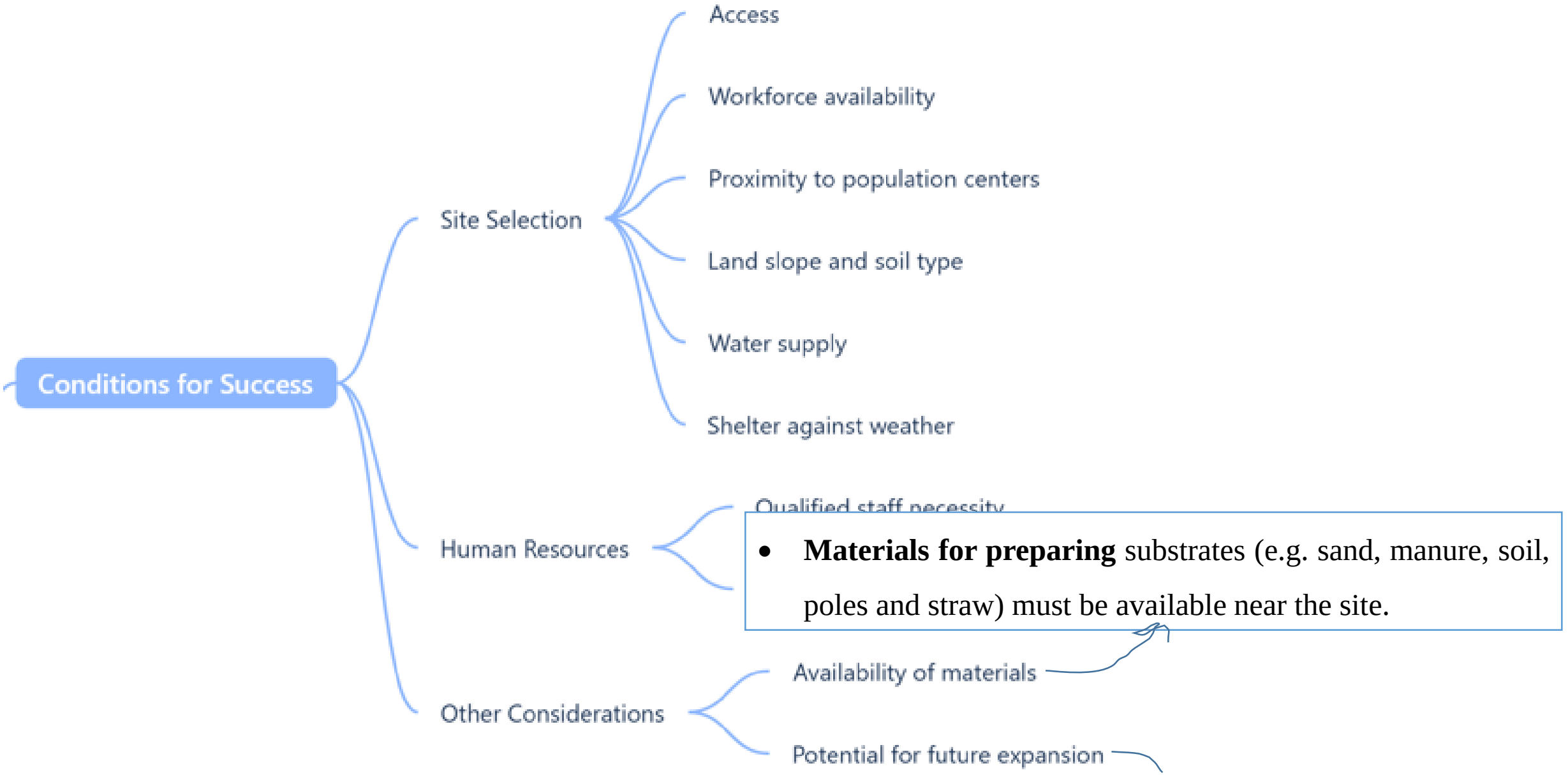
- Employing a relatively large workforce.
- The nursery should be located near population centers.
- It is not advisable to locate the nursery in a low valley for fear of flooding.الفيضانات


Conditions for Success
Site Selection
Access
Workforce availability
Proximity to population centers
Land slope and soil type
Water supply
Shelter against weather
flat land should be chosen if possible to avoid costly leveling work (optimum slope 0.5–3% انحدار).
The soil must be deep, permeability,,,,,,,
Human Resources
Qualified staff necessity
Management organization
Other Considerations
Availability of materials
Potential for future expansion


Conditions for Success
Site Selection
Access
Workforce availability
Proximity to population centers
Land slope and soil type
Human Resources
Water supply: the water must be neither magnesium-rich nor salty. The volume required varies depending on the species grown. Preferably, the water supply should be natural, flowing directly from a wadi or canal, otherwise a well must be dug حفر بئر.
Other Considerations
Availability of materials
Potential for future expansion

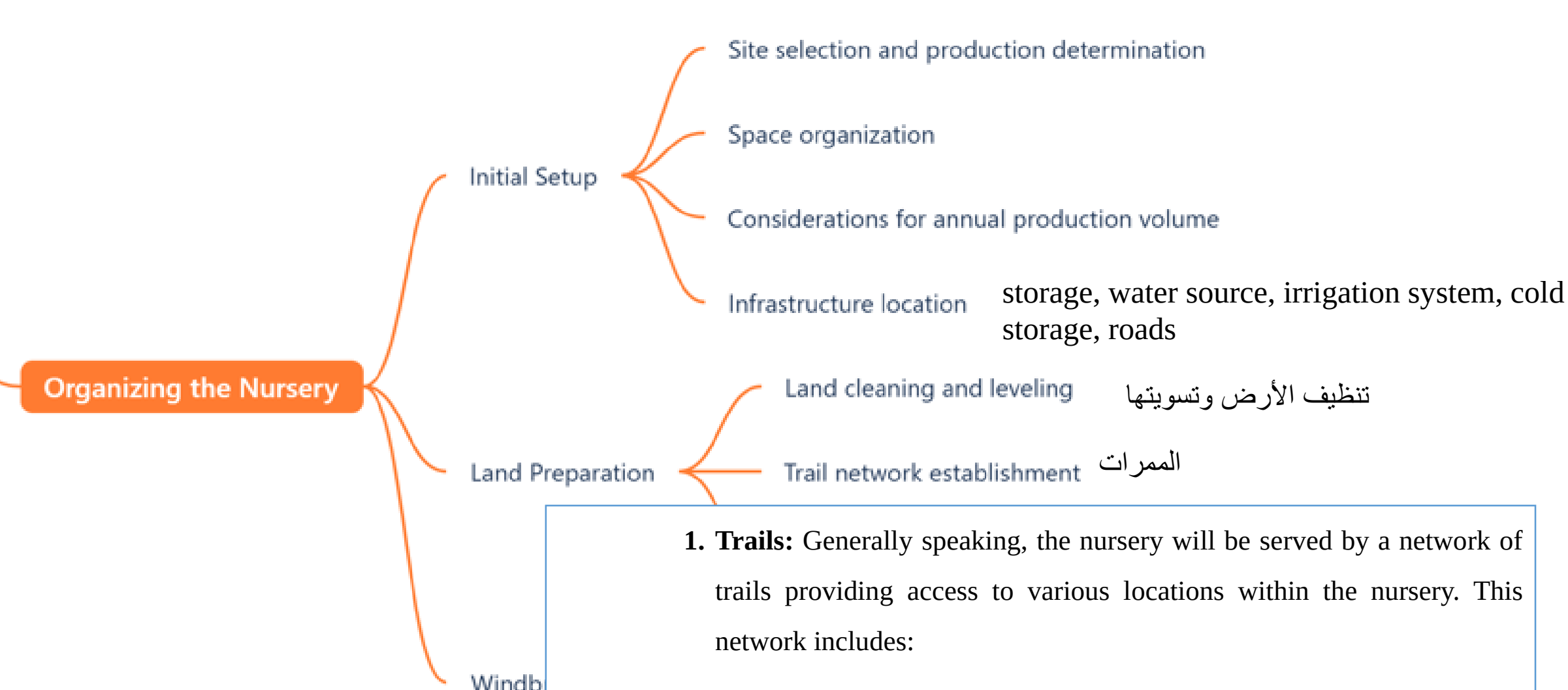

Conditions for Success
Site Selection
Access
Workforce availability
Proximity to population centers
Land slope and soil type
Water supply
Human Resources
Other Considerations
Potential for future expansion
Shelter: Young plants must be protected from **bad weather** الأحوال الجوية , **ridges** القمم areas where the wind often blows الرياح, such as near the sea. A north-facing aspect is best, and windbreaks should be created. Protection against excessive heat الحرارةmust also be provided.


Conditions for Success
Site Selection
Access
Workforce availability
Human Resources
Qualified staff necessity
Management organization
Other Considerations
In order to run a nursery, it is necessary to have qualified and available staff. Management is essential for the proper organisation of work. Depending on the size of the nursery, this role will be filled by a water and forestry technical officer, a technician or a forestry engineer (for forest nurseries), or an agricultural engineer (for vegetable or arboricultural nurseries).
Seasonal and temporary agency workers are recruited as needed for large-scale work that does not require any particular qualifications.



- **Materials for preparing** substrates (e.g. sand, manure, soil, poles and straw) must be available near the site.

- Future expansion in case the reforestation programme grows.



1. **Trails:** Generally speaking, the nursery will be served by a network of trails providing access to various locations within the nursery. This network includes:

- **Main paths** ممر رئيسي **, 5–6 m** wide, for vehicles, etc.

- **Secondary paths**, **2–3 m** wide, for wheelbarrows, carts, etc.

The path network could make it possible to complete a tour of the nursery. Generally, this network represents **10%** of the nursery's **surface area**.

Site selection and production determination

In a nursery, it is preferable to have a permanent fence that prevents access by **domestic and wild animals** (especially game).

This can be supplemented later by one or more rows of windbreaks.

These can have a mechanical or physical function, reducing wind speed and decreasing its harmful effects, **such as plant** drying and the risk of **sand accumulation**.

They can also have a biological function, promoting the **creation of a microclimate** with a **lower average temperature and reduced evaporation.**

Organizing th

Windbreaks

Types of windbreaks

Plant characteristics

The characteristics of the species used for windbreaks are as follows:

- Good adaptation to the soil.
- Rapid growth.
- Good anchoring with a deep taproot system.
- Evergreen species
- Low water consumption (a willow consumes approximately 100 m^3 of water per year).

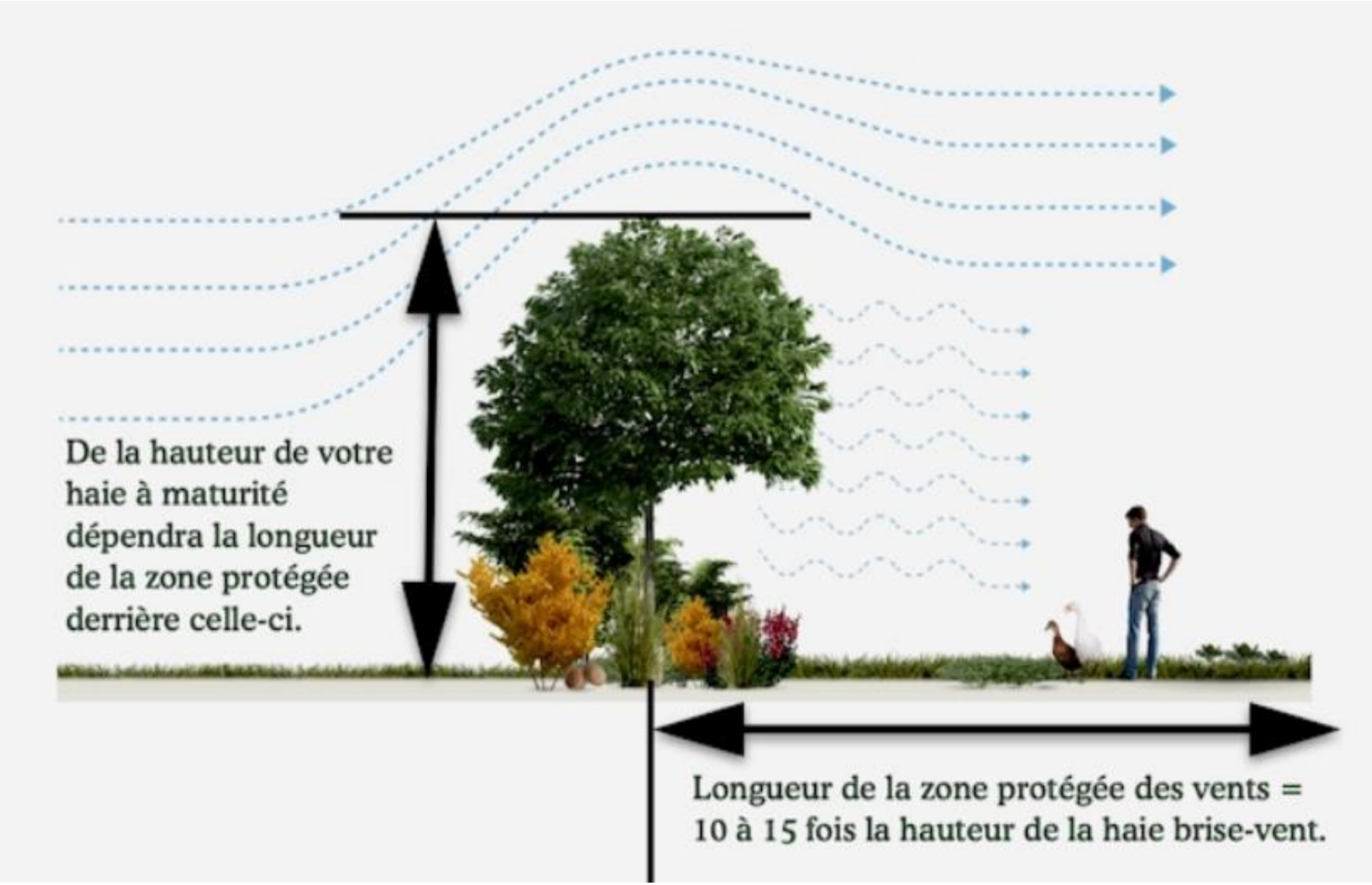
⇔ **Principles of Optimal Design**

- **Orientation الاتجاه :** To be most effective, the hedge should be planted perpendicular to the prevailing wind direction.
- **Height and density:** It should be as tall as possible and reasonably dense to ensure good protection.
- **Year-round protection مدار السنة :** For year-round effectiveness, the hedge should mainly consist of evergreen trees and shrubs with evergreen foliage.

⇔ **Air Flow Management (Filtration vs. Blocking):**

- **Gradual deflection:** The wind must be deflected gradually. Plant low shrubs in the front row on the windward side, followed by taller plants.
- **Avoid sudden blockage.** Avoid an abrupt break in the line of tall plants, as this could increase the wind force further away from the hedge.

- **Necessary filtration:** The hedge should filter the wind, rather than block it completely. The aim is to allow 20–40% of the wind to pass through. Total blocking would create harmful disturbances and friction on the sides of the protected area.



- **Length of the protected area:** For an effective filtering hedge, the protected area extends over a distance equivalent to 10–15 times the hedge's mature height (H). Example: A 10-metre-high hedge can protect an area extending 100 to 150 metres behind it.

A. **The main advantage of artificial windbreaks** is that they are operational immediately after installation. Other advantages include the fact that they require no maintenance and do not compete with plants for space. However, this equipment is not widely used in nurseries.

1. **Preparing the soil in the nursery**

The soil is always needs to be cultivated beforehand. If it is poor quality or lacks certain substances, the first thing to do is improve it.

- **Light and dry soils** can generally be improved with manure, sewage sludge, plant fertilisers, mulch, watering and proper irrigation. The paths should be higher than the beds. Deep digging allows rainwater to penetrate the soil more easily, creating valuable reservoirs for dry periods. It also enables the roots to spread over long distances underground, thus escaping the effects of excessive heat.
- **Very wet soils** التربة شديدة الرطوبةrequire drainage measures such as drainage pipes and gravel paths below ground level, as well as repeated digging and hoeing in hot weather.
- **Compacted soil** requires careful loosening based on the condition of the lower layers; frequent ploughing in each season and the use of manure, wood ash, coal ash, slag and sand will produce good results.
- **Land whose topsoil** تتطلب الأراضي التي استُنزفتhas been depleted by previous crops but whose subsoil is not to be disregarded requires loosening to bring the subsoil to the top and the topsoil to the bottom.

Water Supply

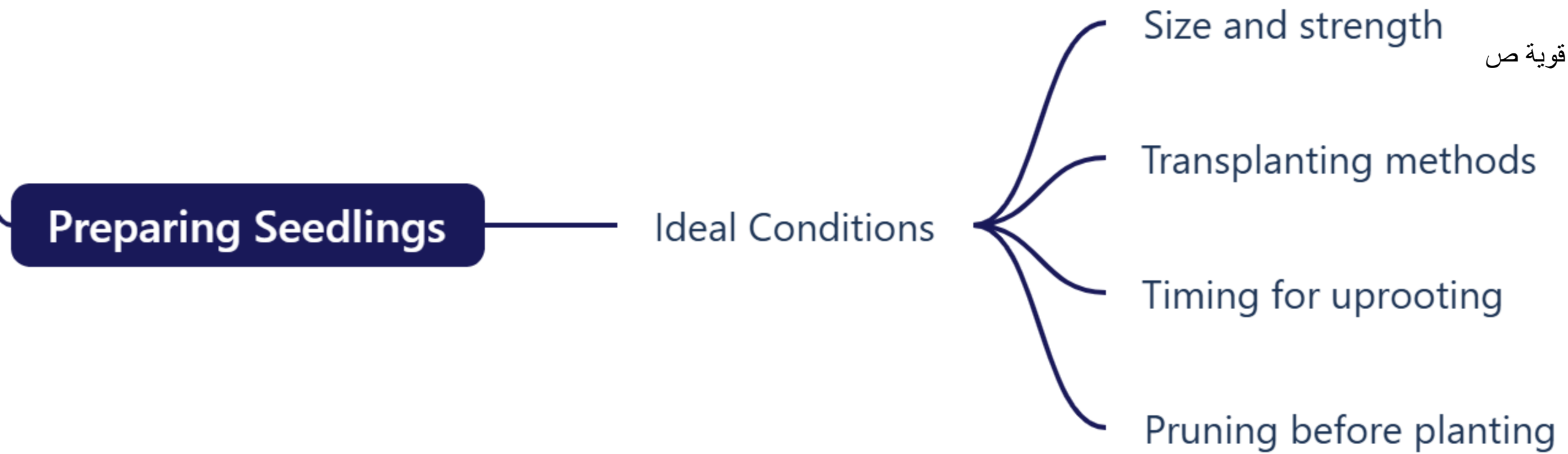
Rainwater is the best type of water for irrigating nursery plants, so it is **important to collect** it wherever possible and deliver it to seed beds and areas where seedlings are germinating.

Next comes water from rivers and streams, followed by water from ponds and swamps with muddy bottoms, which result from fallen leaves, root growth and the activity of aquatic plants. If the nursery is large, or if the climate or type of cultivation requires frequent watering, water can be a dam, stream مجرى مائيًا , well or borehole. بئر

Nursery Enclosure

In open fields, nurseries are **rarely enclosed**, but an enclosure becomes necessary if they are important or exposed to passers-by, hunters, intruders or livestock, or if they are adjacent to dwellings العمارات السكانية .

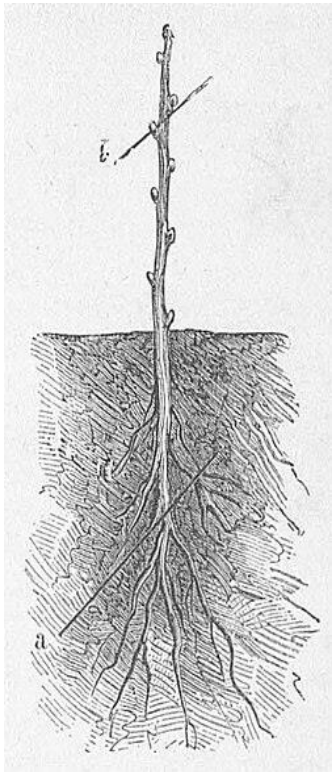
We accept walls, provided they do not significantly **impede air currents**دخول الهواء or concentrate **excessive heat**. Although they are expensive to build, they enable us to grow trees in a trellised تعريش form and to collect **peaches and grapes**. The presence of a natural watercourse or artificial ditch around the nursery provides the additional advantages of water for irrigation and drainage of wet soil.


Preparing Seedlings
Ideal Conditions
Size and strength
قوية ص
Transplanting methods
Timing for uprooting
Pruning before planting

These conditions are achieved by planting them sparsely in loose soil or transplanting them at the embryonic stage.

Ideal Conditions

- Size and strength
- Transplanting methods
- Timing for uprooting
- Pruning before planting



التقليم

the young seedlings are planted in a partially shaded spot close to the plot where they will be grown, with the appropriate distance kept between them. We press the soil around each seedling with our feet, add more soil and water well.

They should be dug up in early November, once the sap flow has completely stopped.