

Marigold Cultivation and Marketing: Scientific Production Practices and Market Opportunities

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Marigold (*Tagetes* spp.) is one of the most important ornamental flower crops cultivated throughout the world. It belongs to the family *Asteraceae* and is native to Central and South America. The two commercially important species are African marigold (*Tagetes erecta* L.) and French marigold (*Tagetes patula* L.). African marigold is characterized by large flowers suitable for loose flower production, whereas French marigold bears smaller flowers used for bedding, pot culture, and landscaping. Marigold is extensively cultivated in India because of its adaptability, ease of cultivation, long flowering period, and continuous market demand. Besides ornamental purposes, the flowers are used for garlands, religious ceremonies, floral decorations, extraction of lutein pigment, cosmetics, natural dyes, pharmaceuticals, and poultry feed.



Climate, Soil and Improved Varieties

Marigold grows well under tropical and subtropical climatic conditions with an optimum temperature of 18–28°C. The crop requires bright sunlight for maximum flowering but is sensitive to frost and prolonged waterlogging. Well-drained sandy loam or loamy soils rich in organic matter with a pH of 6.0–7.5 are ideal for cultivation. Popular African marigold varieties include Pusa Narangi Gaiinda, Pusa Basanti Gaiinda, Crackerjack, Giant Double Orange, Giant Double Yellow, Calcutta Orange, and Calcutta Yellow. Common French marigold varieties are Red Brocade, Rusty Red, Harmony, Bonanza Series, and Safari Series. Variety selection depends on market demand, flower size, colour, and end use.

Nursery Raising and Crop Management

Marigold is propagated through seeds. Seeds are sown on raised nursery beds enriched with well-decomposed compost. Healthy seedlings become ready for transplanting within 25–30 days after sowing. The recommended spacing is 45 × 45 cm for African marigold and 30 × 30 cm for French marigold. Evening transplanting followed by light irrigation ensures better establishment. Balanced nutrition is essential for higher flower yield and quality. About 20–25 t ha⁻¹ of farmyard manure should be incorporated during land preparation along with 100–120 kg nitrogen, 60 kg phosphorus (P₂O₅), and 60 kg potassium (K₂O) per hectare. Half of the nitrogen and the full dose of



phosphorus and potassium are applied as basal, while the remaining nitrogen is top-dressed in two equal splits at 30 and 45 days after transplanting. Integrated nutrient management using organic manures and biofertilizers further improves soil fertility and nutrient-use efficiency. Irrigation should be provided at 5–7-day intervals during summer and 10–12-day intervals during winter, depending on soil moisture. Timely weeding and shallow hoeing reduce weed competition and improve soil aeration. Organic or plastic mulching also conserves soil moisture and suppresses weeds. Pinching of terminal shoots at 30–40 days after transplanting promotes branching, increases flowering shoots, and enhances flower yield, particularly in African marigold.

Plant Protection

Several diseases and insect pests affect marigold production. *Alternaria* leaf spot, caused by *Alternaria taetetica*, produces brown necrotic lesions on leaves and flower stalks. Proper field sanitation, crop rotation, balanced fertilization, and fungicides such as mancozeb effectively manage the disease. Powdery mildew, caused by *Oidium* spp., appears as white fungal growth on leaves and can be controlled with sulfur-based fungicides and improved field ventilation. Important insect pests include aphids, thrips, spider mites, and bud borers. Adoption of Integrated Pest Management (IPM) involving regular crop monitoring, biological control agents, neem-based formulations, and need-based insecticide application effectively minimizes crop losses while reducing environmental hazards.

Harvesting and Post-Harvest Management

Flower harvesting generally begins 60–80 days after transplanting, depending on the cultivar and season. Flowers should be harvested during the cool morning hours when fully opened but before petal deterioration. Harvesting every 2–3 days encourages continuous flowering. Under scientific management, African marigold yields approximately 15–20 t ha⁻¹, while French marigold produces 8–12 t ha⁻¹. Proper post-harvest handling is essential to maintain flower quality. Harvested flowers should be collected in clean plastic crates, kept under shade, graded according to size and freshness, and packed in ventilated containers for transportation. Careful handling and cool storage reduce post-harvest losses and improve market value.

Marketing and Economic Importance

Marketing is a key factor determining the profitability of marigold cultivation. Flowers are sold through different channels such as Producer → Consumer, Producer → Retailer → Consumer, and Producer → Wholesaler → Retailer → Consumer. Farmer Producer Organizations (FPOs), cooperatives, and direct marketing platforms help farmers obtain better prices by reducing the role of intermediaries. Marigold has a wide range of commercial uses. Fresh flowers are extensively utilized for religious offerings, temple decoration, weddings, festivals, garlands, bouquets, landscaping, and floral arrangements. Industrial applications include extraction of lutein pigment, natural food colourants, cosmetics, herbal medicines, essential oils, and poultry feed additives. Demand for marigold flowers increases significantly during festivals such as Diwali, Dussehra, Navratri, Ganesh Chaturthi, and Durga Puja. Value addition offers greater economic returns by converting flowers into garlands, bouquets, dried petals, natural dyes, essential oils, and lutein extracts. Such processing not only enhances farmers' income but also reduces post-harvest losses.

Despite its profitability, marigold marketing faces challenges including seasonal price fluctuations, perishability, transportation losses, inadequate cold-chain facilities, and dependence on festival demand. Improved storage, efficient transportation, market intelligence, digital marketing, and cooperative marketing can significantly improve market efficiency and farmers' income.

Conclusion

Marigold is an economically important ornamental crop with excellent commercial potential. Scientific cultivation practices, including the use of improved varieties, balanced nutrient

management, timely irrigation, pinching, integrated pest management, and proper post-harvest handling, significantly enhance flower yield and quality. Efficient marketing systems, value addition, and farmer cooperatives further increase profitability. With expanding demand from the ornamental, pharmaceutical, food, and cosmetic industries, marigold cultivation offers sustainable income and employment opportunities while contributing significantly to the floriculture sector.

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