

#### Improved Varieties

##### African Marigold (*Tagetes erecta*)

- 1.Pusa Narangi Gainda
- 2.Pusa Basanti Gainda
- 3.Arka Agni
- 4.Arka Bangara

##### French Marigold (*Tagetes patula*)

- 1.Red Brocade
- 2.Rusty Red
- 3.Petite series

Select varieties based on purpose loose flower, cut flower, or ornamental use.

#### Land Preparation

Soil preparation is very important in order to commence the development of healthy roots and the establishment of plants. Plough the land two to three times to attain fine tillage, which will ensure proper aeration of the soil and transplantation of the seedlings smoothly. Add well-decomposed farmyard manure at the rate of 20-25 tonnes per hectare to increase fertility and energize the soil, thus facilitating the development of healthy plants and flowers.

After tilling the soil, level the ground to ensure proper irrigation and to avoid water accumulation in the soil. The creation of raised beds is very advisable, especially in regions with heavy rainfall and poor drainage. Raised beds will ensure proper aeration, prevent waterlogging, and promote healthy root development. A well-prepared field will ensure healthy growth and increased yields.

#### Propagation

Marigold plants are usually propagated using seeds, as this is the cheapest and most efficient method to cultivate a number of plants. The seeds needed vary according to the variety of the marigold plants. The seeds needed for growing African marigold plants are about 1-1.5 kilograms per hectare, whereas the seeds needed for growing French marigold plants are about 0.5-0.7 kilograms per hectare due to the small stature and high survival rate of the plants.

Sow the seeds in well-prepared beds with rich and well-drained soil. Provide the seeds with adequate moisture and shade to ensure proper and uniform germination. The seedlings are ready to be transplanted after 25-30 days, with a height of about 10-15 centimeters with healthy root development.

On the other hand, French marigolds are shorter and bushier, producing fewer and smaller blooms, making them suitable for ornamental purposes and landscaping. Some of the prominent varieties of French marigolds include Red Brocade, Rusty Red, and the Petite series, which are known for their vibrant color and bushy growth.

#### Transplanting and Spacing

Type	Spacing
African marigold	45 × 45 cm
French marigold	30 × 30 cm

Transplant during evening hours to reduce transplant shock and irrigate immediately after planting.

#### Nutrient Management

A consistent and balanced nutrient program is vital for healthy growth, profuse flowering, and excellent blooms in marigold cultivation. Application of well-decomposed FYM at the rate of 20-25 tonnes per hectare will improve soil structure, support microbial populations, and provide a consistent nutrient supply. In addition to organic manures, the recommended dose of chemical fertilizers includes 100-120 kg N, 60-80 kg P, and 60-80 kg K per hectare. Nitrogen promotes healthy growth and development of branches, phosphorus contributes to the development of roots and initial flowering, and potassium helps in the development of flower size, color, and stress tolerance.

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#### INTRODUCTION

Marigold (*Tagetes* spp.) is an important crop in floriculture businesses due to its adaptability, easy maintenance, and high marketability. It is commonly grown for cut flowers, garlands, decorations, religious use, landscaping, bedding, and borders. However, apart from its aesthetic value, marigold also has other uses. The plant produces natural dyes, including xanthophyll, for food colorants and animal feed. It also produces oil with medicinal and industrial value. The plant thrives in a variety of climates, making it a good option for farmers. It also requires a short growing period and less maintenance. When scientific techniques of cultivation are employed, the yields increase, and the flowers improve in quality, making marigold an important crop in floriculture.



#### Climate Requirements

Marigold is hardy and adaptable to various climates. However, its optimal growth is in mild to moderate climate conditions. The optimal temperature for the growth of marigold is between 18°C to 28°C. This range is ideal for the growth of marigold because it allows for vigorous growth of the plant. Marigold is a sun-loving plant that requires full sunlight to carry out photosynthesis. Photosynthesis is crucial for the growth of the plant because it allows for vigorous growth of stems and buds.

Marigold can be grown throughout the year in various regions depending on the climate. However, there is always the risk of cold and heat stress that can affect the growth of the plant. Such stress can lead to the reduction of the size of the flowers. Seasonal planning is crucial in achieving optimal production of marigold.

#### Soil Requirements

The type of soil is crucial in the growth of any plant. Marigold can be grown in various soils. However, it is ideal in well-drained sandy loams and loams. These soils allow for proper aeration of the roots of the plant. The optimal pH range for the growth of marigold is between 6.0 to 7.5. This range allows for the proper uptake of nutrients by the plant. Soils with high organic content allow for vigorous growth of the plant.

Heavy clay soils should be avoided because they tend to retain excess water, leading to poor aeration, root rot, and reduced flowering. Similarly, waterlogged conditions can severely damage plants and decrease crop quality. Incorporation of organic manures, compost, or vermicompost before planting improves soil structure, fertility, and moisture-holding capacity, thereby creating favorable conditions for root development and sustained growth.

#### Expanded Varieties

When it comes to harvesting marigolds, selecting the best varieties is essential, as different types vary in height, flower diameter, color, and their application in horticulture. There are two main types of marigolds that are cultivated, namely African marigold and French marigold, which are classified as *Tagetes erecta* and *Tagetes patula*, respectively. African marigolds are usually taller and have larger blooms, which makes them suitable for loose flower production and garland making. Some of the prominent varieties of African marigolds include Pusa Narangi Gainda, Pusa Basanti Gainda, Arka Agni, and Arka Bangara, which are known for their high yield, color, and uniform flower production.

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## एग्रीकल्चर फ़ोरम फॉर टेक्निकल एजुकेशन ऑफ़ फार्मिंग सोसायटी

कोटा, राजस्थान



### Scientific Cultivation of Marigold

संकलन

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To optimize the use of nutrients, the fertilizers are to be applied in two splits. The full dose of phosphorus and potassium fertilizers, along with half the dose of nitrogen, needs to be applied at the time of transplanting. The rest of the nitrogen dose is to be applied as a top dressing 30 days after transplanting to support healthy growth and development of buds. Micronutrients, including boron and zinc, also play an important role in the development of flowers, flower color, and prevention of physiological disorders. A balanced nutrient program will not only improve yields but also support consistent flower quality.

#### **Irrigation Management**

Proper irrigation is very important in the cultivation of marigolds, as too little or too much water can impede the development and flowering of the plants. The initial irrigation should be done immediately after transplanting to promote the fast establishment of the seedlings and reduce transplant shock. The succeeding irrigations are usually done at intervals of 7-10 days, depending on soil types, weather, and development stages. Soils with high sand content have faster drainage and thus need more frequent irrigations.

Over-irrigation should be avoided, as this may result in waterlogged soil, root diseases, and poor aeration, which may impede the development and flowering of the plants. Proper soil moisture management, within the optimal range, is important, especially during the vegetative and flowering stages, as the plants need water for the development and growth of cells, transport of nutrients, and formation of flowers. Proper irrigation can save water, promote healthy development, and increase flower formation.

#### **Pinching and Growth Regulation**

Pinching is an important cultural practice in marigold cultivation that involves removing the terminal growing tip of young plants. This operation is usually carried out about 30-40 days after transplanting, when plants have developed sufficient vegetative growth. Removal of the apical bud breaks apical dominance and stimulates lateral branching, resulting in bushier plants with more flowering shoots.

The benefits of pinching include increased number of flowers per plant, uniform plant shape, improved canopy spread, and enhanced overall yield. In commercial cultivation, uniformity in plant growth is highly desirable because it leads to synchronized flowering and easier harvesting. Properly timed pinching is therefore an effective technique for improving both productivity and flower quality.

#### **Weed and Pest Management**

Weeds compete with marigolds for nutrients, water, and light, especially in the early days when marigold seedlings are small and tender. Weeding is important for a good start and high yields. Weeding is done manually two or three times in the early stage of marigold growth. Weeds are manually removed without disturbing marigold roots.

Mulching using organic or plastic materials is done to deprive weeds of light for germination. Mulching has additional benefits in that it retains soil moisture, regulates soil temperature, and enhances soil quality. A little hoeing between rows may be done for better soil aeration and stronger roots. A combination of methods in weed management is more effective in maintaining soil fertility and safety.

#### **Pest and Disease Management**

##### **Key Pest Problems**

Aphids, thrips, and leaf miners are common marigold pests. They feed on sap or leaves, which weakens marigold growth and reduces flower quality. They may transmit viral diseases like aphids and thrips. They may be controlled using neem-based preparations, sticky baits for trapping flying adults, and chemical insecticides when their numbers exceed economic injury levels.

#### **Key Disease Problems**

Damping-off, leaf spot, and powdery mildew are common marigold diseases. Damping-off attacks marigold seedlings in nurseries, killing them suddenly. Leaf spot and powdery mildew reduce photosynthesis and flower quality. Precautionary measures against marigold diseases include seed treatment with beneficial microorganisms, appropriate planting distances for better air circulation, and maintaining a clean environment. Fungicidal preparations may be used when necessary. A highly recommended method for marigold management is the Integrated Pest Management (IPM) method, which reduces chemical use and promotes eco-friendly farming.

#### **Harvesting**

The marigolds tend to flower around 60-70 days after they are transplanted, but the exact days may vary depending on the variety. If the marigolds are to be harvested for the open market, it is best to wait until the flower is fully open and at its best size and color. Harvesting should be done during the early morning or late evening to ensure longer flower longevity.

Regularity in the harvest is also essential, as it will encourage the plant to continuously flower. When picking the marigold, it is best to use clean hands or clean scissors to prevent damaging the plant, thereby extending the longevity of the flower.

#### **Yield**

Scientific methods of cultivation can also improve the yield of marigolds, unlike the conventional methods. African marigold produces 12-18 tonnes of flowers per hectare, while French marigold produces 8-12 tonnes per hectare. The yield can be further improved by the introduction of high-yielding varieties, balanced fertilizers, proper irrigation, pinching, and pest control. Development programs in floriculture, which encourage the adoption of better cultivation practices, also involve high-yielding varieties, which are supported by organizations such as the Indian Council of Agricultural Research or the National Horticulture Board.

#### **Post-Harvest Handling**

The post-harvest handling is also essential to maintain the flower's freshness, value, and marketability. After the harvest, the spoiled or infested flowers should be removed to prevent the spoilage of the fresh ones. The fresh flowers should be classified according to their sizes, colors, or uniformity to ensure better marketability at higher prices. The fresh flowers should be kept in the shade to reduce moisture loss, thereby extending the longevity of the flower. When transporting the flowers, it is best to use clean, ventilated containers to prevent heat buildup or damage to the flower.

#### **Benefits of Scientific Cultivation**

The application of scientific cultivation practices in marigold cultivation is beneficial in many ways. First of all, the yields increase, the quality of the flowers is improved, and the timing of the blooms is consistent. These three aspects of improved cultivation practices are very important in the context of marigold cultivation because they can attract more buyers. Improved cultivation practices can also prevent diseases in the crop, minimize wastage of resources, and improve the utilization of resources. Improved cultivation practices can attract premium rates for the flowers, which can improve the financial condition of the farmers. Ultimately, scientific cultivation practices can improve the productivity of the crop, making marigold cultivation a very profitable venture.

#### **CONCLUSION**

Scientific cultivation practices in marigold cultivation involve the application of improved varieties of marigold plants, proper spacing of the plants, proper nutrition of the plants, proper irrigation of the plants, pinch-and-grow practices in marigold cultivation, and plant protection practices in marigold cultivation. Improved cultivation practices can improve the productivity of the crop while maintaining the health of the soil. With the increase in the demand for various types of flowers in ceremonies, festivals, and other functions, marigold cultivation can attract many entrepreneurs because of its high profitability. With the advancement of scientific cultivation practices in the coming years, marigold cultivation is likely to become an important part of modern-day floriculture.