

# Model Profile of 1.0 acre Gladiolus Cultivation

## 1. Introduction

Gladiolus (*Gladiolus* sp.) 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. Gladiolus is an essential component of most flower arrangements including bouquets.



## 2. Scope for Gladiolus Cultivation and its National Importance

Gladiolus is being grown in an area of 11660 ha in the country with an estimated production of 106 crore cut flowers. Amongst the cut flowers, gladiolus occupied third position in terms of both area and production. The major gladiolus producing states in the country are Uttar Pradesh, West Bengal, Odisha, Chhattisgarh, Haryana & Maharashtra. Gladiolus is also grown in states like Uttarakhand, Karnataka, Andhra Pradesh and Sikkim. Even though gladiolus is mainly a winter season flower crop, in areas having moderate climatic conditions, gladiolus can be grown throughout the year.

## 3. Technical Requirements of Gladiolus Cultivation

### 3.1 Climate

Gladiolus can be grown in a wide range of climatic conditions. It can be grown from plains to an altitude of 2500 m. During growth and development, the climatic factor plays a vital role. For successful cultivation of gladiolus, mild climate is ideal, while very hot and too cold conditions are harmful. Gladiolus prefers sunny conditions and should never be planted under shade and requires at least 80 % of total sunlight for proper growth and flowering. However the site should be sheltered from strong winds. Constant humid weather is not suitable as it attracts pathogens.

### **3.2 Soil**

Gladiolus can be grown in a wide range of soil varying from light sandy to clay loam soils. However deep (at least 30 cm), well drained, friable soils rich in organic matter and nutrients are suitable for its cultivation. The pH should be slightly acidic in the range of 5.5-6.5. If the soil is light and sandy, adequate amount of well rotten organic manure should be applied whereas in heavy soils, sandy soil could be added to improve the soil texture.

### **3.3 Soil Preparation**

The first ploughing is done to a depth of 30 cm two months before planting and left as such. About 2-3 weeks before planting, second ploughing is done followed by rolling for a fine tilth. The field is divided into small areas for the benefit of uniform levelling of land and irrigation. Drains are also provided to drain out excess water.

### **3.4 Planting Material**

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. Generally corms are classified based on their diameter. The size of the corm has a definite bearing on the length of the spike (floral stem). A medium sized corm with high crown is better than a flat large corm. Generally for flowering, corms of diameter 2.5 cm and above are used for planting, while the smaller ones are used for corm multiplication. So good quality, adequately sized corms, free from pathogens should be selected for planting. Few flower growers also import the corms from European countries.

### **3.5 Spacing and Plant Population**

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. The length of the ridges can be maintained keeping in view the size of the plot and the convenience in inter cultural operations. Planting can also be made on the surface followed by earthing up instead of planting in pre-formed ridges. In this case, further earthing up at a later stage becomes mandatory. On the basis of specified spacing, 80000 corms would be required for planting in one acre area.

### **3.6 Time of Planting**

Generally gladiolus is grown in the winter. However in moderate weather conditions, it can be grown round the year except for the summer months when sun burn will be severe. Staggered planting of corms will help in continuous supply of spikes. Round the year planting allows farmers to take three crops of gladiolus in two years. However, in the present scheme, only one crop cycle per year with staggered planting has been assumed.

### **3.7 Depth of Planting**

The corms and cormels are planted in a row, base down, and are covered with soil. Shallow planting of corms results in more cormel production but may result in lodging in high wind areas. Ideally the depth of planting can be in the range of 7-10 cm.

### **3.8 Fertilization**

Application of organic manure is of paramount importance for both flowering and corm development. However, use of too much manure should be avoided as this tends to make the flower spikes too tall and slender. Manurial dosage of 10 MT of FYM, 50:60:60 kg of NPK per acre and 5 kg of Zinc has been assumed.

### **3.9 Irrigation**

The soil should have sufficient moisture at the time of planting so that no watering is required till sprouting. The frequency of irrigation largely depends on the type of soil and prevailing weather conditions. During warm weather, irrigation can be done twice a week, while the same can be brought down to once a week during winter. After harvest of flowers, watering should be reduced. Irrigation atleast 4-7 days before lifting of corms depending upon the weather conditions would help in easy and effective lifting of corms and cormels.

### **3.10 Interculture**

If planted under ridges and furrows system, when the shoots are about 20 cm in height, earthing up / hilling can be done for keeping the plants erect and to prevent exposure of corms. By adopting surface planting system, earthing up can be done at the fourth leaf stage. Generally weeding can be taken up at two leaf and four leaf stages. Close planting obviates the need for staking. However, weeding and staking may be carried out as and when found necessary.

### **3.11 Plant Protection**

Aphids, Thrips, cutworms, mites, loopers, seed corm maggot usually attack the plant and cause considerable damage. Application of Sevin/Malathion, Chlorpyrifos at 0.2 % is found to be effective in controlling these pests. Fusarium rot, spongy rot, neck rot, leaf spot and viral diseases are prevalent in gladiolus. Fungal diseases can be controlled by application of fungicides like Dithane M-45, Captan, Bavistin etc. For viral disease, the affected plants should be uprooted and destroyed.

### **3.12 Harvesting of spikes and lifting of corms**

The spikes would be ready for harvest from 60-120 days after planting depending upon the variety, corm size at the time of planting and season. The spikes should be harvested at tight bud stage, with one to five florets showing colour and at least four leaves on the plant for development of corms and cormels. Thus if planting of corm is done in the month of September, the harvesting of spikes will begin from November/December and continues upto January/February. The frequency of harvesting the spikes should be adjusted depending on the growth of the plant/spike demand, market prices etc.

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.

### **3.13 Yield**

The spike and corm yield in gladiolus vary depending on the cultivar, corm size, planting density and management practices. The yield parameters are considered as under :

Spike yield : One spike per plant  
Corm yield : One plantable size corm per plant and cormels

Accordingly the yield per acre would be around 80000 spikes. However, only 90 % of the spikes are considered as saleable in this model. The cormel yield varies from 1.5 - 2.5 quintals per acre depending on variety, depth of planting etc. Even though the cormels are sold upto Rs.300 per kg, in the present scheme, income from cormels have not been considered, as sustained sale of cormels may not be possible considering the existing area and likely area expansion under gladiolus.

### 3.14 Post Harvest Handling

**3.14.1 Flowers :** The cut spikes should be immediately put in water and should be taken out only at the time of packing. After cutting, the spikes are graded based on the length of the spike and number of florets. Based on the above criteria, North American Gladiolus Council has categorised the spikes into the following categories:

Sl. No.	Grade	Stem Length (cm)	No. of florets
1	Fancy	> 107	16
2	Special	> 96 upto 107	15
3	Standard	> 81 upto 96	12
4	Utility	< 81	10

For the domestic market, the spikes are graded into three categories viz., A, B & C. After grading, the spikes can be bundled into 12 or 24 and wrapped with packing paper and elastic bands. Ideally the spikes should be packed in Corrugated cardboard boxes, but the practice is packing in gunny bags after wrapping the flowers with paper. Bundles of 60 dozens of spikes are packed while transporting. To prolong the vase-life, a little portion, say 1.5 cm of the spike from the base is cut under water on alternate days.

**3.14.2 Corms :** After lifting, the corms are cleaned and should be cured for a fortnight in shade/well ventilated place. Generally, the corms undergo a dormancy period of 2-3 months after which it sprouts. To prevent sprouting and desiccation of corms, it is preferable to keep the corms in cold storage till next planting. The corms may be stored after treating them with fungicides to prevent rotting in storage.

The techno-economic parameters for the model project are detailed in **Annexure I**.

## 4. Financial Viability and Bankability

### 4.1 Project Cost

The cost of gladiolus cultivation in one acre works out to Rs.2,84,300/-. The above costs are average indicative costs. Banks may adopt higher or lower than the average costs depending on local conditions and viability of the units. The cost of gladiolus cultivation is given in **Annexure II**.

#### **4.2 Margin Money**

The margin money / down payment prescribed are 5 %, 10 % and 15% for small, medium and other farmers respectively. The rest of the cost of development will be provided as bank loan. However, in the present model, 15 % of the unit cost i.e. Rs.42,600/acre has been considered as margin money.

#### **4.3 Bank Loan**

Bank loan of 85 - 95 % of the total cost of development shall be available from the financing institution. Bank loan considered in the model is 85 %. It works out to Rs.2,41,700/acre in the model.

#### **4.4 Rate of interest**

Banks are free to decide the rate of interest within the overall RBI guidelines issued from time to time. However, the ultimate lending rate has been considered as 14 % for working out the bankability of the model project.

#### **4.5 Security**

Banks are guided by RBI guidelines issued from time to time in this regard.

#### **4.6 Financial Analysis**

Financial analysis was carried out for one acre of gladiolus cultivation. For financial analysis, the income was assessed on a conservative basis. The detailed calculation of project's income and expenditure has been indicated in **Annexure III**. IRR, NPW and BCR for the model works out to more than 50 %, Rs. 2,40,478/- and 1.61 respectively and the details are given in **Annexure IV**.

#### **4.7 Repayment period of loan**

Based on the cash flow the detailed repayment schedule has been worked out and furnished in the **Annexure V**. The repayment period works out to five years.

#### **DISCLAIMER**

*The views expressed in this model project are advisory in nature. NABARD assume no financial liability to anyone using the report for any purpose. The actual cost and returns of projects will have to be taken on a case by case basis considering the specific requirement of projects*

**Annexure I : Techno-economic parameters**

Spacing	30 cm x 15 cm
Planting Material	Corms
Plant Population (plants/acre)	80000
Labour (Rs./manday)	200.00
Planting material (Rs./corm)	3.00
Farm Yard Manure (Rs./MT)	1000.00
Urea (Rs./kg)	12.25
Single Super Phosphate (Rs./kg)	36.25
Muriate of Potash(Rs./kg)	27.50
Sale price of Gladiolus spike (Rs./spike)	3.00
Sale price of corms (Rs./corm)	1.00

**Annexure II : Project Cost**

(Amount in Rs.)

Sl. No.	Item of Expenditure	Year 1
1	Land Preparation	2500
2	Layout (Marking, Pegging, Layout etc.)	1000
3	Planting Material	240000
4	Planting (mandays)	3200
5	Manures & Fertilizers	14690
6	Plant protection operations	5000
7	Irrigation Expenses	1500
8	Interculture	9000
9	Workable fence	6000
10	Harvesting & Packing	5000
11	Packing Material	2500
12	Transportation	8000
13	Misc. (incl. interest on working capital)	1600
	<b>TOTAL</b>	<b>299990</b>
	Rounded off	300000

**Annexure III : Income - Expenditure Statement**

(Amount in Rs.)

Sl. No.	Item	Year					
		1	2	3	4	5	6
	<b>Income</b>						
1	Yield (No. of saleable spikes/acre)	72000	76000	76000	76000	76000	76000
2	Income from spikes (Rs3/spike.)	216000	228000	228000	228000	228000	228000
3	Production of corms (no.)	80000	85000	120000	150000	150000	150000
4	Sale of corms (no.)	0	3000	20000	35000	35000	35000
5	Income from corms (Rs.)	0	3000	20000	35000	35000	35000
	<b>Total Income</b>	216000	231000	248000	263000	263000	263000
	<b>Expenditure</b>						
1	Cultivation expenses	300000	54000	59400	65340	71874	79061
	<b>Surplus</b>	-84000	177000	188600	197660	191126	183939

**Annexure IV : Financial Analysis**

(Amount in Rs.)

Sl. No.	Particulars	Year					
		1	2	3	4	5	6
1	Income	216000	231000	248000	263000	263000	263000
2	Capital Expenditure	300000	0	0	0	0	0
3	Maintenance expenses	0	54000	59400	65340	71874	79061
4	<b>Total Expenditure</b>	<b>300000</b>	<b>54000</b>	<b>59400</b>	<b>65340</b>	<b>71874</b>	<b>79061</b>
5	Net Income	-84000	177000	188600	197660	191126	183939
	<b>Financial indicators</b>						
	Discount factor	15%					
	Present Worth of costs	448031					
	Present worth of benefits	920390					
	NPV	472359					
	BCR	2.05					
	IRR	>50%					



## Annexure V : Loan Repayment Schedule

(Amount in Rs.)

	Total capital cost	300000							
	Loan at 85%	255000							
	Margin Money at 15%	45000							
	Rate of Interest on term loan	13%							
Year	Loan O/s at the beginning of the year	Interest	Interest Outstanding	Gross Surplus	Re payment		Total Outgo	Net Surplus	Loan O/s at the end of the year
					Interest	Principal			
1	255000	33150	33150	-84000	0	0	0	-84000	255000
2	255000	33150	66300	177000	66300	31050	97350	79650	223950
3	223950	29114	29114	188600	29114	74617	103730	84870	149334
4	149334	19413	19413	197660	19413	89300	108713	88947	60034
5	60034	7804	7804	191126	7804	60034	67838	123288	0