



# ENVIS NEWSLETTER



**Centre for Environmental Studies (CES)**  
**Dept. of Forest, Env. & Climate Change, Govt. of Odisha**

**Issue No.: 66**

**July-September, 2021**



Director, Centre for Environmental Studies  
 -cum- Coordinator, State ENVIS Hub,  
 Forest, Env. & Climate Change Dept.  
 Government of Odisha

**Shri Rajiv Kumar, IFS**

Principal Chief Conservator of Forests

## From the Coordinator's Desk...

I am happy that State ENVIS Hub, Centre for Environmental Studies, Odisha is going to publish its 66th issue of ENVIS Quarterly Newsletter. ENVIS has been providing information on different issues related to environment. Publication of Newsletter is one of the ways for dissemination of information among wider public. This Newsletter focused on one of the important topics "Floriculture in Odisha: Present Status, Challenges, Way Forward".

Floriculture, also known as flower farming, is regarded as an agribusiness with an expanding market base providing employment and entrepreneurship in rural as well as in urban areas. In Odisha, growing of flowers and gardening by public are in practice for many centuries. Conservation of natural flora therefore is very important to propagate & promote cultivation of nature flowers.

Hopefully, this newsletter will be informative and educative for the readers.

Best Wishes.

*Rajiv Kumar*  
 (Rajiv Kumar)



**Supported by :**  
**Ministry of Environment, Forest & Climate Change**  
**Govt. of India, New Delhi**



## Floriculture in Odisha : Present Status, Challenges, Way Forward

Floriculture is one of the important and aesthetic horticultural disciplines that involves cultivation of ornamental flowers for their use in beautification of lawns and gardens, for use as cut flowers, pot plants, house plants, cut cultivated foliage, and for use as raw materials in industries (cosmetic/perfume/pharmaceutical industry). Floriculture, also known as flower farming, is regarded as an agribusiness with an expanding market base providing employment and entrepreneurship in rural as well as in urban areas.

In Odisha, growing of flowers and gardening are in practice for many centuries. Traditional flowers grown in the backyards were mostly used for religious purposes. Commercial floriculture has received attention only recently. Presently floriculture in Odisha has been identified as a profitable venture for the farmers, unemployed graduates, tribal youths, women entrepreneur, school and college dropouts. It has also been recognized as a profitable crop under crop diversification. Flower trading in Odisha is such that local entrepreneurs say it is a Rs.50cr industry. The area under floriculture in the state is about 6612 ha with an annual production of about 24.80 lakh t of loose flower and about 48.80 lakh ton of cut flowers. The various avenues of commercial floriculture are production of loose and cut flowers; production of cut foliage; production of flowers for essential oil extraction and nursery business.

The present flower production is able to meet only 10% of the State's demand. Odisha largely depends on Andhra Pradesh, West Bengal, Karnataka and Delhi to meet its flower requirement during its festive seasons. To promote commercial cultivation of flowers and to meet the increasing demand in the domestic market, the State Govt. is implementing the floriculture programme in mission mode and there is provision of financial assistance to the farmers under this programme.

Flowers like Rose, Marigold, Tuberose, Gladiolus are some of the flowers which are a large demand over the years. These flowers can be grown profitably in the State under different agro climatic situations.

### **Present Status:**

In the State, there is growing demand for ornamental plants with the rising standard of living, aesthetic sense and awareness among people.

A large number of private and public gardens & parks have been developed in the State during last 15 years or more where good number of ornamental flowering and foliage plants have been planted. Besides many more gardens and parks are also expected to come up in near future for which there will be requirement of a huge quantity of ornamental plant planting materials. Ornamental flowering plants like rose, mussaenda, hibiscus, bougainville, poinsettia, dahlia, chrysanthemum and others are of greater significance among various nursery grown ornamental plants. Most of the nurseries in the State are very small and they do not follow modern technique of propagation or have required infrastructure facilities like tissue culture units, propagation chamber with misting facility and even mother plants. They procure various planting materials; particularly plants like budded rose, rooted dahlia, chrysanthemum, hybrid seedlings of merigold, hibiscus, mussaenda etc. from Kolkata, Midnapur, Kakinada, Rajahmundry and Bengaluru and do trading either due to unavailability of mother plants in their nurseries or due to great demand of these plants. There is also high demand for quality seasonal flower seeds, bulbs, tubers, corms etc. Now few local nurseries are producing these materials on a limited scale for their own use.

### **Challenges:**

The challenges of floriculture in the State are: less interest shown by traditional farmers to grow flowers; lack of sufficient knowledge on production technology and post harvest management like grading, packing, storage & transport of flower crops, less exposure to technical manpower who can guide the farmers to high tech floriculture. Lack of quality planting materials; production technologies of some flowers (both traditional and high value crops) is yet to be standardized under agro-climatic

zone level. Inadequate infrastructural facility like green house, net house, cool chain etc. and organized market channels and natural calamities like drought, flood and cyclone.

### **Way forward:**

There is great potentiality for development of commercial floriculture in the State, although presently it is in infancy. The agro climatic condition of the State is favorable for various flowers in demand. Cultivation of cut flowers like gladiolus, tuberose, chrysanthemum, golden rod, gypsophila, cook's comb, gomphrena can be taken up in and around the cities/towns in addition to cultivation of traditional flowers like marigold, tuberose, desi rose, small flowered chrysanthemum, china aster, jasmine and crossandra for loose flower production.

Cultivation of flower crops for oil extraction is highly profitable. Essential oils are used for preparation of cosmetics, medicines and perfumes. Tuberose and Jasmine can be successfully cultivated in the state for essential oil production. At present the flowers of tuberose and Jasmine from an area of about 60 acres are going to Ichhapuram for oil extraction. Cut foliage of areca palm, livistona palm, fishtail palm, bottle brush, polyalthia, cycas, asparagus, kamini, fern, etc. are used in florist trade for decoration purpose. These can be successfully and profitably cultivated in the State.

Eastern ghat highland zone of Koraput with prolonged winter and mild summer is favourable for production of quality blooms over an extended blooming period. Similar climatic condition prevails in Keonjhar and Phulbani and favourable for protected cultivation of high value flower crops in addition to common cut flower varieties. Export oriented units can be established in above districts for protected cultivation of cut rose, chrysanthemum, gerbera, carnation, anthuriums, liliun, orchid etc. at a cheaper production cost.

There is greater scope of live foliage and flowering plants in both export and domestic market. These can be produced commercially in the State due to favourable agro climatic conditions and the nursery business will have higher profit. There is very good scope of establishment of tissue culture

units in the State for large scale production of quality planting materials of flowering plants and indoor foliage like gerbera, anthurium, carnation, liliun and orchids.

Kewda is an important flower crop used for essential oil production in Odisha. Kewdas grown in the State are second to none in the world so far as quality is concerned. The natural Kewda plantation is seen mostly in Ganjam, Jagatsinghpur and Puri districts which has not yet been explored to a desired level for quality flower production and oil extraction.

There is vast scope for commercial cultivation of water lily and lotus in different water bodies in coastal areas of the State. The inferior indigenous naturally grown types can be replaced with improved/hybrid types.

Marigold is mostly grown in the state for fresh loose flowers. This is also grown for production of dry flowers which is used in poultry feed to improve the colour of egg yolk and meat. Besides, edible dye is prepared from it as it is rich in xanthophylls pigments. So, there is scope to exploit this avenue. There is scope of growing Dutch roses in Odisha which can be exported to Dubai, Singapore and European countries.

There is need for establishment of auction hall for the sale of flowers in the state where cultivators from rural /urban areas can take part in the auction. This will increase the income of the farmers. The cold storage units should be provided for preserving the flowers for a longer duration and refrigerated vans for transporting the stock from far-off places.

### **Cultivation practices of important crops:**

#### **Gladiolus**

(*Gladiolus* sp.) Gladiolus is a very popular bulbous ornamental plant. Its magnificent inflorescence with florets of dazzling colours, varying forms and sizes and long keeping quality makes it an attractive cut flower. Gladiolus spikes can be kept in the vases for 8-10 days depending on the variety and the ambient conditions prevailing in the room. The flower is an essential component of most flower arrangements including bouquets. The promising cultivars of gladiolus in

India are Friendship white, Friendship pink, American beauty, Vince's glory, Vince' beauty, Red beauty, Her majesty, White prosperity, Wild rose, Apple blossom, Cherry blossom, Black Jack, Oscar, Yellow stone, Rose supreme, Mayur etc. Besides Pusa Unnati (florets are purple red/pink in colour, spikes are very long about 126 cm in length with 16-20 florets, produces 2-3 shoots from each mother corm). Pusa Srijana (florets are purple group in colour, spikes are long about 86 cm in length with 15 to 17 florets, produces 2-3 shoots from each mother corm) and Pusa Red Valentine (a mid maturing variety producing long and sturdy spikes with 17-19 florets, each measuring about 9.76 cm in diameter, the floret brick or blood red are the centre of attraction. This variety produces on an average 2.33 corms and 28 cormels from each mother corms.), Pusa Vidushi (an early and mid maturing variety, first florets open 80-85 days after planting. Spikes with 15-16 number of florets per spike. Florets are purplish white in colour. More than two shoots and two corms are produced from each mother corm.) and Pusa Manmohak (a mid maturing variety flowering in about 100-105 days. The florets are saffron red. Spikes are more than 93.00 cm in length and about 19-21 number of florets per spike. It produces more than two corms and more than 49 cormels from each mother corms), Pusa Shubham (It produces 14-16 florets of cream to yellow colour. It is an early variety, flowering in about 72 days. The life of a spike is 10 days. It produces 1.6-2.3 shoots and more than 2 corms and 20 cormels from each mother corm), Pusa Kiran (It produces white coloured florets 16-19 in numbers). It is an early variety flowering in about 75 days. The life of spikes is about 10 days. It produces 1.9-2.7 shoots and more than 2 corms and 20 cormels from each mother corm are promising cultivars released from IARI during 2011, 2012 and 2013. It can be grown from plains to an altitude of 2500 m. For successful cultivation of gladiolus, mild climate is ideal, while very hot and too cold conditions are harmful. The crop prefers sunny conditions and should never be planted under shade and requires at least 80% of total sunlight for proper growth and flowering. It can be grown in a wide range of soil varying from light sandy to clay loam



soils with slight acidic nature. Gladiolus is propagated by corms (the underground storage organs-which are sometimes wrongly called as bulbs) and cormels. The cormels of the first year would be normally of very small size and would not yield any flowers. It would require one or two growing seasons for the cormels to become corms that can yield flowers. About 4-5cm dia corms give best flowers. Before planting, corms should be soaked in 0.02% bavistin for half an hour which protect for disease attack to the crop in the field. About 1 lakh corms are required for planting 1 ha of land. Gladiolus is generally planted in ridges and furrows system of planting with a distance of 30 cm between ridges and 15 cm between corms within the ridge. Ideally the depth of planting can be in the range of 7-10 cm. Generally gladiolus is grown in the winter. The ideal nutrition for the crop is 20 g N, 20 g P and 20 g K per m<sup>2</sup> or 200 kg N +200 kg P +200 kg K along with 50 t FYM required per ha. Nitrogen is applied in 4 equal splits i.e during planting, at 2-3 leaf stage, spike emergence stage and 2 week after harvesting of flowers. Irrigation can be given once in a week. Spray the crop with 0.2% Malthion or 0.03 % Imidachloprid whenever there is attack of aphids. Thrip attack can be controlled by spraying 0.2% Malathion or 0.1% Profenofos or Fiproni. The spikes would be ready for harvest from 60-110 days after planting depending upon the variety, corm size at the time of planting and season. The corms are lifted after maturity, when nearly 25 % of the cormels turn brown and the leaves turn yellow and start drying. It takes nearly one and half to two months after flowering for the corms to attain maturity. The yield per hectare would be around two

lakhs spikes. The cormel yield varies from 4-6 quintals (15-20 lakhs ) per hectare The total cost of cultivation and gross return per hectare comes to Rs 7.10 lakhs and Rs 9.00 lakhs respectively. Thus the net return (profit) per hectare is Rs 1.90 lakhs.

### Marigold

(*Tagetes* sp.) It can be grown throughout the year. But grows well in hot and dry as well as humid climate. It can not withstand severe cold. The ideal growing temperature ranges from 15-35°C. It requires well drained sandy loam soil. Cultivars of marigold are grouped in two groups: (a) African Marigold (*Tagetes erecta.*): Tall growing plant/big size flowers. The different common cultivars are Giant Double, African Orange, African Yellow, Snow Bird, Golden Age, Sirakole, Spun Gold, Spun Yellow, Sweet 'n' Yellow, Sweet 'n' Gold, Bidhan Marigold 1, Bidhan Marigold 2, Pusa Basanti Gianda, Pusa Narangi Gainda. (b) French Marigold: (*Tagetes patula*): Dwarf plant with small flowers. The different common cultivars are Red Pigmy, Happy Orange, Happy Yellow, Queen Sophia, Orange, Sophia, Honey Sophia, Goldie, Star Dust, Rusty Red, Lemon Drop, Honey Comb, Golden Boy, Harmony, Susana, Little Devil.

The average seed rate is 2-2.5 kg per ha. Seedlings are raised in nursery during May. One month old (15 cm height) seedlings are planted in one side of ridge at 40 x 30 cm spacing.(for African Marigold) and 30 x 20 cm spacing (for French Marigold). The ideal nutrition for the crop is 20 g N, 20 g P and 20 g K per m<sup>2</sup> or 200 kg N +200 kg P +200 kg K along with 50 t FYM required per ha. 50 % N is applied along with full dose of P, K and FYM as basal and rest 50% N applied after one month of planting. Irrigation is applied at 7 day interval. The crop requires constant moisture from bud



formation to harvesting. The crop is sensitive to water logging. The crop duration is 4-5 months. Leaf spot and bud rot diseases can be controlled by 0.2% mancozeb. Mite attack can be controlled by spraying the crop with 0.2 % Propargite or Fenazaquin. Normally flower is picked in 3 days after 60 days of planting. French marigold and African marigold will be flowering after 45 days and 60 days of transplanting of seedlings, respectively. The average yield is 12-15 tonnes of flowers per hectare. The total cost of cultivation and gross return per hectare comes to Rs.1.47 lakhs and Rs.2.65 lakhs, respectively. Thus the net return (profit) per hectare is Rs 1.18 lakhs.

### Rose

(*Rosa* sp.): Modern roses grown in gardens are Hybrid Tea, Floribunda (Grandiflora), The popular variety under Hybrid T are Mainu Parle, Gladiator, Montezuma, Papa Meiland, Taj Mahal, Grand Opera, Gold Medal, Lal Bahadur, Montrel Paradise, Super Star. Similarly, the popular varieties under Floribunda are Blue Perfume, Golden Jubilee hocking Blue, Lutin, Summer snow. However, in the cut flower trade, popular varieties are Sonia, Motria, Golden Times, Norwa, Mercedes, Kanchi, ICO-Ambassador. Rose are generally propagated by 'T' or 'T' budding. *Rosa multiflora*, *IIHR of R.indica* are suitable rootstocks and budding is done during winter season. Light and well drained soil with pH 6.0-7.5 is suitable for the crop. Rose grows best in open field where they get full sun at least for 5 hours in a day. Crop is propagated by seeds, cuttings, budding, and micropropagation. Roses are planted at a spacing of 60 x 60 cm in the bed size of 6.0 x 1.2 mt. Prepared at 0.75 to 1.0 mt apart. For planting individually in pits the pit size is 60 x 60 x 60 cm. The best time for bed preparation in plains is May or June. Ideal time of planting is September to October and can be continued up to December. Before planting remove all dried, dead, damaged and diseased twigs, leaves and damaged root coming out of earth ball etc. with sharp secateurs. Planting in late-afternoon is considered best. Ideal time of pruning is mid October to mid November. During pruning 6-8 nos of shoots per bush should be retained and each shoot should have 6-8 nos of eye.



Newly planted rose plants should not be pruned. Blitox paste should be applied on the cut ends. 5 kg well rotten cow dung manure should be applied per plant during pruning. After one week of pruning each plant should be applied with 20g Urea, 60gm SP and 25 gm MOP. The newly planted rose need frequent watering till they establish and afterwards once or twice a week. The suckers at the base of the stem should be removed as soon as they appear. Powdery mildew disease can be managed by spraying the crop with 0.2 % wettable sulphur. Besides leaf spot disease can be controlled by spraying the crop with 0.2 % mancozeb. Spray the crop with 0.2% Malthion or 0.03 % Imidachloprid whenever there is attack of aphids. Thrip attack can be controlled by spraying 0.2% Malathion or 0.1% Profenofos or Fipronil. Mite attack can be controlled by spraying the crop with 0.2 % Propargite or Fenazaquin. When outer one or two petals start unfurling harvesting is done in local market. But fully coloured tight buds are harvested for distant market. Stop watering and nutrition after harvesting flower, for about 4-8 weeks until most of the leaves drop. Thereafter pruning up to 30-60 cm from ground level carried out and watering and nutrition are given. The optimum yield in open field is 40-50 flowers per plant or 200-300 flowers per m<sup>2</sup>. The yield is 3-5 tonnes per year. The per hectare production of rose comes to 43 lakhs (Nos.) and the total cost of cultivation and gross return in open field per hectare as Rs 27.13 lakhs and Rs.54.27 lakhs, respectively. Thus the net return (profit) per hectare is Rs 27.14 lakhs (Majumdar and Lahiri, 2012).

### **Tuberose**

(*Polianthus tuberosa* L.) : Loam, Clay loam, Sandy loam soil having pH range from 6.5-7.5 with proper drainage are suitable for cultivation of tuberose. It is a tropical plant and grow throughout

the year. The popular single type varieties (with one row of corolla segments) are Phule- Rajani, Calcutta Single, Coimbatore Single, Bangalore Single, Srinagar, Prajwal, Baivab. The popular double type varieties (more than 3 rows of corolla segments) are Suvasini, Pearl Double, Calcutta Double. Tuberose is propagated by bulb and size is 1.5-2.0 cm. Bulbs (One lakh bulbs/ha) are planted in 10 mt x 1.5 mt bed. For one year crop, 2-3 bulbs/hill and for 3 years crop, one bulb/hill are planted. The recommended planting distance is 30x 20 cm. The depth of planting should be 4-5 cm. Ideal time of planting is March to May and irrigation should be provided on need basis. The requirement of manures and fertilizers for the crop are FYM 50t, Neem cake 4 quintals, N 300 kg, P 200kg and K 200 kg per ha. At the time of planting tuberose 1/3 rd N and full dose of P and K along with FYM and Neem cake are applied. Subsequently 1/3rd N applied 30 days after planting and balance 1/3rd N applied at 60-90 days of planting. Weeding should be done at monthly interval and light earthing up done at two months age. Irrigation to the crop should be given at weekly interval. However irrigation should be avoided at maturity stage of bulbs. In case stem rot and bud rot infestation more, spray the crop with 0.3% of copper oxychloride or 0.2 % Redomil or Bavistin. Beside spray the crop with 0.2% Malthion or 0.03 % Imidachloprid whenever there is attack of aphids. Thrip attack can be controlled by spraying 0.2% Malathion or 0.1% Profenofos or Fipronil. Flowering starts after 130-150 day of planting. The yield of the crop is 50 quintal of loose flowers /ha or 2.5 lakh spikes/ha. The yield of ratoon crop increases as compared to the 1<sup>st</sup> year crop.



## Gerbera:

(*Gerbera jamesonii*) Gerbera is an important commercial flower crop grown in a wide range of climatic conditions. The flowers come in different colours including yellow, orange, creamy white, pink, brick red, scarlet, maroon, terracotta & various other intermediate shades. The double cultivars sometimes have bicolour flowers. The cut blooms are used for floral arrangements and preparation of bouquet. The cut blooms when placed in water remain fresh for a reasonable time. The production technologies of Gerbera in poly houses are illustrated below.

**Soil Structure:** The main factors to consider are soil pH between 5.5 & 6.5, soil not be saline (salinity level should not be more than 2m mhos/cm), soil be highly porous and well drained to have better root growth and penetration of roots. The roots of gerbera go as deep as 50 to 70 cm.

**Disinfection of Soil:** Before planting gerbera, disinfection of soil is absolutely necessary specially for the fungus, *Phytophthora*. The various methods of disinfection/sterilization are: (a) Sun - Cover the soil with plastic for 6-8 weeks (b) Chemicals - Use Methyl Bromide/Formalin@ 7.5-10 lit/100 m<sup>2</sup> & then cover with plastic for two weeks. Then flush the soil approximately with 100 litres of water per m<sup>2</sup> to drain the traces. Thereafter wait for two weeks before plantation

**Bed Preparation:** In general, gerberas are grown on raised beds to assist in easier movement & better drainage. The dimension of beds should be : Height: 45cm, Width: 60cm

**Varieties:** Popular varieties are Red star, Jallisse, Quote, Shimmer, Lovely, Tecla, Sunway, Dalma, Cochovelle, Goliath, Dune, Sangria.

**Planting:** While planting gerbera plants, the crown of the plant should be 2-3cm above soil level. As the root system establishes, the plant is pulled down. Therefore, the crown must be above the ground level at planting. Plant the seedling without disturbing the root ball. Generally two rows are planted on each bed. Planting distance -row to row 37.5cm and plant to plant 30 cm. Rake the soil surrounding the plant at every fortnight for aeration. After plantation,

maintain the humidity at 80% for 4-6 weeks to avoid desiccation. Avoid excessive watering to gerbera.

**Irrigation:** The water quality should be pH-6.5-7.0 & E.C-0.5-1.0 ms/cm. To lower the salinity level of water, add acid in the water tank & then irrigate. Immediately after plantation, irrigate the plants with an overhead micro sprinkler for four weeks to enable uniform root development. Thereafter, gradually change to drip irrigation. Generally one drip per plant is required. The water requirement of the gerbera plant is approximately 700ml per plant per day. In hot summer foggers may be used to maintain the humidity in the air. Before irrigation, observe the soil column and visually check the soil moisture content. The quantity of irrigation varies with season. Always water the plant before 12 noon. Until the first flower is produced, irrigation can be done with overhead micro sprinklers, thereafter with drippers. The RH of the air should exceed 90-92%. As a thumb rule, the soil should be moderately moist, however never having excessive water. The crown must be dried out.

**Scheduling:** Small plants require about 8 weeks to develop the first flower. The first flower bud should be removed to develop the plants further. The next flower can be harvested. On an average during a year 3 flowers/month/plant can be harvested. This pattern can change slightly with the season

**Basic Nutrition Schedule:** Till 2-3 weeks after planting no fertilizers are applied. From 3-12 weeks 20:20:20@0.75g/lit/day N:P:K, and from 12 weeks onwards 15:8:35@1.5g/lit/day to be applied. The optimum treatment combination is 20:40:20g N-P-K/m<sup>2</sup>. This is a general schedule that has to be amended by analyzing soil samples at regular intervals.

**Trace Elements:** The availability of micronutrients or trace elements is related to the soil pH and presence of other nutrients in the soil. Copper, zinc, manganese and iron are more available at low pH while molybdenum is more available at higher pH. Therefore, pH <4.0 or >7.5 minor elements deficiency symptoms may occur. Presence of more phosphorus reduces root uptake of Cu, Fe, Mn, Zn. Micronutrients should be given weekly or fortnightly as per the deficiency symptoms. Calcium foliar spray of 25-30

ppm can be given in calcium deficiency. Besides Calcium deficiency may be prevented by pre-planting of Ca sources as limestone, gypsum or super phosphate and adjusting the pH 5.5-6.0. In case of Mg deficiency, liquid fertilization with  $MgSO_4$  (Epsom) at 0.5g/lit can be given. If there is iron deficiency, liquid fertilization with  $FeSO_4$  at 0.5g/lit or chelated iron 0.25g/lit may be applied to the growing media.

### Diseases & Pests:

**Crown rot/Foot rot:** Caused by *Phytophthora cryptogea*. Leaves of infected plants wilt, gradually become dry and turn to reddish brown colour, the crown turns black and decays.

The disease is severe when the soils are constantly wet. Control-Soil drenching with 0.2% Benomyl (Benlate)/Ridomil (Metalaxyl). Remove the infected plants

**Root rot:** Caused by *Pythium*. Root skin is easily removed, plants wilt. Control-Soil drenching with 0.2% -0.3% Benomyl (Benlate)/Ridomil (Metalaxyl)

**Botrytis blight:** Occurs when the relative humidity is >92% for two hours in the morning. Gray spots on the flower petals rot in the heart of the flower. Control-spraying Carbendazim may be advised @0.1%.

**Aphids:** Caused deformed leaves, excrete some substance on which fungus develops. Control-spraying Imidacloprid (3l/10lit) or Flonicamid (3g/lit) may be made.

**Whitefly:** Occurs when the climate is hot and dry, cause damage to the leaves. Control-spraying Diafenthiuron (1g/lit) or Flonicamid (3g/lit) or Buprofezin (1ml/lit) may be recommended.

**Leaf miner:** White specks on the leaves caused by flies, white tunnels in leaves caused by larvae. Control- Indocarb (1ml/lit) or Imidacloprid (3l/10lit) or Flonicamid (3g/lit) may be followed.

**Mites:** Older leaves are curled up, the younger one being deformed and a leathery, deformed flower. Control-spraying Fenazoaquin (2ml/lit) or

Propargit (2ml/lit) or Hexythazon @ 0.06% may be done.

**Thrips:** Causes white specks or stripes on ray flowers, flower heads may be deformed, Silvery, grayish spots on the leaves, brown spots on leaf petiole /mid vein. Control-Spraying Profenofos (0.1%) or Fipronil (0.1%) or Acetamiprid (0.3g/lit) or Thiomothoxam (0.3g/lit) may be advocated.

**Harvesting:** Gerbera is a 24-30 month crop. The first flowers are produced 7-9 weeks after plantation. The average yield is 200 flowers per square meter (6-7 plants). The flowers are harvested when 2-3 whorls of stamens have fully developed (particularly in single types). Some of the varieties are picked little later, especially the double types. For this flatness and openness are important ( when outer petals are fully expanded). Pluck the flowers in the morning or late in the evening or during the day when temperature is low. The flowers should be pulled rather than cut, because cutting will leave a stem stub on the plant that encourages the development of diseases. A flower should be bent sideways from the heart and pulled loose. However, with young plants, this needs to be done with great care to avoid pulling off the plants from the beds. Before putting the flowers in the water, the heels (the hairy woody lower 2-5cms of the stem) must be cut off in order that they can suck water. Immediately put the flowers in water after harvesting for 4 hours at 7-10<sup>o</sup>c. Always add 7-10 ml commercial bleach /Sodium hypochlorite solution in one lit of water i.e 1% solution. Gerberas respond very well to re-cutting of stem before placing them in water or preservative solution at stage of marketing.





## Orchid Cultivation

Orchids are the doyens of horticultural plants because of their extraordinary flower qualities. The flowers do have highly attractive floral architecture and are available in wide range of colors, shapes and sizes. The added features of the flowers are the long self-life; some of the flowers could stay for more than two weeks after being cut from the plants. In general, orchids are traded as both cut flowers and potted flowers. Because of their unique features, the flowers are fetching high values in the floricultural trade. The demand of the flowers is growing in all parts of the world for which orchids are being cultivated in commercial scales to meet the demand. Growing orchids has become a good source of income.

Though the family of orchid comprised of about 25,000 species, the member of the genus, *Dendrobium*, *Phalaenopsis*, *Cymbidium*, *Oncidium*, *Vanda* and *Cattleya* are being extensively used in all parts of the world and are produced in a commercial scale to meet the demand. Among these, *Phalaenopsis* orchids are highly popular for the potted flowers whereas the *Dendrobium* orchids are used for the cut flower production. The unique combinations of color, size and shape of some of the *Dendrobium* orchids make the flowers attractive and highly suitable for cut flower production. The hybrid orchid "*Dendrobium Sonia*" is used for the cut-flower production. The flowers are available in different combinations of the purple and white color. The variety could be grown easily and from a single plant, 5-7 flowering sticks could be produced in a year. This variety has been found to be ideal for the state of Odisha. Some of the growers are able to produce high quality flowers of the variety. The varieties of the other orchids (*Phalaenopsis*, *Cymbidium*, *Oncidium*, *Mokara*, *Vanda* and *Cattleya*) are generally used as potted flowers. Under Odisha climatic conditions, these are proven to be producing high quality flowers.



*Dendrobium*

*Phalaenopsis*

*Vanda*



*Cattleya*

*Cymbidium*

*Oncidium*



*Commercial cultivation of Dendrobium Sonia*

Orchids prefer to grow under shaded conditions. The requirement of light intensity and the temperature differs from variety to variety. However, in general, orchids need 35,000 to 65,000 LUX light intensity for which it is suggested to grow again under the shadenet. In general, 50% shadenet or higher, based on the condition, is preferred. Again, for the orchids, black shadenet are recommended. High humidity in the environment is highly essential for the proper growth and development; ideally the requirement is 70-80%. The orchid houses must be provided with the foggers to provide humidity. Temperature of the growing environment must be maintained within the range of 15 to 33°C. Variation in the temperatures will affect the production of flowers. In the areas where temperature is reaching beyond 35°C, it is suggested

to provide foggers and air circulatory fans to reduce high temperatures. For more sensitive varieties like *Phalaenopsis*, it is advised to grow them under greenhouses equipped with fan and cooling pad systems. This facility could reduce the temperature upto 5°C less than the ambient temperature. In order to maintain all these climatic parameters, for households, it is advised to construct small polyhouses on the roof tops, covered with polyethylene sheets (200 micron, UV stabilized) and black shadenet (50%). However, orchids could be grown in the shaded area of the house where direct sunlight is not available for the plants. For commercial cultivation, it is essential to have a well-structured polyhouse provided with equipments like automated watering and fogger facility and circulatory fans.

Since majority of the orchids being grown are epiphytes, these need special potting medium for the growth and development. Use of regular soil is not recommended. Under natural conditions, the epiphytic orchids grow on the tree branches. Similarly, tree branches could be used for the orchids. However, in recent years, the mixture of charcoal, brick pieces and coconut husk pieces (1:1:1) is good for growing orchids. For the commercial production of flowers, the plants are grown on the coconut husks. These are cheaper and prove to be best potting medium for the growth and development of *Dendrobium Sonia*. For any potting media, it is recommended to wash and disinfect thoroughly before use.

Different types of pots are available for growing orchids, all the pots need to have sufficient holes for providing aeration to the roots of the plants. Both plastic and clay pots are good for orchids. Different types are available in the market. It is important that, the roots of the orchid should not touch the ground, the pots containing orchids need to be kept on the tables or benches. Different types of benches are also available, the most common are the iron benches. For commercial purpose, currently shadenet benches are being used for the growth of *Dendrobium* orchids. In this type, the nets are spread on the top of the strong monofilament

wires supported by concrete pillars. The coconut husk pieces are kept on the top of the shadenet and plants are tied with strings. The major attraction of these benches is that the plants get sufficient air for their growth and most importantly, it drains water efficiently.

Proper watering is one of the crucial steps for orchid cultivation, application of more water will spoil the roots of the plants. It is highly important that the water quality should be good, water containing high salts are not recommended for orchids. It is advised to use the river water. The mode of application of irrigation on the plants is also highly important for orchids; it is recommended to use foggers and watering should be done on the entire plants. For home garden purpose, hand sprayers are good for watering, however, for commercial purpose, motor driven automated water sprayers are recommended to use.

As that of the other plants, orchids require good amount of nutrients. In practice the water soluble NPK (19:19:19) is recommended to use. For the fully grown plants, it is recommended to provide 2gm/l, once in a week on the plants. Foliar application of the fertilizer is recommended to use, it is essential that all parts of the leaves are receiving the fertilizer. Once the orchids reach adult stage and are about to induce flower, reduce the application of the fertilizer to once in two weeks. Once the flowers are produced, one could stop the application of the fertilizer. Care must be taken not to overfeed the orchids; this could severely affect the growth and development.

Orchids require protection from different diseases. It is recommended to apply Bavistin 1gm/l on the plants as foliar spray, the treatment will provide protection against fungal diseases. In cases of any disease of Bacterial Soft and Brown Rot incidence, application of Streptomycin Sulphate @ 0.1 g + Copper Oxy Chloride @ 2 g/l is required. Similarly, for the Blackrot disease, foliar application of Metalaxyl 2 g/lit. is recommended. For pest problem, hands picking of the organism and subsequent killing is recommended.

## DISTRICT WISE AREA & PRODUCTION OF FLORICULTURAL CROPS DURING 2018-19

DISTRICT	MARIGOLD		ROSE		GLADIOLI		TUBE ROSE	
	Area (in Ha)	Production (in Lakh stems/Ha)	Area (in Ha)	Production (in Lakh stems/Ha)	Area (in Ha)	Production (in Lakh stems/Ha)	Area (in Ha)	Production (in Lakh stems/Ha)
Angul	150	15000	45	84	31	29	-	-
Balasore	12	120	66	116	90	88	40	92
Bargarh	98	829	50	98	26	25	10	28
Bhadrak	13	106	33	62	9	9	8	15
Bolangir	77	698	35	69	29	26	14	38
Boudh	15	128.1	21	46.2	4	4	3	4.5
Cuttack	147	1439	150	333	143	147	32	79
Deogarh	84	743	66	127	19	19	9	20
Dhankanal	130	1219	72	132	65	62	23	59
Gajapati	64	644	53	107	31	31	46	127
Ganjam	172	1150.5	92	182	62	60	52	118
Jagatsinghpur	8	87	13	25	9	9	4	12
Jajpur	13	113	16	30	15	15	5	10
Jharsuguda	8	76	20	47	18	17	5	14
Kalahandi	130	1156	75	127	59	59	6	11
Kandhmal	82	726	44	85	65	65	18	45
Kendrapara	18	180	10	19	10	10	2	14
Keonjhar	105	961	130	235	115	113	11	28
Khurda	86	788	103	219	121	120	7	20
Koraput	136	1261	46	86	84	81	15	44
Malkangiri	75	710	25	43	35	34	14	37
Mayurbhanj	138	1272	100	189	97	99	22	59
Nabarangpur	70	633	31	53	27	26	25	59
Nayagarh	64	584	60	92	30	30	14	39
Nuapada	84	791	30	50	25	24	5	14
Puri	150	1363.5	137	230.2	94	94	12	37.2
Rayagada	99	927	54	114	68	64	13	35
Sambalpur	150	1338	120	254	78	80	17	38
Sonepur	69	641	30	56	24	24	14	36
Sundargarh	130	1180	98	194	61	62	18	40
<b>TOTAL</b>	<b>2577</b>	<b>36864.1</b>	<b>1825</b>	<b>3504.4</b>	<b>1544</b>	<b>1526</b>	<b>464</b>	<b>1172.7</b>

*Source: Odisha Agriculture Statistics 2018-19*

### Conclusion:

Today floriculture is viewed as multi-billion dollar industry with lucrative business opportunities at national and international level as international market grows 8-10 % annually and domestic market at 20 to 25%. Outreach of the technologies and creating awareness about the benefits of practicing floriculture among rural population is the need of the hour. The farmers, the business class and the corporates should come forward for the flower farming where the scope is wide open and feasibility of profit is sky touching in Odisha.

## OBSERVATION OF WORLD OZONE DAY 2021

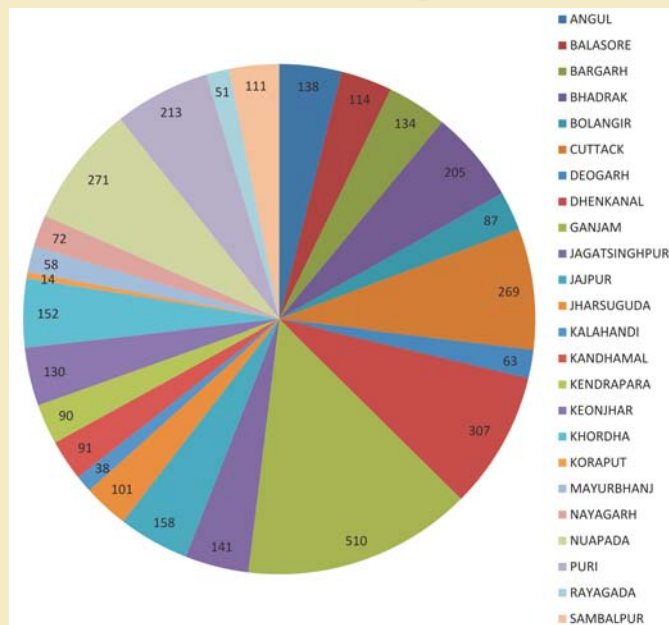
As per the instruction of ENVIS Secretariat, Ministry of Environment, Forest & Climate Change (MoEF&CC), Government of India; State ENVIS Hub at Centre for Environmental Studies, Odisha carried out following steps immediately for wide publicity of conducting different activities on "Protection of Ozone Layer".

- ❖ Advertisement in Social Medias
- ❖ Wide publicity through ENVIS Web Portal and CES Web Portal
- ❖ SMS to Mobiles of Teachers and Students
- ❖ Conducting different awareness activities

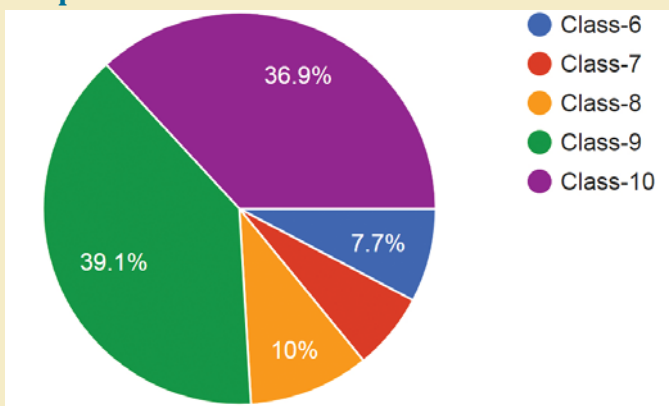
Drawing & Painting competition was organised for all school students of Odisha on the eve of 27th World Ozone Day-2021. About 200 students from different schools have sent their painting through our email.

State ENVIS Hub, Centre for Environmental Studies (CES), Odisha organized an online Quiz Competition on 16.09.2021 at 3.00 PM to 4.10 PM. The main objective was to spread awareness among students about the depletion of Ozone Layer and sharing information about atmosphere, ozone, CFC, acid rain etc. Link was for Quiz Competition - <https://forms.gle/JUaTEiLbPco33aXR8>. In this competition, 4211 students from different schools participated through the Google Form <https://forms.gle/JUaTEiLbPco33aXR8>.

### Total : 4211 Responses District wise responses



### Responses from different Classes



**Acknowledgment:** We are thankful to **Dr. Sanghamitra Patnaik**, Senior Scientist & Head, Krishi Vigyan Kendra, Mayurbhanj-I and **Dr. Nihar Ranjan Nayak**, Senior Scientist, Regional Plant Resource Centre, Bhubaneswar for providing relevant information for this newsletter.

**Disclaimer :** The views expressed by the writers do not necessarily reflect the views of the Centre for Environmental Studies or The Editor.

**Contact details :** State ENVIS Hub, Centre for Environmental Studies, Forest, Environment & Climate Change Department, Government of Odisha RPRC Campus, Ekamra-Kanan Road, Nayapalli, Bhubaneswar-751015, E-mail: [ori@envis.nic.in](mailto:ori@envis.nic.in), Website: [www.orienvis.nic.in](http://www.orienvis.nic.in)

*This newsletter is also available in electronic form at our website:  
[www.orienvis.nic.in](http://www.orienvis.nic.in) and [www.cesorissa.org](http://www.cesorissa.org)*

#### ENVIS EDITORIAL TEAM

Sri Rajiv Kumar, IFS, Director, CES-cum-Cordinator  
Sri Pravat Mohan Dash, Programme Officer  
Sri Prashanta Ku. Nayak, Information Officer

**For more update, Please Like [www.facebook.com/CESOdishaGovt](https://www.facebook.com/CESOdishaGovt) and Follow [www.twitter.com/CESOdishaGovt](https://www.twitter.com/CESOdishaGovt)**