

19. Nursery Management

Himanshu Sharma

Field officer,
Adama India pvt. Ltd.

Minam Gamoh

SRF, ICAR - NIAP
(National Institute agricultural economics and policy research)

Abstract:

An essential link between plant propagation and ecological care is the management of plant nurseries. Nurseries may significantly contribute to the creation of a more resilient and biodiverse environment by embracing innovation, sustainability, and an integrated approach to plant production. It is impossible to overestimate the significance of efficient plant nursery management in light of global issues like climate change, habitat loss, and dwindling biodiversity. Plant nurseries have the potential to positively impact the conservation of natural resources, improvement of ecosystem services, and development of resilient landscapes through the implementation of sustainable practices, utilization of technical innovations. It helps to maintain biodiversity, improve environmental quality and provide food security. For addressing environmental issues, promoting sustainable development goals, and satisfying the growing demand for a variety of plant species, plant nurseries must be run effectively.

Keywords:

Nursery management, sustainability, plant growth, productivity.

19.1 Introduction:

The term "plant nursery management" refers to a wide range of techniques used to effectively propagate, cultivate, and distribute plants for a variety of uses, such as landscaping, agriculture, forestry, restoration, and conservation. Plant nurseries play an ever-more-important role as society attempts to achieve sustainable growth while tackling huge environmental concerns.

It involves managing environmental conditions to maximize plant growth and development, carefully choosing parent plants, and using suitable propagation techniques (such as tissue culture, grafting, vegetative propagation, or seed propagation). Moreover, plant nursery management covers a wide range of operational components such as building facilities, site selection, pest and disease control, fertilization and irrigation techniques and inventory management. A nursery operation's capacity to succeed and remain sustainable depends on each of these elements.

For successfully producing and distributing healthy, superior plants, plant nursery management requires an effective combination of both ecological concepts and horticultural practices.

19.2 Nursery and Its Importance:

Nursery is a place where special care is provided to ensure favourable conditions for growth of seeds, cuttings etc., of plants which can later be transplanted and multiplied in desired fields.

In nursery full care is taken in order to ensure maximum germination of seed and also to take care of plants at early growth stages when they are tender. Maximum vegetable, fruits and flowers are propagated through seeds and require a nursery for raising seedlings. Plants that are propagated through cuttings also require nursery so that they can grow and multiply in fields when they get strong enough to tolerate natural environment conditions.

Importance of Nursery Raising:

- Hybrid seeds cost is very high so it is important to take care of those seeds at the time of germination till they reach proper growth.
- Maintenance of plants in nursery is easy and number of plants that can be maintained is very high.
- Favourable conditions for growth of seeds can be provided in nursery.
- Crop growth is uniform when transplanted to main field.
- Insects-pests, diseases and unwanted plants can be managed easily.

19.3 Selection of Nursery Site:

Site of nursery plays a crucial role for its success so there are some important factors to take into account before selection of nursery site.

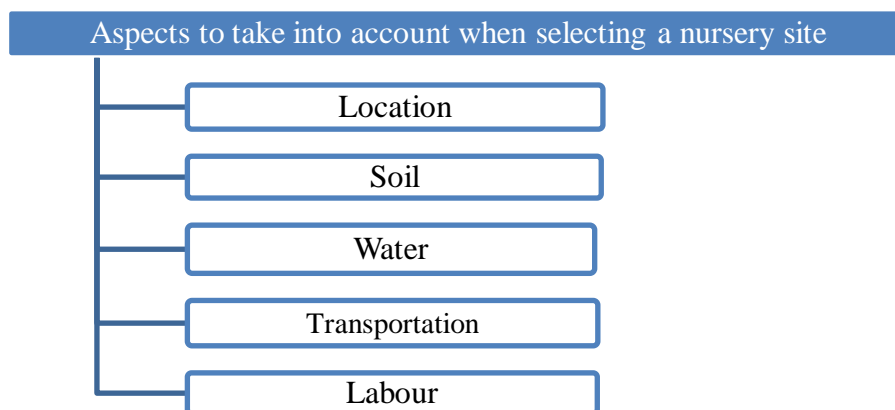


Figure 19.1: Selection of Nursery Site

- A. Location** - Location of nursery must be sun facing in order to get adequate sunlight. Surrounding of nursery should be pollution free and away from area having dirt and dust.
- B. Soil** - Sandy loam soil having high organic matter is considered best for growing plants and pH of soil should be neutral (6.5 - 7.5). Water holding capacity of soil should be good so that water loss can be minimised.
- C. Water** – Irrigation should be done regularly and water should be fresh with neutral pH. There should be water reservoir or tank so that there is no water scarcity at any time.
- D. Transportation** – Proper connectivity of nursery with road is very important as it reduces cost. Distance of nursery from market should be less as it reduces chances of damage during transportation.
- E. Labour** – Maintaining nursery is labour intensive work so there must be enough labourers at site.

19.4 Nursery Bed Preparation:

For establishing a nursery proper seed bed preparation is done in which stones, pebbles and weeds are removed from land where seeds are to be sown. Soil of these nursery beds must be rich in organic matter, there should be proper aeration in soil and free from water logging. According to environmental conditions nursery beds can be prepared in three different ways.

- **Raised bed** – As the name suggest the nursery bed is raised to 10 - 15 cm high from ground level. These types of beds are prepared in area receiving high rainfall or during rainy seasons. Width and length of bed are 1.5 m and 3-5 m. there is gap of around 5–10 cm between beds in order to perform various cultural practices.
- **Sunken bed** – Beds are prepared 10 – 15 cm below ground level so that maximum water can be conserved. These types of beds are prepared mainly in dry and windy areas.
- **Level bed**- In level bed the area where plants are grown is divided into uniform small beds, usually these types of beds are created during non-rainy seasons.

19.5 Soil Treatment:

Different soil treatments are done so that soil borne diseases can be prevented and pests under soil are killed so that losses from these can be reduced. Some of soil treatment methods are as follow.

- **Soil solarisation** – It is a process in which the prepared bed is covered with polythene film for 3 weeks. Due to covering of bed, temperature inside polythene sheet increases 30- 40 °c from outside temperature which makes organisms present in soil vulnerable to being killed by heat. Weeds present in soil also gets killed due to excess heat.
- **Spray of fungicide** – Various fungicides like captan or carbendazim @ 5 g / m² can be applied for control of soil borne diseases.
- **Spray of insecticide** – Insecticides like chlorpyrifos @ 2ml/ lt of water is applied in soil to kill insect pest.

- Use of bio-agents – various bio agents like Trichoderma @ 10-25 g/m² are used to control pathogens in soil.

19.6 Types of Nurseries:

Nursery can be classified on 3 different bases:

Based on duration:

- **Temporary Nursery:** Nursery used for growing of crops by farmers for a short period of time is temporary nursery. These types of nurseries are mainly those in which farmer raises crops that needs to be grown in nurseries before transplanting into main field. These are raised mainly near to main field so that cost and loss during transportation are reduced.
- **Permanent Nursery:** Nurseries where wide variety of seedlings and rootstocks are raised for selling purpose are permanent nursery. These nurseries are grown in large areas as compared to temporary nursery. In these types of nurseries proper care and nutrition is provided to plants as compared to temporary.

Based on plants produced:

- Vegetable nursery - Nursery where vegetable seedlings are grown.
- Ornamental nursery – Nursery where ornamental seedlings and rootstocks are raised.
- Fruit nursery – Nursery where seedlings, rootstocks and cuttings of various fruits like apple, mango etc., are raised.

Forest nursery – Various tree plants are grown in these nurseries so that they can be later planted in forests, near road or can be grown for wood.

Based on structure used:

- Open field – This kind of nursery is set up in open fields. These are susceptible to hazards of nature. Seed beds are prepared according to environment conditions prevailing.
- Shade net – These nurseries are raised behind shade net structure. In order to provide plants with a range of shade according to their need, variety of colour and mesh size shade nets are used.
- Poly tunnel – Small greenhouse like structure covered with plastic sheet is used to cover nursery from harsh environment conditions and it also provides better growth of seeds.
- Greenhouse – These are big framed structures having plastic sheet covering in which various plants are grown so that more favourable conditions can be provided to plants for their growth.

With the advancement in agriculture concept of pro-trays is introduced so that seeds can be grown in mixture other than soil in order to avoid damage due to soil borne pathogens

and protection from pest present in soil. Plug-trays or pro- trays are the ideal way to plant hybrid and high-valued seeds. Coco peat mixed with vermiculite and perlite in ratio (2:1:1) are mainly used as growing medium for pro-trays as coco peat has good water retaining capacity.

19.7 Management of Young Nursery Plants:

- Irrigation – The young seedlings should be frequently watered with low pressure. Timely and required irrigation is very important as plants may die due to lack or excess of irrigation.
- Nutrition – Nutrition plays an important role in growth of plants as the growing medium must have adequate organic carbon. Nitrogen can be used to boost the growth of seedlings.
- Weed control – Weed control is very necessary as weeds start competing with seedlings and also may act as a carrier of some pathogen or pest which may cause damage. So, weeds must be removed timely with hand weeding or with tools. We can also spray various pre-emergence herbicides to avoid growth of weeds.
- Thinning – Process of removal of excess plants mainly weak, infected or damaged plants are removed so that nutrition is only used by healthy plants. This process also provides adequate space for growth of plants.
- Hardening – When seedlings are ready to be transplanted to main field hardening process is done 1-2 week prior to transplanting. In this process seedlings are not provided with water and temperature is also raised so that seedlings when transplanted to main field may adapt to harsh environment conditions.

19.8 Conclusion

Successful management of plant nurseries is important for the accomplishment of conservation and business objectives. Nurseries may play a vital role in biodiversity conservation, ecosystem restoration, and agricultural productivity by utilizing sustainable growing methods, maintaining high standards of plant health, and applying efficient production strategies. Furthermore, incorporating scientific research and new technology into nursery management techniques might improve productivity and adaptability to environmental shocks. The need for good nursery management techniques will only increase as long as we confront ongoing environmental difficulties on a global scale. As a result, nurseries must become more innovative and adaptable to meet the needs of the future.

19.9 References:

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