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Cultivating Resilience: A Comprehensive Guide to Dolichos Bean and Its Benefits

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ARTICLE ID: 48

Introduction

Dolichos (*Lablab purpureus)* is a genus of flowering plants in the legume family, Fabaceae. It is grown for vegetables, pulse, fodder, green manure, cover crop, medicines and ornamental purpose (Ayyangar and Nambiar,1935). It is one of the oldest legume crops known to be cultivate dry and semi-arid regions of Asia, Africa and America (Ayyangar and Nambiar,1935), in India it is popularly grown in south, east and north-east parts of the country. It is the major source of protein in South Indian diet. With cultivation area of 0.085 million hectares and production of 0.030 million tonnes, Karnataka only contributes about 90% of both area and production of Dolichos in India (Laxmi et al.,2015). It is grown either in pure stand or intercropped with cereals like finger millet, corn and sorghum, and with other crops like groundnut, castor in rainfed ecosystem. It prefers comparatively cool season, and moreover majority of traditional cultivars are temperature-and photoperiod-sensitive and requires short days for flowering.

Importance of Dolichos Bean

- **Nutritional Importance:** Dolichos bean is a highly nutritious legume that provides protein, vitamins, and minerals. It is a good source of dietary fiber, calcium, iron, and potassium. The protein content of dolichos bean seeds ranges between 20-25%, making it an excellent dietary supplement, especially in regions with limited access to animal proteins.
- **Soil Health and Nitrogen Fixation:** As a leguminous crop, dolichos bean has the ability to fix atmospheric nitrogen through symbiotic relationships with Rhizobium bacteria. This process enriches the soil with nitrogen, improving fertility and reducing the need for synthetic fertilizers. Consequently, dolichos bean is an excellent crop for sustainable agricultural practices and soil conservation.

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- **Drought Tolerance:** Dolichos bean is well adapted to semi-arid conditions, making it a suitable crop for regions prone to drought. Its deep root system helps it extract water from deeper soil layers, enabling it to survive under limited water conditions.
- **Forage and Green Manure:** In addition to its seeds and pods, dolichos bean can be used as forage for livestock. The plant's biomass is high in protein, making it a valuable feed. Moreover, when used as a green manure crop, dolichos bean can improve soil structure and organic matter content, further enhancing soil fertility.

Package of Practices for Dolichos Bean Cultivation

1. **Climate and Soil Requirements**
   - **Climate:** Dolichos bean is well-suited to tropical and subtropical climates. It requires warm temperatures (18°C to 30°C) for optimal growth. Though it can tolerate dry conditions, it thrives in areas with moderate rainfall (600–800 mm annually). However, excessive rainfall may lead to waterlogging and fungal diseases.
   - **Soil:** It grows best in well-drained loamy to sandy loam soils with a pH of 6.0 to 7.5. The crop does not tolerate saline or waterlogged conditions. Soil with good organic matter content promotes healthy growth and higher yields.
2. **Varieties**

Different varieties are suited for different uses (e.g., pod, seed, or forage production). Some commonly grown varieties include:

- **HA-3:** A high-yielding variety suitable for dry regions.
- **HA-4:** Known for its short duration and drought tolerance.
- **Konkan Bhushan:** A dual-purpose variety suitable for pod and seed production.

3. **Land Preparation**
   - Plow the land thoroughly to break soil clods and improve aeration.
   - Incorporate well-decomposed farmyard manure (FYM) at the rate of 10–12 tons per hectare during land preparation to enrich the soil with organic matter.
   - Ensure that the field is free from weeds and that the soil has a fine tilth before planting.
4. **Sowing**

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- **Time of Sowing:** The optimal time for sowing dolichos beans is during the monsoon (June to July) or post-monsoon (September to October) depending on the agro-climatic zone. In regions with winter rains, sowing can also be done in early spring.
- **Seed Rate and Spacing:**
    - For bush varieties: Use a seed rate of 20–25 kg per hectare.
    - For pole varieties: Use a seed rate of 10–15 kg per hectare.
    - Spacing: For bush types, maintain a spacing of 30–40 cm between rows and 10–15 cm between plants. For pole types, rows should be spaced 1 meter apart, and plants should be spaced 50–60 cm apart within the row.
- **Seed Treatment:** Before sowing, treat seeds with Rhizobium inoculum (200 g/10 kg seed) to enhance nitrogen fixation and improve plant growth.

5. **Irrigation Management**
    - Dolichos bean is moderately drought-tolerant, but adequate moisture is necessary during the critical growth stages such as flowering and pod development.
    - In rainfed areas, supplemental irrigation may be needed if dry spells occur.
    - Avoid over-irrigation, as waterlogging can harm root development and encourage fungal diseases.
6. **Nutrient Management**
    - **Basal Fertilizer Application:** At the time of sowing, apply 25 kg nitrogen (N), 50 kg phosphorus (P_2O_5), and 25 kg potassium (K_2O) per hectare.
    - **Top Dressing:** Depending on soil fertility, an additional 20 kg of nitrogen can be applied as top dressing during the flowering stage.
    - Application of organic fertilizers like compost or FYM is recommended to improve soil structure and nutrient availability.
7. **Weed Control**
    - Weeding should be done 20–30 days after sowing and again after 50–60 days to keep the field weed-free.
    - Hand weeding or hoeing is commonly practiced. In larger fields, pre-emergence herbicides like Pendimethalin (1 kg active ingredient per hectare) can be used to control weeds effectively.
8. **Pest and Disease Management**

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Some of the major pests and diseases affecting dolichos bean include:

- **Pests:**
  - **Aphids:** Spray neem oil (5%) or insecticides like Imidacloprid (0.5 ml/liter of water) to control aphid infestations.
  - **Pod Borers:** Use pheromone traps to monitor and control pod borer populations. Spray Spinosad (0.3 ml/liter of water) for effective control.
- **Diseases:**
  - **Powdery Mildew:** This fungal disease can be controlled by spraying sulfur-based fungicides at the onset of symptoms.
  - **Anthracnose:** Apply fungicides like Carbendazim (1 g/liter of water) at regular intervals during humid conditions to prevent anthracnose outbreaks.

9. Harvesting and Post-Harvest Practices

- **Pods:** Pods can be harvested when they are tender and green, typically 60–90 days after sowing.
- **Seeds:** Harvest seeds when the pods turn brown and dry on the plant, which is usually 120–150 days after sowing.
- **Threshing and Drying:** After harvesting, dry the pods under the sun for 3–4 days before threshing. Seeds should be further dried to reduce moisture content to around 8–10% for safe storage.

10. Yield

- **Green Pods:** Bush varieties can yield 5–7 tons per hectare, while pole varieties can yield up to 10 tons per hectare.
- **Dry Seeds:** Average seed yields range from 0.8–1.5 tons per hectare under normal conditions.

11. Storage

Store the harvested seeds in cool, dry conditions. Seeds should be treated with an appropriate insecticide or fungicide to prevent storage pests such as bruchids.

Conclusion

Dolichos bean is a versatile and valuable crop with immense potential for improving food security, enhancing soil health, and supporting livestock nutrition. The above package of practices, when followed diligently, can ensure high yields and improved quality of produce.

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Moreover, its drought tolerance and nitrogen-fixing abilities make it an excellent candidate for sustainable and climate-resilient farming systems.

With increasing awareness of the need for sustainable agricultural practices, dolichos bean holds promise as a significant crop for smallholder farmers, particularly in resource-limited environments. Promoting its cultivation can contribute to improved livelihoods, nutrition, and environmental sustainability.

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