Course- Floriculture &Landscaping (ELP)

Course code- ELP-AGP 808

Practical Manual

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PREFACE

Floriculture is an important branch of horticulture dealing with all aspects of amateur & commercial cultivation of Garden plants. These plants have a rich tradition of uses in various aspects of our life since ancient time. They are getting increasing attention of entrepreneurs for the potential role in domestic and foreign markets as a source of cut and loose flowers, Indoor plants, flower bouquet, aromatic compound in the form of natural source of essential oils and perfumes.

Floriculture and landscaping module has been divided into five business ideas to impart hands on training on each of the selected business ideas.

The selected ideas been written in the following formats.

I. Justification.
II. Technical details.
III. Economic analysis / Cost & profit analysis.
IV. SWOT analysis.
V. Environment impact Assessment

CONTENT

Business Idea: 1

Production and Marketing of Dutch Rose

Current status and prospects of growing dutch rose

Rose is considered the 'queen of flowers' and is the most popular of all other garden flowers in the world. It is believed to the oldest flowers under cultivation and ranks number one among the cut flowers varieties in the international market.

The total production of Dutch roses in India is approximately around 0.03 thousand metric tonnes, which generated 141.45 lakhs rupees of income, thereby contributing heavily to the economy of the nation. Dutch rose is mainly cultivated in 4 Indian states; West Bengal, Karnataka, Gujarat and Chhattisgarh (www.agrifarming .in)

Dutch rose is considered as an important cut flower variety with commercial importance. These flowers are exclusively grown in polyhouse in India because of their high demand in the foreign countries during various occasions like Valentine's Day, New Year, Christmas and marriage ceremonies. The total production of Dutch roses in India is approximately around 0.03 thousand metric tonnes, which generated 141.45 lakh rupees of income, thereby contributing heavily to the economy of the nation. Dutch rose is mainly cultivated in 4 Indian states; West Bengal, Karnataka, Gujarat and Chhattisgarh. The majority of the produce from the plants is for export purpose, which earns the farmer good returns. The government has also taken a step forward to support the Dutch rose cultivation by offering subsidies at various levels to encourage this sector

I . JUSTIFICATION

Rose is the leading cut flower in the international cut flower trade and is also the leading cut flower exported from India over 90 percent greenhouses grow rose as cut flower. Rose is universally acclaimed as a queen of flower.

Roses are important for garden decoration, cut flowers, extraction of oil , rose water , gulkand making etc. Any garden seems incomplete without roses may be any form, as a bush, standard or semi-standard, climber or miniature .

There is a huge demand of roses in local as well export market . Cut flower export is an established market in the country and abroad.

The salient characters of rose cultivars for cut flower are -.more number of petals, petals open slowly , more longevity, attractive colour, long and strong stem.

Establishing an unit of production in the open condition or in the polyhouse would be a profitable business proposition.

II. Technical Details:

Necessities for cultivation:-

1) Sunlight requirement of roses.
2) watering roses.
3) pruning roses
4) fertilizer for rose plan
5) well drainage system

The basic things required for Dutch rose cultivation in a polyhouse are orientation, design and management of polyhouse, soil preparation and sterilization, obtaining the proper planting material, irrigation, cultural practices, control of pests and diseases and fertilization.

VARIETIES :-

Modern rose grown in garden belong to different classes viz. Hybrid tea's , floribunda, grandiflora , polyantha , miniature , climbers & ramblers,

Hybrid Tea:First Red, Escada (Red), Osiana (Champagne). Ravel (Dark pink). Texas, Pareo (Yellow), Nicole, Vivaldi (Pink), Tincke (White), Tennesse, Monica (Orange), Skyline (light yellow).

Floribunda:- Cross between Hybrid and polyantha Golden times, Frisco, Yellow River(Yellow) Vanilla, Cream prophyta(cream). Kiss. Europa, Flirt(Pink). Escimo(White), Larnbarda(orange), Mercedes, Gabrielle(Red) etc. Performance of most of the above mentioned varieties are good in Pune followed by Bangalore and Delhi Pareo, Frisco. Yellow River etc perform unsatisfactorily in most of the places in India

Climate and soil:- Rose thrives well in sunny climate and required minimum six hours sunlight. The ideal temperature for rose 28-30degree c during day and night 15-18 degree c.Temparature less than 3 degree may cause darkening of petal colour to black. Highertemperature often fades the petal colour. The ideal relative humidity 60-65%.

Well drained, medium loam soil having a ph of 6.0-7.5 is ideal for rose growing. Heavy clay soil is not suitable for rose cultivation there should be soft warm below 45-60 cm layer of soil for rose growing. Rose cannot tolerate salinity and water logging.

Propagation:-Roses can be propagated by seed, stem cutting,grafting and budding.Rose iscommercially propagated by T-budding and stenting .stenting is a quick method of propagation of roses based on grafting a selected cultivar on an uprooted cutting of a root stock resulting in a complete plant in 3-4 weeks. The stented plant is called stentling .the technique used is whip grafting .selection of an ideal rootstock is very important for successful growing of roses.

T' BUDDING OF ROSE

FINAL PRODUCT OF T-BUDDING(Growth of desired scion on de headed root stock

		
Vermillion group	Blend group	Lavender group

Grandiflora:-Cross between Hybrid &Floribanda

Polyantha:-It looks like Floribunda but size is small

DIFFERENT VARIETIES OF DUTCH ROSE

Some of the Dutch Rose varieties are - Top Secret , Gold Strike , Carve Heel, Peach Avalanche, Sweet Avalanche, Tropical aAmagon, Hot shot, etc

Planting in Polyhouse Dutch Rose Cultivation Project :

Mainly two types of planting material can be used for Dutch rose cultivation, such as: budded plants or top grafted plants. The proper choice of the variety is highly important for good results. Budded planting material which is 5 to 6 weeks old and free from all contamination can be used for planting. If the farmer chooses to plant two rows on a single soil bed, then the spacing between the plants should be around 18 cm and row spacing should be 30 cm. The estimated planting density for Dutch rose plants is about 8-10 plants/sq m. After planting, the humidity of the area has to be maintained at 80% to prevent desiccation of plants.

SOIL BED PREPARETION:- Roses need a soil that drains well but holds moisture long enough for the roots to absorb it. Loam soil is ideal, too much clay may cause water logged but the sandy soil will drained before the root can get a good drink. In green house single, double or four row planting system in bed is being followed and spacing of 30*25 is kept optimum planting density in greenhouse is 60 to 70 thousand per hectare.In order to provide better drainage and aeration to the roots of the plant, raised soil beds are created for planting. The soil is made porous by adding gravel sand at the bottom of the bed. The best dimensions of the soil beds could possibly be as such: height of the bed should be around 45 cm, width at the top should be 90 cm and the spacing between the beds should be around 45 cm. Organic manure application to the bed can increase its texture and nutrition content.

Soil condition and sterilization in Polyhouse Dutch Rose Cultivation Project:-Well drained soil with rich organic matter and good oxygen content is considered best for Dutch rose cultivation. 30% of organic matter is required on the top of the growing beds for rose plants. The pH of the soil should be maintained around 5 to 6.5. The Dutch rose plants can also be cultivated on artificial growing mediums like coco peat, rock wool and pumice. The land inside the polyhouse should be dug to a depth of 30 cm and all weeds, stones, unwanted materials etc. should be removed. Decomposed FYM, sand, coir pith in the ratio 2: 1: 1 should be added along with 10 kg of urea to the soil.

STERILIZATION

Soil sterilization is a process of disinfecting the soil before planting the new plants. One method of sterilizing the soil is to supply formalin @ 10 liters per sq m and cover it with polythene film for 4 days. The land is properly aerated after removing the film and irrigated thoroughly to flush out the residual chemicals. Another way of sterilizing the soil is with hydrogen peroxide and silver. It is considered to be the most cost efficient and effective way of sterilizing the soil for Dutch rose cultivation. Initially the land is irrigated and 35 ml of hydrogen peroxide is mixed with 1 liter of water and spread over the soil. This should be allowed to settle for 4-6 hours, after which planting can be done. It is estimated that 1 sq m of land needs 1 litre of the solution.

Climate requirement for Polyhouse Dutch Rose Cultivation Project

Rose plants need sufficient light for growth. The optimum temperature within the polyhouse should be 15-28°C with a relative humidity of around 85-90%. Rose plants perform best in tropical and subtropical climates of India.

Optimum nutrients (ppm) status:

pH: 6.2-6.8, Calcium: 55, EC: 0.7, Magnesium: 20, Nitrate: 180, Ammonium: 2, Phosphate: 4, Iron: 0.39, Potassium: 45, Manganese: 0.04, Sodium: 25, Zinc: 0.07, Chloride: 35, Boron: 0.08, Sulphate: 105, Copper: 0.05, Bi-carbonate:30,

Calcium: 55

After care:-generally hand weeding is practiced. Monocot weeds can be effectively control with glyphosate (0.1 kg/ha) and dicot weed with pendimethalin or oxyfluorfen (0.5kg/h)

Weeding

Intercultural practice in poly house:-

Prunning:- The rose bushes are pruned once a year during second or third week of October in the northern plains. After about 6-7 weeks of pruning the plants start flowering . The time of flowering can be adjusted according to date of pruning .in the old hybrid tea bushes ,previous season's thick shoots are pruned up to half the length ,keeping about 5 or 6 eyes on each stem. A slanting cut is made a little above an eye which is facing outwards .the floribundas are pruned moderately. Hard pruning of hybrid tea and floribunda, keeping only 3-4 shoos with 3-4 eyes from the base is practise for obtaining exhibition bloom .prunning is done during late October to early November in west Bengal .A paste of Bordeaux mixture or cupper oxy chloride should be applied to the cut ends to prevent diseases.

Bending:- in protected cultivation ,bending is followed to produce high grade flower. All weak shoots are bent down to fill any area void of foliage and thus attain a desirable leaf area index to optimize photosynthetic potential and facilitate the transport of sugar to the developing shoots. The shoots which arise on dormant buds following knuckle cuts are generally more vigorous and produce high quality and superior grade flowers this vigour may be attributed to the fact that cane diameter is larger at knuckle and since weak shoots are bent, all remaining

shoots are exposed to better life and less competition . Bending is necessary for keeping enough leaves on the plants which are required for production of carbohydrates

Disbudding :-the young vegetative buds in the leaf axils of basal and lateral shoots aredisbudded. To encourage branching and more number of lateral and flowers.

Desuckering:- The shoots or suckers of rootstock emerging from the base of the plants should be removed as soon as they appear they can be distinguished from those of the scion by shape and size of their leaves .

Mulching:- rose bed may be mulch with straw, black polyethylene film ,saw dust etc

	
debloosoming	pruning

IRRIGATION:-

THE frequency of irrigation depends upon the soil texture and climate. Watering is more frequent in sandy soil and hot weather than in clay soil and humid /rainy or cool season in eastern /southern or coastal areas it may not be necessary to irrigate plants.

1)Irrigation is done through drip irrigation with one line along every row

2)One drip if inserted about 15 cm below the soil level helps to maintain optimum moisture around root zone .

3) Daily water requirement varies with the outside temperature from 2-5liter/m2

4) During vegetative stage irrigation through sprinkler /mister /fogger is beneficial.

FERTILIZER :-

Rose being perennial crop ,requires regular nutrient through manures and fertilizer . starting from land preparation ,planting , growth ,pruning and at the beginning of flowering about 8-10 kg of well rotten cow dung per plant is required per planting .depending upon crop growth followed by watering . Neemcake at the rate of 50 gm per plant at the end of flush of flowering. After one month after pruning may be taken up at 7-10 days interval it should be stop after flower bud start opening in foliar spraying of urea(1.25 gm/lit) and potassium dihydrogen(H_2PO_4) . Foliar application of urea (0.2-0.3 %/lit)also useful. Foliar grade water soluble fertilizer 19:19:19 ideal as a micro nutrient element . Mixture of manganese sulphate (15gm),magnesium sulphate (20gm),chealeted iron 10gm and borax(5gm) added to 25 litre of water (concentration 2gm/lit) in the market multiplex commercial formulation is available.

	
Mustard cake,Urea ,DAP	Mixing all fertilizers with the soil

Harvesting and post-harvest management :-Roses should be harvested at the tight bud stage when one or two petals begin to unfold. The stage of harvesting depends on variety, distance to

market place, climate and consumer preference. Roses cut too early may develop bent neck. Flowers should be cut in the morning or evening. They should be cut leaving 2-5 leaflet leaves on the stem. After cutting, they are immediately placed in a hydrating solution to maintain turgidity. After cut, they are cooled or graded. Roses are stored at 2-3°C with a relative humidity of 90-95%. The flowers should be transported to cool rooms. Pre-cooling removes the field heat and improves the post-harvest life. The hydrating solution may be acidified with 300 ppm citric acid to improve the uptake of solution. . The vase-life can be improved by using floral preservatives in vase solution. Aluminum sulphate and citric acid @ 300 ppm improve the vase-life. The flowers can be wet stored at 2-3°C. After cooling the flowers are shifted to grading room. All the inferior stems and those infested with pests and diseases are removed. The flowers are sorted to different grades manually or by automatic graders. Long stemmed varieties are graded from 40 cm onwards with a difference of 10 cm. The short stemmed varieties are graded from 40-65 cm with a difference of 5 cm.

Packing and transport: The graded stems are made into bundles of 20 each. The buds are wrapped with corrugated paper. The leaves are removed from lower 5 cm portion of the stems. The bunches are packed in fiberboard boxes. The stems should be tightly packed to avoid movement during transport . The flowers are transport to Calcutta flower market and nearby local market. During market survey, Rose selling near diamond harbour station Rs. 12/- per stem as on 22/5/2023.

ROSE CUT FLOWER PACKAGING

	
Flower shop inspection	
	
Flower shop in Gariahat Rs. 15/-	Rose selling beside road Rs. 10/-

Stage of flower harvesting:

_ For local market: When outer one/two petals start unfurling.

_ For distant market: Fully coloured tight buds

_ White, pink and yellow cultivars are harvested earlier to red as red may not open if harvested at tight bud stage

Average yield:

Indian greenhouses: 150-200 stems/m2/year.

For best results use the following processing guidelines:

- Unpack your roses carefully. Leave the wrappers on!
- Remove leaves below the flower line, but not above. Cut all stems sharply at an angle. We recommend cutting underwater whenever possible.
- Place bunches in a clean bucket of warm water containing a quality commercial hydrating solution such as Pokon & Chrysal RVB. Roses can be left in hydration solution for 24-36 hours. After that, they should be displayed in a flower food solution.
- Place roses with the wrappers on inside your cooler for 3-5 hours.
- Remove the wrappers, remove the outer "guard petals" and display your roses!

Diseases and pests:-

Aphids, attack the tender portions of rose plant. Infestation is more at shoot tips and flower buds. Both the nymphs and adults suck sap and reduce vigour of the plants buds fail to open and get dried.

Red scales: The reddish brown projection noticed on older shoots and parts is an indication of the incidence the scales are mostly stationary and start sucking sap from plants. The affected plants lose vigour and present a sticky appearance.

Thirps : Adult and nymphs suck sap from new flush mostly drop, which appears after pruning The leaves exhibit typical brown patches. The flower buds fail to open and the production also gets adversely affected. The flower

Petals lose their colour and appear brown. Ash weevil: Both adult and grubs attack rose plants. The adult weevil chews the leaf margins to produce regular holes. Clean intercultivation, deep ploughing exposes young grabs to natural predators.

Bud borer: The larval stage attacks young unopened flower buds while the adult lay eggs on buds and would not cause any damage. The larvae soon after batching enter the flower buds by

making holes. Once de the larvae feed on developing flower parts mostly petals. In severe cases, the bud gets completely damaged.

Chafer beetle: Both adults and grubs attack the plants. The grubs feed on roots and cause wilting of plants. The adult weevils feed on leaves, flower buds to produce irregular holes. Clean inter-cultivation, deep ploughing expose the young grubs to natural enemies.

APHID

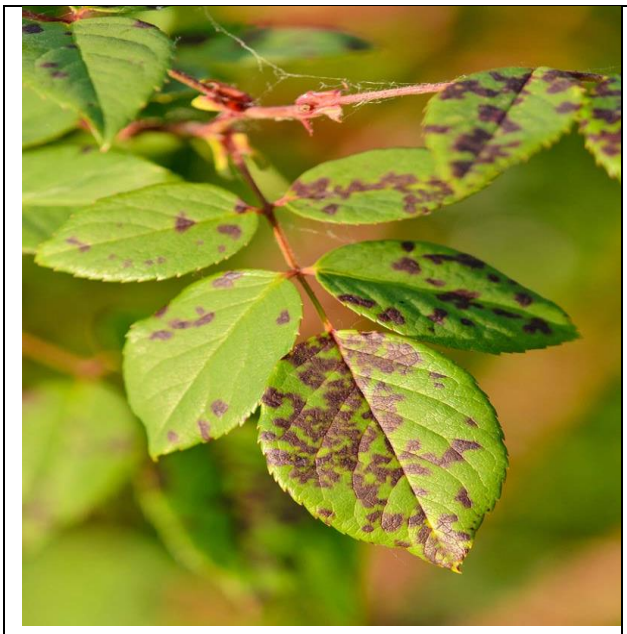
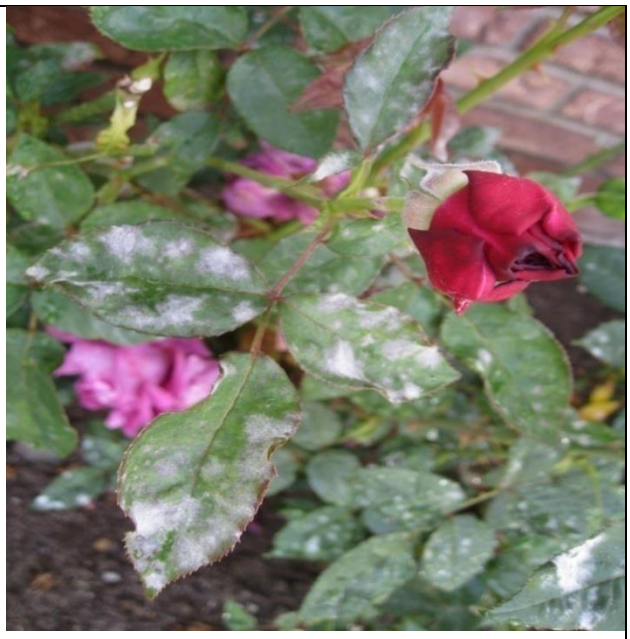
Diseases

Diseases affecting the crop are dieback, powdery mildew and downy mildew.

Dieback: Old plants are more prone to this disease. The infections enter from wounds caused by mechanical means or insects attack. The infection spreads rapidly. several cases.

Powdery mildew: All the aerial plant parts are affected. White powdery growth appears on lower surface of the leaves. The infected leaves curl and get malformed. The infected flower buds fail to open.

Downy mildew: The upper surface of the leaf shows typical yellow-discolouration. The affected leaves

	
DOWNY MILDEW	**POWDARY MILDEW**

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III. COST AND PROFIT ANALYSIS

POLYHOUSE DUTCH ROSE CUTFLOWER PRODUCTION IN POLY HOUSE AND MARKETING (1000sq.m)

Assumptions-	**Area (Sq m)**	**1000**
	1. cost of planting materials@ Rs 50/plant and no. of plants /sq.m@ 8	50
	No. of plants/ 1000 sq m	8000
	No. Of plants per Sq m	8
	2. Average yield per plant-30 buds	30
	Sale price of each stem (Rs.)	8
	3.cost of constructing polyhouse /sq.m Rs 750/-	750
	4.Elctricity usage : 3 units /day	
	5. Rate of labour /day -Rs. 300/-	

Output						
1	Year	1st	2nd	3rd	4th	5th
2	Capacity utilisation	50%	85%	100%	100%	100%
3	Total production	120000	204000	240000	240000	240000
	Revenue(Rs per annum): Total for 5 years	960000	1632000	1920000	1920000	1920000

A. Capital Cost/fixed cost		
	Polyhouse @ Rs 750 /m2 , for 1008 sq.m including glazing materials, Shed net, GI pipe	756000
B.Running Cost/Overhead cost/variable cost/recurring	Drip irrigation system with foggers , fertigation and filtration facilities	400000

costs		
	Number of Dutch rose plants/1000 sq m. i.e. , 8000 plants @Rs 50	113400
	Fertile soil, FYM, sand, Rice husk	112000
	Total Dutch rose cultivation cost	5000
	Tube well/water source cost	10000
	Electricity connection cost	15000
	Farm Implement cost and fertilizer storage	30000
	Total Fixed cost	**1441400**

Recurring cost						
Annual Land rent cost	4000	4000	4000	4000	4000	
Power cost/Electric bill@3 units /day	50000	50000	50000	50000	50000	
Annual Fertiliser consumption (Rs)	30000	30000	30000	30000	30000	
Annual Manpower salary	120000	120000	120000	120000	120000	
Annual Labour wages	96000	96000	96000	96000	96000	
Annual pesticides consumption (Rs)	30000	30000	30000	30000	30000	
Annual packaging cost (Rs)	4000	4000	4000	4000	4000	
Annual Transport cost(if any)	1500o	1500o	1500o	1500o	1500o	
Annual Marketing cost	10000	10000	10000	10000	10000	
Annual Insurance amount	5000	5000	5000	5000	5000	
Recurring cost	**349000**	**349000**	**349000**	**349000**	**349000**	

Total project cost	**1790400**	0	0	0	0	
Recurring cost	**349000**	**349000**	**349000**	**349000**	**349000**	
Total cost	**2139400**	**349000**	**349000**	**349000**	**349000**	
Sale price	**960000**	**1632000**	**1920000**	**1920000**	**1920000**	
Net benefit	-1179400	1283000	1571000	1571000	1571000	
DF @15%	0.870	0.756	0.658	0.572	0.497	
Discounted cost @15%DF	1860348	263894	229473	199542	173515	2726772
Discounted benefit @15%DF	834783	1234026	1262431	1097766	954579	5383586
NPW@15%DF	2656814					
BCR @15% DF	1.97:1					
IRR	114%					

Repayment schedule

Total project cost	1790400
Margin money@25%	447600
Bank loan	1342800

Year	Loan O/s at the beginning of the year	Intt.@10%	Net income	Repayment		Total out go	Net surplus	Loan O/s at the end of the year	DSCR
				Principal	Intt.				
1	1342800	134280	0	0	134280	134280	0	1342800	0
2	1342800	134280	1283000	500000	134280	634280	648720	842800	2.022766
3	842800	84280	1571000	500000	84280	584280	986720	342800	2.688779
4	342800	34280	1571000	342800	34280	377080	1193920	0	4.166225
								Total DSCR	8.87777
								Ave DSCR	2.219442

IV.SWOT ANALYSIS AND CONCLUSION

STRENGTH:-

1) High experience owner operator

3) Good transport system, flower market is very close by

4) Availability of skilful labour

5) Very popular with customers

Weakness :-

1)Unavaility of full time labour

2)parasites and pest

3)high cost

4)lack of storage facilities

Opportunities:-

1)festive seasons and special occasion

2)high demand for flower

3)export opportunities

4) Globalization and changing cultures

5) Real estate housing contracts

Threats

1)sudden climate change

2)frequent power outages

3)lack of agricultural insurances

4)competitions from substitutes products(artificial flower)

CONCLUSION:

Rose is the is the leading cut flower in the international cut flower trade and is also the leading cut flower exported from India over 90 percent greenhouses grow rose as cut flower . Rose (*Rosa hybrida*) is universally acclaimed as a queen of flower.After going through project details as analysed from the economic portion regarding financial analysis it is evident that poly house production of Dutch rose and marketing is a profitable business not only it provide the profit to the promoters but also helps the farming community eco-friendly sustainable and climate resilient business it will reaches cultural heritage and aesthetic senses of the involve stake holders with the fragrance of the queen of flower –Dutch rose .

V. Project summary:

As evident from the economics of the project and benefit cost ratio (1.97:1)of Rose cultivation, it is economically one of the most profitable business option for the entrepreneurs.

Risk Management:

1. Crop failure due to adverse climatic condition
2. Poor quality seedling leading to poor crop stand.
3. Lack of vitality of seedling
4. Disease problems

Mitigation plan :

1. Financial loss due to Crop failure is being covered through crop insurance policy

2. Poor crop stand is being compensated through consumer protection Act

3. Adequate plant protection measures to protect the crop from the initial stage to keep it healthy.

VI. Environment Impact Assessment.

1. Crop cultivation in high land is generally eco-friendly and climate resilient and necessary compliances as prescribed by the climate regularity body are duly adhered to.

Business Idea-2

GERBERA PRODUCTION AND MARKETING

I. JUSTIFICATION

Gerbera is a perennial, harbaceus plant of Asterace family . Widely used as a popular cut flowers for its irreparallel colour diversity and long Vass life. With gerbera cultivation farmer can earn approximately Rs50,000/ month even from 0.5 acre of land . Now-a-days, gebera is being cultivated both in open condition and in protected polyhouse condition .Both the cases due to its popularily in the local as well as in the international market , gerbera growing is becoming a very good profitable business ideas.

II. TECHNICAL DETAILS:-

1. Introduction:

Gerbera is popular and widely veryused as a decorative garden plant or as a high value cut flower .It also known as African Daisy .Carl Linnaeus named it by showing honour to German scientist Traugott Gerber .The place of origin of Gerbera is Africa , Asia , and Tropical regions of South America. Gerbera comes in many vibrant colours including red, orange, yellow, pink, white and cream. It has long-lasting3 to 4 inch flower. Flower stalks are long, thin and leaf less single or double type of single or multicolour. It flowers round the year in warm, humid conditions .It takes 2-3months from planting of flowering. Gerbera cultivation can be very profitable for farmers if they cultivate it.

With proper maintenance and also used as cut flower because its considerable long vase life, decoration on occasions landscaping.

- Family:Asteraceae
- Genus:Gerbera;
- Kingdom:Plantae
- Order: Asterales
- Varieties of Gerbera:
    a) Marinilla
    b) Mammutc
    c) Melrosed
    d) Casablaneaee
    e) TorroRosso
    f) PalmBeach.

Species and Varietal diversity in Gerbera:

Observation on the characteristics of the Cultivated 6 varieties:

Name of the Variety	Plant Height (cm)	No. of leaves/plant	Flower Stalk length(cm)	Flower Diameter (cm)	Colour of the flower	Colour of disk floret
Marinilla	40.26	14	54.5	8.93	Orange red	black
Mammut	33.06	9	42.7	9.4	Cream	yellow
Melrose	40.86	11	56	10	LightPink	Deep pink
Casablanca	36.63	10	42.7	7.5	White	green
Torro Rosso	40.16	9	51	7	Red	black
Palm Beach	35.6	12	45.9	8	Yellow	green

Marinilla

Melrose

Mammut

TorroRosso

Palm Beach

Casablanca

2. Necessities for cultivation:

- ✓ Sunlight requirement of plant.
- ✓ 50%shade
- ✓ Watering
- ✓ Fertilizer Application
- ✓ Well drainage system
- ✓ Rakethesoiloncein15 days
- ✓ Remove old leaves to facilitate new leaf growth and good sanitation.
- ✓ Hand Weeding is done whenever necessary.

3. Climate and temperature:

Bright sunshine accelerates the growth and quality of the flowers, however, in summer this flower needs diffused sunlight .Gerbera plants grown in locations with insufficient light will not bloom well. The optimum day and night temperature is 27 degree C and 14degree Crespectively.Forflowerinitiationtheoptimumtemperatureis23degreeCand for leaf unfolding itis25-27degreeC.

4. Soil condition and & sterilization:

Well drained, rich, light, neutral or slightly alkaline soil with pH rangeof 5.5-7.0. The crop can be cultivated through the year. The EC of soil should not exceed 1mS/cm.

Therefore, at the time of site selection for raising of gerbera soil testing is essential and on the basis of soil test data, amelioration can be done. Moreover, gerbera grows satisfactorily in well-drained and porous soil for porous soil for better root penetration. The gerbera roots can penetrate upto a depth of 50-70cm.

Sterilization:

Soil sterilization is required before gerbera plantation to manage Phytophthera infestation. There are three main soil sterilization methods available.

Steam- Not practical for Indian conditions.

Solar – In this method plastic sheet is covered on the soil for 6-8weekws. The sunrise will heat the soil, and this will kill most fungus.

Chemical- This is most advanced and useful method. Hydrogen peroxide with silver is used for sterilization of soil.Use of formalin@7.5-10lit/100 sq.m can also be done.

5. Soil bed preparation:

Gerbera is cultivated on raised beds.Thedimensionsofthebedinwhichthe bed height is 45cm, width of bed is 65cm and pathways between beds30cm.In loamy soils,15% sand is added along with organic manures10kg/square meter and rice husk 4kg/square meter .During the bedpreparation after disinfection neem cake must be applied @1kg/sq mwhich may prevent against the nematodes adversely affecting the plants.The materials mentioned above should be mixed thoroughly to get agoodmedium.

6. Planting in Polyhouse:

The planting of gerbera in two rows of plants are planted in the bed with spacing of row to row (20cm) and plant to plant (15cm). For maintaining such spacing six plants can be accommodated per square meter. Thus for planting in 1000 square meter of polyhouse, 6000 seedlings will be required. Proper care should betaken at the time of planting as the root ball should not be disturbed. A third of plug of gerbera plant should be above of soil and remaining two-third below of the soil. The crown of seedlings should be1-2 cm above soil.



PlantinginPolyhouse

Gerbera potted plants of six different varieties

7. Intercultural practices in polyhouse:

Few activities have to be carried out during Gerbera cultivation so as to facilitate healthy plants and better yield.

Such practices are:

Weeding and ranking of the soil: weeds always compete for nutrition with the plants and hence removing them is the best possible way of effectively providing nutrition to the required plants. Since the plants are irrigated on a daily basis, there is a possibility of hard surface formation due to which there is no proper aeration in the soil. Ranking is the process of removing the hard surface cover over the soil and allowing aeration to the roots of the plant. Weeding should be done twice in a month.

Disbudding: The buds that form during the initial stage of plant growth or few days after planting(45days) are expected to be of inferior quality and should be removed from the base of the stalk to facilitate strong plant with healthy flowers. This process of removal of inferior quality flowers is called disbudding .The normal commercial production of gerbera starts after 75 to 90daysofplanting.

Removal of old leaves: Sanitation within the polyhouse area is extremely important to keep the plants healthy and have increased production. Removing the old, dry and infested leaves from the plant and burning them outside the farm area or adding them to a compost pit is an effective way of controlling disease and pest infestation.

Pests		
Name	**Damage**	**Control meaures**
Whitefly	White fly feeding causes leaf yellowing and drop. A heavy whitefly infestation is difficult to treat.	Use of yellow sticky traps. The use of aerosols, parathion and malathion sprays.
Leaf Minor	Reduce flower production. Stunting the Plants Growth.	Dimethoate at 0.1% gave good control. Chemicals like acephate or paraffinic oil may also be used ,but they will only be effective early in the morning.
Disease		
Name	**Damage**	**Controlmeasures**
Powdery mildew	✓ Whitepowdery coating on thefoliage.	✓ Usefungicides, elementsulpherorDinecap.
Bacterial leafspot	✓ Small to large spots circular at first ,then became irregular And dark brown to black spot.	✓ Maintain low relative humidity. ✓ Avoid overhead watering.

9. Irrigation:

The quality of water required for gerbera plants should have a pHof around 6.5 to 7.

The P^H of the water can be reduced by adding acid to the watertank and then should be used for irrigation. The following steps can be followed for irrigation scheduling:

- ✓ Immediately after planting, overhead irrigation has to be given for 3 weeks so as to enable uniform root development.
- ✓ Once the roots establish, drip system of irrigation isused so as to provide the proper amount of fertilizers to the plants.

- ✓ Each plant should have one drip such that in the 2nd year of planting it facilitates foliage growth.
- ✓ Each plant requires approximately 300 to 700 ml of water per day depending upon the season.
- ✓ Checkthesoilmoisturepracticallyandthenshoulddecidethe quantityofwatersupply.
- ✓ Wateringshouldbedoneinthemorningbefore12PM.
- ✓ The relative humidity of the region should not exceed 90-92%.
- ✓ The soil bed should be moderately moist, excessive watering should be avoided.
- ✓ Water stored for more than 4 or 5 days should not be used for irrigation.

			
Watering			

10. Fertilizer application:

Fertilizer can be applied frequently at optimum level as excess application of fertilizer may cause harm to gerbera. Soil analysis must be done at an interval of two to three months to decide nutrient schedule.

✓ After three weeks of plantation N:P:K 19:19:19 @ 0.3 g/ plant should be applied every alternate day for first three months during the vegetative phase to have better foliage.

✓ During flowering stage, N:P:K16:8:24orN:P:K20:20:20 +13:0:45 @ 0.3 g/plant every alternate day should be applied for more flowers and better flower quality.

✓Fertilizer application should be given frequently in small quantities for optimum results.

✓As and when the deficiency of micronutrients will be noticed

,the corrective measures should be adopted.

✓To maintain Carbon-Nitrogen ration of the soil of beds, organic manures

are added at the rate of 2kg per square metre at every 3 months interval.

✓

11. Harvesting:

The gerbera plant has a cultivation life cycle of 30-36 months and the plant is ready for its first harvest within 7 to 8 weeks of planting.

During the harvesting period, the plant approximately has 14 to 16 leaves. The average yield from each plant is considered to be 40 flowers per year. Harvesting the flower should be done when 2 or 3 whorls of stamens develop completely because this decides the vase life of the flower. Picking should be done in the morning or late evening when the temperatures are low. It is advisable to pluck the flowers rather than cutting them.The heel of the stem should be cut in anangular fashion.

Harvested flowers should be placed in 2 to 3 cm of water for about 4

hours and the temperature should be about 14 to 15 degree C. The water in which the harvested flowers are placed should be treated with sodiumhypochlorite@7-10mlperlitofwater.

Each flower is sleeved with a polythene bag of dimensions 4.5 x 4.5 inches and then they are bundled into a pack often. These bundles are placed into boxes and each box is expected tocontainaround250to300flowers.Theexpectationsofagoodflowerare:

1. Stalklength-45-55cm
2. Diameter of the flower -10-12cm.
3. vaselife-8to12days(approx.)

Harvesting of Flowers

Measurement offlower

Marketing

III. COST AND PROFIT ANALYSIS

BusinessPlan for Gerbera Cutflower Production(10,000sq.m/1ha):

Assumptions	Area (sq m)	**10000**
	1. No. of flowers/sq.m/year	**192**
	2. Plants/sq.m	**8**
	No. of flowers per plant/ year	**24**
	Cost of gerbera planting material (Rs. / plant)	**25**
	Total planting area @ 80% of total area (sq. m)	**8000**
	No . of plants / ha	**64000**
	No. of flowers per year/ ha	**1536000**
	Sale price of each stem (Rs)	5

Output	**Year**	**1**	**2**	**3**	**4**
	Capacity utilisation	**30%**	**90%**	**90%**	**85%**
1	Flower production(no of stems/year):	460800	1382400	1382400	1305600
3	Revenue(Rs per annum):	2304000	6912000	6912000	6528000

Inputs						
A. Capital Cost/fixed cost						
	Polyhouse @ Rs 600/sq.m	6,000,000	0	0	0	
	Drip irrigation	75000				
	Total Gerbera plant cost	1600000				
	Tube well/water source cost	75000				
	Electricity connection cost	30000				
	Farm Impliment cost	25000				
	Total fixed cost	**7,805,000**				
B.	**Running Cost/Overhead cost/variable cost**					
	Reparing of polyhouse set up	0	100000	120000	120000	
	Annual Land rent cost	80000	80000	80000	80000	
	Power cost/Electric bill	25000	25000	25000	25000	
	Annual Fertiliser consumption (Rs)	50000	50000	50000	50000	
	Annual Manpower salary	200000	200000	200000	200000	
	Annual Labour wages	100000	100000	100000	100000	
	Annual pesticides consumption (Rs)	10000	10000	10000	10000	
	Annual packaging cost (Rs)	25000	25000	25000	25000	
	Annual Transport cost(if any)	20000	20000	20000	20000	
	Annual Marketing cost	25000	25000	25000	25000	

	Annual Insurance amount	12000	12000	12000	12000	
	Total recurring cost	**547,000**	**647,000**	**667,000**	**667,000**	
	Total project cost	**8,352,000**	**647,000**	**667,000**	**667,000**	
	Total project cost (Rs.lakh)	**83.52**	**6.47**	**6.67**	**6.67**	
	Income	**2304000**	**6912000**	**6912000**	**6528000**	
	Income (Rs. Lakh)	**23.04**	**69.12**	**69.12**	**65.28**	
C.	**Net income**	-60.48	62.65	62.45	58.61	
	DF @15%	**0.870**	**0.756**	**0.658**	**0.572**	
	Discouted cost @15%DF	72.63	4.89	4.39	3.81	**85.72**
	Discounted Income @15%DF	20.03	52.26	45.45	37.32	**155.07**
	NPV@15%DF	69.35				
	BCR@15%DF	1.81	:1			
	IRR	87%				

Repayment schedule of Gerbera (1.0 ha)									(Rs. Lakh)
							TFO		83.52
							Margin 25%		20.88
							Bank loan		62.64
Year	Loan outstanding at the beginning of year	Intt @10%	Net income	Repayment		Total outgo	Net surplus	Loan outstanding at the end of year	DSCR
				Principal	Interest				
1	62.64	6.26	23.04	5.00	6.26	11.26	11.78	57.64	2.05
2	57.64	5.76	62.65	25.00	5.76	30.76	31.89	32.64	2.04
3	32.64	3.26	62.45	25.00	3.26	28.26	34.19	7.64	2.21
4	7.64	0.76	58.61	7.64	0.76	8.40	50.21	0.00	6.97
								Total DSCR	**13.27**
								Ave DSCR	**3.32**

Marketing

IV. SWOTAnalysis: and Conclusion

- **Strength–**

1) BetterManagement
2) Exportlevelquality
3) EffectiveMarketingStrategy
4) Useof wastematerialinthefarm
5) IdealProjectforresearchwork

- **Weakness–**

1) NoBargaining
2) Lackof Export
3) HighPackaging MaterialCost
4) UnskilledLabour

- **Opportunities-**

1) ExporttheGerbera flowers.
2) Increasethe sourceofincomethroughalliedEnterprise.

- **Threats–**

1) ChangesinGovernmentpolicies.
2) Increasingthenumberofcompetitors.
3) FluctuationinMarketRates.

Conclusion:

Gerberaisthelatestsensationto Indian floriculture, commercially grown throughout the world in a wide range of climatic condition.

Moresustainablegreenhousegerberaproductioninhorticulturecanberealisedby developing new greenhouse and cultivation concepts. Gerbera flower production has emerged as the most profitable agri-business in the study area. Under the present cost, yield and price structure, the gerbera growers has more cushioning for hike in input prices, reduction in yield and prices of other flowers. From Gerbera cultivation economics, we can say that farmers can earn approximately six lakh per year from 0.5Acreland that is almost fifty thousand per month. **Polyhouse production of Gerbera cut flower is a profitable business**

V. Project summary:

As evident from the economics of the project and benefit cost ratio , this business is economically one of the most profitable business unit.

Risk Management:

1. Crop failure due to adverse climatic condition
2. Poor quality seed /seedling leading to poor germination or crop stand.
3. Lack of vitality of seedling
4. Pest and disease problems

Mitigation plan :

1. Financial loss due to Crop failure is being covered through crop insurance policy

2.Poor Germination is being compensated through consumer protection Act

3. Adequate plant protection measures to protect the crop from the initial stage to keep it healthy.

VI . Environment Impact Assessment.

Crop cultivation in high land is generally eco-friendly and climate resilient and necessary compliances as prescribed by the climate regularity body are duly adhered to.

THE NEOTIA UNIVERSITY

ज्ञानम् आत्म प्रदीपाय

Business Idea : 3

PRODUCTION AND MARKETING OF MARIGOLD

I. JUSTIFICATION

Marigold (*Tagetes sp*.) is grown as an ornamental crop for loose flowers as well as a source of pigment for poultry feed. Flowers are sold in the market as loose or after making into garlands. Other than loose flower, it can also be used as cut flower. Marigold is used especially for beautification and also in landscape plans due to its variation in height and colour of flowers. Leaf paste is used externally against boils and carbuncles. Leaf extract is a good remedy for ear ache. Flowers extract is considered as blood purifier, a cure for bleeding piles and is also a good remedy for eye disease and ulcers. The essential oil present indifferent species of*Tagetes* canfind use in the perfume industry.

In the state of west Bengal it is grown as poor mans crop very widely in varied purposes specially selling in the local market for religious purpose leading to a very good business proposition. Everyone can cultivate it and do this business for poor mans in the era of small and marginal farmers of Bengal as also in India.

Introduction

Flowers play an important role in people's lives. Every flower in nature is a soul blossoming. People become happier and more helpful as a result of this. For the souls, these are like sunshine, nourishment, and medicine. Flowers are an important part of floriculture,which is a highly concentrated area of the Ministry of commerce, for the development of the country. One of the most regularly planted flowering plants is the marigold, which belongs to the **Asteraceae** family. The marigold **(*Tagetes spp*.)** is the most popular loose flower in India. It isplanted as an ornamental crop, a pot plant, and as part of landscaping. Marigold is a flowerthat is native to Central and South America, particularly Mexico. There are 33 species in the genus Tagetes, with the two most common being***Tagetes erecta L.,*** also known as Africanmarigold, and ***Tagetes patulaL.,*** also known as French marigold. ***T. patula***(French marigold)followedasimilarpathfromMexicotoAfrica,and***T.erecta***(African marigold) was planted in Europe in 1596 and ***T. patula***in 1573. Tagetes was named after the demigod ‘Tages,' who was noted for his beauty.Both kinds are utilized as cut or loose flowers, as well as pot plants. Marigold is appropri ate for herbaceous borders as well as pots andshrubberies to add colour and fill space. Edging, hanging baskets,

and rockeries are all good places to use Frenchmarigold.The flowers of the Frenchmarigold are tiny, have lengthy peduncles,and come in a variety of colours i.e.,orange, yellow, mahogany and rusty red,deep scarlet etc.

Varieties of Marigold:

i. ***TageteserectaL***.(AfricanMarigold)

ii. ***TagetespatulaL.***(FrenchMarigold)

iii. ***Tagetestenuifolia***

DIFFERENT TYPES OF MARIGOLD

Marigold is grown as an ornamental crop for loose flowers as well as a source of pigment for poultry feed. Flowers are sold in the market as loose or after making into garlands.Other than loose flower,it can also be used as cut flower.Marigold is used especially for beautification and also in landscape plans due to its variation in height and colour of flowers. Leaf paste is used externally against boils and carbuncles. Leaf extract is a good remedy for ear ache. Flowers extract is considered as blood purifier, a cure for bleeding piles and is also a good remedy for eye disease and ulcers. The essential oil present indifferent species of*Tagetes* canfind use in the perfume industry.

II. TECHNICAL DETAILS

Climaticrequirement:

Marigold requires mild climate for luxuriant growth and flowering. Mild climate during growing period (14.5°-28.6°C) greatly improves flowering while higher temperature (26.2°-36.4°C) adversely affects flower production.

Soil Requirement:

Marigold is adaptable to different types of soil conditions and thus can be grown successfully in a wide variety of soils. However, a deep, fertile, friable soil having good water holdingcapacity,well drained and near to neutral in reaction (pH 7.0 – 7.5) is most desirable. An ideal soil formarigoldcultivation isfertileandsandyloam.

Field Preparation and Sowing:

Nursery beds are thoroughly prepared by digging and incorporating well rotten FYM. Beforesowing the seeds, Malathion dust should be dusted on outer side of nursery beds to avoidants.



PREPARATION OF FIELD

Planting Material and Propagation:

Marigold is mainly propagated by seeds, besides; it can also propagated by cuttings. Crop raised from seeds is tall, vigorous and heavy bloomer. For raising seedling for one hectare, about 1.0 kg seed is required. For raising seedlings seeds can be sown in pots, seed boxes or on flat or raised nursery beds. Seeds should be sown thinly and be covered with light soil or sand or sieved leafmould and wateringshould be done by finenose.For cutting method,6-10cm long cuttings are made from the apical portion of the shoot and treated with root promoting hormones like IAA and IBA. Cuttings planted in sand or vermiculite root easily and rooted cutting are transferred in bed or pots for flowering.


Time of Transplanting:

Mid July, mid October and February-March are suitable time for transplanting. At the time of transplanting they should of 7 to 10 cm height and bear 3-4 true

leaves. Transplanting should be done in well prepared land in the evening .

TRANSPLANTING OF SEEDLINGS

Spacing:

Tagetes erectarequire 45 × 30 cm spacing while ***T. patula***require 20 × 20 cm or20 × 10 cmspacingforhighyield.

Nutrient Management:

FYM is given @ 50 tones/ha at the time of field preparation. In African and French marigoldapplication of 400 kg N, 200 kg P and 60 kg K per hectare should be done. Nitrogen should be given two or three times during growth period.

Water Management:

The frequency and quantity of water mainly depends upon factors like soil and season. In lighter soil, more frequent irrigation is required than heavy soil. Weekly irrigation is necessary from September-March in sandy loam soil.

During summer months from April to June, frequent irrigation at an interval of 4-5 days is required.

WATERINGTHEPLANTS

WeedManagement:

In marigold production, control of weeds is an important operation. In India, 3-4 manual weeding are required for entire period.Chemical weed control is also recommended.

Intercultural Operations:

Pinching:

Apical portion of shoot if removed early, a large number of axillary shoots arise resulting in well shaped bushy plants bearing more number of uniform flowers. The removal of shoot apices 40 days after transplanting enhances the flower yield.

Staking:

It means providing support to the tall plants. The African marigold plants grow tall and needs to be staked with the help of bamboo sticks. Otherwise, lodging and bent stem may affect proper display of the plant.

STAKING

Pestand Disease Management:

Red Spider Mite (*Tetranychussp.)*	Controlled by spraying Metasystox 25 EC, or Rogor
Hairy Caterpillar(*Diacrisia oblique)*	Controlled by Nuvan or Thiodan at1ml/l of water
Damping off	Caused by *Rhizoctonia solani*. Seeds should be treated with Captan @ 3g or Carbendazim @2.5g per kg of seeds Before sowing
Collar Rot	Caused by *Rhizoctonia solani, Pythium sp.* It can be prevented by soil sterilization or by using healthy Seedlings.
FlowerBudRot	Caused by *Alternaria dianthi* .ControlledbysprayingDithaneM-45@0.2%.
PowderyMildew	Caused by *Oidium sp.* Controlled by spraying Karathane 40 EC @ 0.5% or dusting with sulphur powder at fortnightly intervals.

Harvesting:

Marigold flowers are plucked when they have attained full size. Plucking of

flowers should be done in cool hours of the day. The field should be irrigated before plucking so that flowers keep well for alonger period after harvest.Plucked flowers are collected in polythene bags or bamboo baskets for carrying to markets.

Yield:

The yield of flowers in African and French marigold not only varies with cultivar but also cultural practices including planting, spacing and fertilization showed a marked variation in flower number from 6 to 8 million and from 1.5 to 2.5 million per hectare, in French and African marigold, respectively, the corresponding ranges of variation in the weight of flowers were 8 to 12 tonnes/ha in French marigold and 11to18 tonnes/ha in African marigold.

Post Harvesting:

Post harvest processing, grading , packing and storage:

After harvesting the flowers they are dried on floor under shade for 2-3 days. Upon drying, the seeds are separated by hammering the flowers and the flower straw is separated out by winnowing of the hammered flowers. The seeds are thoroughly cleaned and graded before packing in polybags or cloths bags, and are stored in cool places .The moisture contents of the seeds must be examined before the packing.

Marketing:

Marigold flowers are widely used as a loose flower in India. In recent years, Marigold becamepopular as loose flower. The cultivation of the Marigold for aesthetic value as well as seedpurpose is gaining importance among the individual growers of our country. Some of thegrowers sell the flowers of Marigold either French type or African type as a pot plants. Thehighly developed, attractive inflorescence and foliage make it an ideal potted floriculturalcrop.PottedMarigoldisaquickcroptoproduceandofferanopportunityforgrowerstotakeadvantage of on present-day demand for the plant. As a consequence, the demand for the marigold flower is increasing day by day,especially in India.According to the reports, in India,the total area under

marigold cultivation is 255 thousand hectares with production of 1754 thousand MT loose flowers . Hence, considering the production of an African variety of Marigold as the proper subject matter of the DPR project is well justified as it bears large scale business opportunities.

IV.SWOT Analysis of Marigold Production:

Strength	• Environmental friendlycultivationwithlowinputs • Varietyofaestheticfeatures • Highmarketvalueasloose flower • Marigoldplanthasmedicinalpropertieswhichareusedto curemanydiseases. • AllpartsofT.patulahasessentialoilwhichisusedin perfumeindustry
Weakness	• Lackofcoldstoragefacilities • Lack of sale and exportpromotionfacilitiesHigh costofadoption
Opportunities	• Marigoldisusedaslooseflowersfor making garlands for religious andsocialfunctions. • It has gained popularity amongst the grower due to its wide adaptability and variety of colours. • Any one can start a business on marigold throughout theyear.
Threats	• Inheavy winterplantsand flowersaredamagedbyfrost. • Marigold plants are easily attackedbypestanddiseasesspeciallydampingoffintheseedli ngstageandnematode attack.

III..ECONOMIC ANALYSIS

- **Assumption:**

Sl. No.	Parameters	Value
1.	Land(acre)	1.5(6070sq.m)
2.	Totalno. of Plants/6070sq.m	48560
3.	No.ofPlants/sq.m	8
4.	Spacing(m)	0.45*0.3
5.	CostofeachSeedlings(Rs.)	1/-
6.	TotalCost of Seedlings (Rs./ season)	48560/-
7.	Variety/ Type	African Marigold

- **Output:**

Season	Winter	Summer	Rainy
1.Production of Flower (kg/acre)	6000	3000	4000
2.Sale Price/kg(Rs.)	70/-	90/-	80/-
3.Revenue(Rs./Season)	4,20,000/-	2,70,000/-	3,20,000/-
4.Revenue(Rs./annum)	**1,010,000/-**		

Inputs:

a. **Capital Cost/FixedCost:**

Factor	Cost(Rs.)
1.Tubewell/Water Source Cost	1,00,000/-
2.ElectricityConnection Cost	50,000/-
3.Farm Implement Costs	50,000/-
4.TotalFixedCost	**2,00,000/-**

b. VariableCost:

Factors	Cost(Rs.)
1.AnnualLandRentCost	20,000/-
2.Annual LandPreparationCost	5,000/-
3.Annual SeedlingCost	1,45,680/-
4.Annual IrrigationCost	15,000/-
5.Annual ElectricBill	10,000/-
6.Annual Fertilizer Consumption	30,000/-
7.Annual Pesticides Consumption	30,000/-
8.Annual Packaging Cost	20,000/-
9.Annual Transport Cost	25,000/-
10.Annual Marketing Cost	25,000/-
11.Annual Insurance Amount	5,000/-
12. Annual Manpower Cost (Labour +Farm Manager)	2,10,000/-
13.Total Variable Cost	**5,40,680/-**

- **Total Project Cost(Rs.):**Fixed Cost + Variable Cost = 7,40,680/-
- **Revenue/annum(Rs.) =** 1,010,000/-
- **Net Benefit (Rs.)** = 2,69,320/-
- **BCR = 1.36 : 1**

IV. SWOT Analysis and Conclusion:

Strength

- Environmental friendly cultivation with low inputs
- Variety of aesthetic features
- High market value as loose flower
- Marigold plant has medicinal
  Properties which are used to cure manydiseases.
- All parts of *T.patula* has essential oil which is used inperfume industry

Weakness

- Lack of cold storage facilities
- Lackof sale and export promotion facilities
- High cost of adoption

Opportunity

- Marigold is used as looseflowers for making garlands for religious and socialfunctions.
- It has gained popularity amongst the gardeners due to its wide adaptability and variety of colours.
- Any one can start a business on marigold through out the year.

Threats

- In heavy winter plants and flowers are damaged byfrost.
- Marigold plants are easily attacked by pest and diseases specially damping off in the seedling stage and nematode

Conclusion:

Economics of the cultivation of marigold proved that Marigold Business is a profitable one. As in our state of West Bengal, most of the farmers (96%) are small and marginal, it would be one of the most important options for them for their livelihood management.

NOTE ON BANK LOAN:

As marigold is a seasonal crop, based on scale of finance entrepreneur can avail bank loan as per normal rules of repayment schedules. Farmers can have the opportunity of KCC loans also at a very low level of interest and subvention facilities based on timely repayments. Normally no loan as per law has been approved based on seasonal income from the crop cultivation. Marigold is a short term crop of 90 days. Bank will provide short term loan under Seasonal Agricultural Operation (SAO).

Business Idea-4: PRODUCTIONAND MARKETING OF TUBEROSE

I. JUSTIFICATION:

In our country most of the farmers are small and marginal. They are also doing Tuberose cut flowers business to earn their livelihood. That's why this flower could be one of the most important options for the income of the community.

Besides thisTuberose is important in the following aspects---

a) Tuberose can successfully be grown in pots, borders, and beds and commercially cultivated for its various uses. It is also a popular cut flower, not only for use in arrangements but also for the individual florets that can provide fragrance to bouquets and boutonnieres. The long flower spikes are excellent as cut flowers for table decoration. The flowers emit a delightful fragrance. Tuberose represents sensuality and is used in aromatherapy for its ability to open the heart and calm the nerves, restoring joy, peace, and harmony. Tuberose flowers have long been used in perfumery as a source of essential oils and aroma compounds. Tuberose oil is used in high-value perfumes and cosmetic products.

b) Furthermore, fragrant flowers are added along with stimulants or sedatives to the favourite beverage prepared from chocolate and served either cold or hot as desired. Tuberose bulbs contain an alkaloid -lycorine, which causes vomiting. The bulbs are rubbed with turmeric and butter and applied as a paste over the red pimples of infants. Dried tuberose bulbs in powdered form are used as a remedy for gonorrhoea.

II. TECHNICAL DETAILS-

Introduction to Tuberose-

Tuberose (*Polianthes tuberosa L*) is one of the most important tropical ornamental bulbous flowering plants cultivated for the production of long-lasting flower spikes. It is popularly known as Rajanigandha or Nishigandha. It belongs to the family Amaryllidaceae and is native toMexico. Tuberose is an important commercial cut as well as a loose flower crop due to its pleasant fragrance, longer vase-life of spikes, higher returns, and wide adaptability to varied climates and soil. They are valued much by the aesthetic world for their beauty and fragrance. The flowers are attractive and elegant with a sweet fragrance. It has long been cherished for the aromatic oils extracted from its fragrant white flowers. Tuberose blooms throughout the year and its clustered spikes are rich in fragrance; florets are star-shaped, waxy, and loosely arranged on a spike that can reach up to 30 to 45 cm in length. The flower is very popular for its strong fragrance and its essential oil is an important component of high-graded perfumes.

The fragrance of flowers is very sweet, floral, and honey-like and can help give emotional strength. The flower spike of tuberose remains fresh for a long time and finds a distinct place in the flower markets. Due to its immense export potential,

the cultivation of tuberose is gaining momentum day by day in our country.

Single

Double

Species, Types/Cultivars or Varieties:

List of the 10 varieties planted in the field with characteristics studied:
Following 10 varieties collected from BCKV were cultivated in TNU campus

Sl. No.	Variety	Type	Wt. of Bulb(g)	Cir. of bulb (cm)	Diameter of bulb(cm)	Length of bulb
1.	BR-18	Double	14.27	11.1	1.5	7.8
2.	BR-24	Double	13.75	11	3	6
3.	BR-19	Double	11.96	12	3.4	5
4.	SUVASINI	Double	16.58	11.5	3	8
5.	CALCUTTA DOUBLE	Double	15.54	13.5	3.2	10
6.	PRAJWAL	Single	13.66	9.5	2.7	11.5
7.	BR-1(BIDHAN SHINGDHA)	Single	16.65	12.5	4	11.6
8.	BR-2(BIDHAN UJWAL)	Single	15.14	10.1	3.2	6.8
9.	SHRINGAR	Single	11.85	9	2.5	8.9
10.	PHULE RAJANI	Single	12.05	11.2	2.5	8.96

Prajwal

Bidhan Snigdha

Suvashini

Calcutta Double

Climate requirement :

a) The crop is best suited for cultivation in tropical to subtropical and temperate climates.

b) The crop is reported to flower profusely throughout the year, if the climate is mild and free from extremes of high and low temperature.

c) A temperature range from 20-30°C is considered ideal for this crop.

Season of Planting:

Tuberoses are generally planted in February-March in the plains and April-May in the hills. The bulbs can also be planted during July-August.

Soil condition and sterilization:

a) Tuberose can be grown on wide variety of soils from light, sandy loam to a clay loam.

b) The soil should be at least 45 cm deep, well drained, friable, rich in organic matter.

c) The soil should have a pH range from 6.5 to 7.5 with good aeration.

Soil Bed Preparation:

a) The land is ploughed deep, twice, to a depth of 45 cm.

b) At the time of the second ploughing apply FYM @ 20- 50 t/ha and incorporate into the soil.

c) Then the soil is brought to a fine tilth by breaking the clods and removing the weeds.

d) The field is laid out into plots of convenient sizes with irrigation channels, ridges and furrows at the recommended spacing.

Soil bed Preparation

Seed Treatment: Bulbs are treated with fungicides **(SAAF powder i.e., Carbendazim + Mancozeb)** @2gm/lit of water and kept for 30 minutes and dried in the shade before planting.

Planting:

The spacing between plant to plant is 15 -20 cm

Whereas, spacing between row to row is 30 cm.

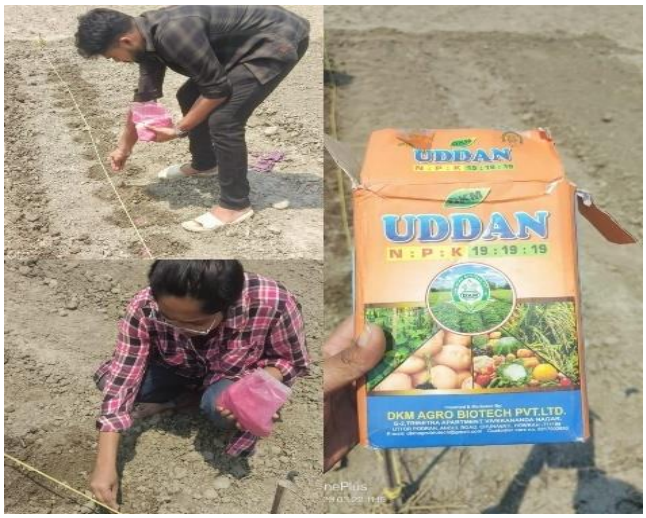
Planting material of tuberose (bulb)

Irrigation:

Subsequently, the crop is irrigated at 5-7 days intervals depending upon weather conditions. In the summer months, irrigation is recommended twice a week.

Nutrient management:

1. 100 kg N, 60 kg P2O5 and 40 kg K2O /ha is recommended for tuberose production.
2. Of the full recommended dose of fertilizers, half the N, the full dose of P and K has to be applied at the time of planting and
   the remaining half of N is given as a top dressing after 45 days
   of planting.



Special intercultural operations:

1. Weeding is done whenever weed incidence is observed.
2. Mulching by straw is done to conserve soil moisture.
3. Keep observing the plant growth regularly.
4. The application of Atrazine (@ 3 kg/ha) can be done as a pre-emergence weedicide keeps the plots weed-free.

MulchMming

Hand weeding

Plants after 3 weeks of plantation

Pests and their Management:

Name of the Pest	Management
Aphids	NSKE(5%)
Red spider mite	Controlled by spraying Metasystox 25EC, or Rogor
Thrips	Rogor @ 2ml / lit, Malathion 0.1%

Disease Management:

Name of the Disease	Management
Stem rot	Carbendazim @ 2gm/lit of water
Flower bud rot	Caused by *Alternaria dianthi. Controlled* by spraying Dithane M -45 @ 0.2% .
Alternaria leaf spot	Copper oxy chloride @2ml/litre of water

Harvesting:

1. Flowers are ready for harvest in about 3 to 3 1/2 months of planting.

2. Depending on the purpose, harvesting is done by cutting the fully-opened spikes from the base or single flowers are harvested as they open by day; the picking of individual flowers should be completed by 8.00 a.m.

3. Flowers yield up to 17-18 t/ha can be expected from a well-maintained crop.

Post Harvest Management:

For producers and shippers, we recommend pulse pre-treating the flowers with preservative solution containing 20% sucrose. This can be obtained by making your normal preservative, then adding a pound and a half of sugar to each gallon of the preservative solution.

arketing:

The plucked flowers were brought by the farmers in large sacks and taken to the commission agents who fixed the Prices for the day. The prices varied and fluctuated a lot, depending on the weight of the produce of the day, the quality of the flowers, the day of the week, special events on the day etc. For instance, on Fridays and other festival days the prices went up because the demand for them was high on those days.

A part of the produce was also exported to the larger metros and abroad, especially to the Middle East. For exports, the flowers were sealed in special airtight packages. Domestic market was only focused and studied in this study. Since the flower's life was about 24 hours, its demand was highest in the morning when the buds were fresh and went significantly down by the end of the day, by the time the buds began to bloom. The remnants of the auctions were sold at dirt-cheap prices. The buds on the plant bloom a little after sunset, but when plucked, they bloom earlier.

Domestic Marketing Channels of Tuberose:

Following three domestic marketing channels were identified in Jothi flower market (Thiruvannamalai) which was the major market to which tuberose was marketed in the study area.

Marketing Channel I

Producer-Commission Agent-Retailer-Consumer.

Marketing Channel II

Producer-Commission Agent-Wholesaler-Retailer-Consumer.

Marketing Channel III

Producer -Wholesaler -Retailer -Consumer.

The channel I, II and III were the important domestic channels in sale of tuberose for the farmers in the study area because major portion of the tuberose was marketed through these channels.

III. Cost and Profit Analysis:

Tuberose cut flowers production and marketing (1 Acre/4000 sq m)

Assumption 1. Quality planting materials (bulbs) @ Rs. 4/- only and selling price per spikelet/ flower stick @Rs 10 each

Output	1st year	2nd year	3rd year	4th year	5th year	6th year
Capacity (no of flower stick per year):	100000	200000	200000	200000	200000	200000
Sale price of each stem (Rs):	4	5	5	5	5	5
Revenue(Rs per annum):	400000	1000000	1000000	1000000	1000000	1000000
Extra income from bulbs @ 8mt /yr/acre	0	4000	20,000	35000	25000	10000
Total income	4,00,000	10,04,000	10,20,000	10,35,000	10,25,000	10,10,000
Total income (Rs. lakh)	4.000	10.040	10.200	10.350	10.250	10.100

Inputs

A. Capital Cost

Cost of planting material	240000
Source of Irrigation water/tube well	100000
Number of tube rose plants	60000
irrigation cost	50000
Electricity connection cost	30000
Farm Impliment cost	20000
Fencing cost	100000
Total fixed cost	600000
Total fixed cost (Rs. Lakh)	**6.00**

Running Cost/Overhead cost

Annual Land rent cost	15000	15000	15000	15000	15000	15000
Power cost/Electric bill	8000	8000	8000	8000	8000	8000
Annual Fertiliser consumption (Rs)	75000	75000	75000	75000	75000	75000
Annual Manpower salary	150000	150000	150000	150000	150000	150000
Annual Labour wages	150000	150000	150000	150000	150000	150000
Annual pesticides consumption (Rs)	50000	50000	50000	50000	50000	50000
Annual packaging cost (Rs)	40000	40000	40000	40000	40000	40000
Annual Transport cost(if any)	50000	50000	50000	50000	50000	50000
Annual Marketing cost	25000	25000	25000	25000	25000	25000
Annual Insurance amount	6000	6000	6000	6000	6000	6000
Total variable cost	569000	569000	569000	569000	569000	569000
Total variable cost (Rs. Lakh)	**5.690**	**5.690**	**5.690**	**5.690**	**5.690**	**5.690**

	Year						
Cost of cultivation	1	2	3	4	5	6	
Fixed cost	6.00	0.00	0.00	0.00	0.00	0.00	
Variable cost	5.69	5.69	5.69	5.69	5.69	5.69	
Total cost	**11.69**	**5.69**	**5.69**	**5.69**	**5.69**	**5.69**	
Income	**4.00**	**10.04**	**10.20**	**10.35**	**10.25**	**10.10**	
Net income	-7.69	4.35	4.51	4.66	4.56	4.41	
DF @ 15%	0.870	0.756	0.658	0.572	0.497	0.432	
Discounted cost @15% DF	10.165	4.302	3.741	3.253	2.829	2.460	26.751
Discounted income @15% DF	3.478	7.592	6.707	5.918	5.096	4.367	33.157
NPV @ 15% DF	6.406						
BCR @15%DF	1.24	:1					
IRR	51%						

TERM LOAN REPAYMENT SCHEDULE (TUBEROSE 1.ac) **(Rs. Lakh)**

TFO		11.69
Margin @20%		2.338
Bank loan		9.35

YEAR	Loan Outstanding @ beginning of year	Interest @10%	Net Income	Repayment		Total out go	Net Surplus	Loan Outstanding @ end of year	DSCR
				Principal	Interest				
1	9.35	0.935	4.00	1.00	0.935	1.935	2.06	8.35	2.07
2	8.35	0.835	4.35	1.00	0.835	1.835	2.51	7.35	2.37
3	7.35	0.735	4.66	2.00	0.735	2.735	1.92	5.35	1.70
4	5.35	0.535	4.66	2.00	0.535	2.535	2.12	3.35	1.84
5	3.35	0.335	4.56	2.00	0.335	2.335	2.22	1.35	1.95
6	1.35	0.135	4.41	1.35	0.135	1.487	2.92	0.00	2.97
							Total DSCR		**12.90**
							Ave DSCR		**2.15**

IV.SWOT Analysis:

V.Project summary:

As evident from the economics of the project and benefit cost ratio (1.24:1) of Tuberose cultivation, it iseconomicallyoneofthemostprofitablebusinessoptionsfortheentrepreneurs.

RiskManagement:

1. Crop failure due to adverse climatic condition
2. Poor quality seedling leading to poor crop stand.
3. Lack of vitality of bulb.
4. Disease problems.

Mitigation plan:

1. Financial loss due to Crop failure is being covered through crop insurance policy

2.Poor crop stand is being compensated through consumer protection Act.

3.Adequate plant protection measures to protect the crop from the initial stage to keep it healthy.

VII. Environment Impact Assessment.

Crop cultivation in high land is generally eco-friendly and climate resilient and necessary compliances as prescribed by the climate regularity body are duly adhered to.

Business Idea -5.

PRODUCTION AND SELLING OF ORNAMENTAL POTTED PLANTS

I. JUSTIFICATION:

Flowers are a symbol of beauty. There is no man in this world who did not love flowers and potted plants . Flowers and foliages are not only for pleasure but also used for beautification & of commercial importance. Demands for flower & flowering plants are increasing day by day. Birthdays, felicitation, farewells, meetings ,political stages ,marriage ceremonies, friendship and besides these we can place flowers in drawing room, bedroom &office chamber decoration Due to urbanization , peoples are now addicted to potted plants resulting a very good business proposition .

INTRODUCTION:

Horticulture involves traditionally eight professional domains, which can begrouped into two broad sections, depending

On the type of crop taken into consideration.

- Ornamentalscrops:arboriculture,floriculture andlandscapehorticulture.
- Edibles crops:olericulture,pomology, viticulture, oenology and post harvest physiology.

Ornamental crop production is grouped into two broad sections:

- Floriculture: including the production and marketing of floral crops like cut flowers, potplants, bulbs, bedding plants and perennials.
- Nursery Stock: including the production and marketing of individual trees, shrubs,vines and other perennial hardy plants.The term Live Plants is often used for Nursery Stock and other plants and is therefore not so easy to define in statistics.

A houseplant,sometimes known as a pot plant, potted plant, or indoor plant, is an ornamental plant that is grown indoors. As such, they are found in places like residences a nd offices mainly for decorative purposes .Common houseplants are usually tropical or semi-tropical, often epiphytes, succulents or cacti.

IMPORTANCEOFFLOWERS & DEMANDS:

Flowers are a symbol of beauty. There is no man in this world who did not loveflowers. Flowers are not only for pleasure but also used for beautification & ofcommercial importance. Demands for flower & flowering plants are increasing day by day.

1. Birthdays,felicitation,farewells,meetings,politicalstages,marriageceremonies,friendship,lovers'expression&besidesthese we can place flowers in drawing room, bed room & office chamber decoration.
2. Potted plants are required for beautification,the creation of a pleasant environment along with other ornamentals.
3. For religious purposes flowers are used widely.
4. Flowers help to remove mental agony, depression, & disease syndromes.
5. Natural beauty of flowers and plants provides mental peace & amusement for flower lovers.
6. Flowers are widely used for home decoration ,Car decoration ,Garland making, felicitation and honouring guest.
7. Business with flowers is emerging as a big opportunity for employment &incomeg eneration.
8. Floriculture is an important branch of horticulture dealing with all aspects of amateur & commercial cultivation of Gardenplants.These plants have a rich tradition of uses in various aspects of our life since ancient time. They are getting increasing attention of entrepreneurs for their potential role in domestic and foreign markets as a source of cut and loose flowers, Indoor plants ,flower Bouquet, Aromatic compound in the farm of natural source of essential oils and perfumes.

Fig: Beautification done by different kinds o f Ornamental Potted Plants

SELECTIONOF SPECIES,TYPES /CULTIVARS OR VARIETIES:

The species which were selected were:FOLIAGE:

- *Epipremnum aureum* (Money Plant)
- *Dracaena reflexa* (Song of India)
- *Spathiphyllum wallisii* (Peace Lily)
- *Philodendron erubescens* (Philodendron)

FLOWERING:

- *Calathea majestic* (Peacock plant)
- *Gerbera jamesonii* (Gerbera)
- *Polianthes tuberosa* (Tuberose)
- *Tagetes erecta* (Marigold)

OTHERCULTIVARSWHICHCANBE PLANTED:

FOLIAGE:

- Snakeplant
- Croton
- Diffenbachia
- Poinsettia
- Ti plant
- Caladium
- Coleus
- Aglaonema
- Alocasia
- Elephant Ears

FLOWERING:

- Rose
- Bougainvillea
- Chrysanthemum
- Orchid
- Hibiscus
- Jasmine
- Petunia

Fig: Moneyplant

Fig: Philodendron

Fig: Song of India

Fig: PeaceLily

Fig: Peacock plant

Fig: Gerbera

Fig: Marigold

Fig: Tuberose

NECESSITIES FOR THEPRODUCTION OF ORNAMENTAL POTTED PLANTS:

- Amazing Beauty: Ornamental plants, both flowering plants and non-flowering plants, climber, creepers, hedge plants or garden plants-gives a visual treat to the eyes.
- Ornamental Plants are the best and most natural air purifiers, these plants purify the air during photosynthesis.
- Ornamental Plants prevent soil erosion and come in many textures used for landscaping to help prevent soil erosion.
- Ornamental Plants reduce stress: Many people believe that indoor plants in offices or homes reduce stress levels and refresh them.
- They are attractive in the appeal and smell.
- Ornamental Plants help to create an amazing ecosystem. Pollinating agents like insects, and bird adds a natural charm to the garden.

REQUIREMENTS:

- **Selection ofsite**:
  - The site selected for the production of Ornamental potted plants of the products with minimum or no damage.
  - The site should have a good water source.
  - Wind breakers like Eucalyptus,Ashoka, mango, etc.can be planted to provide necessary shade and protection.

- **Product choice:**
  - The product choice will primarily depend on the market demand in near by areas.
  - Varieties of various ornamental plants like shade-loving foliage plants, flowering plants, and creepers can be propagated in the nursery.
  - Planting materials such as seedlings of flowers, bulbs, corms, etc. can also be produced.

- **Nursery beds:** The nursery beds should be prepared for storing the plants &theplantswhicharekeptfor sale.

Fig: Nursery Bed

- **Collectionandplantingofmotherplants:**
  - The plantation of mother plants is important for developing a nursery.
  - The mother plants must be true to the type and true to variety.
  - The plants should be properly labelled.
  - The mother plants must be maintained properly for the rigorous growth otherwise, the number of propagated plants will get reduced.
  - Ifmother plants are not available then we go for buying the seeds/seedlings.

- **Certification for the nursery:** All State Govt.'s Department of Horticulture issues certificates for nursery activities and it is a must for all certified nursey to be registered with Govt.

- **Storage of dried,clean soil and compost manure:**
  - For raising flower seedlings during the rainy or early winter season, the soil and compost would be stored during the hot or summer months.
  - In the rainy season, the collection of dried soil and manure is very difficult.
  - Collect soil and compost and preserve it in a clean,dry & darkplace.

- **Manuring:**

Manuring is done for vigorous growth of plants. It should be applied at a proper dose and time. Cowdung manure, which is a rich source of nutrient ,can be mixed with soil.

- **Watering:**
  - Watering is done according to the need of the plant.
  - Watering is done with rose cane or through sprinkler or drip irrigation system.

- **Drainage:**

Potting mixtures for specific plants are selected in such a way that it provides both aeration and drainage to the plants.

Generally, this sort of mixture contains garden soils vermicompost neem carnal dust and cocopeat, perlite and vermiculite.

This provides good drainage in pots and maintains plant health.

- **Infrastructure:**

  - An office roomfortheownerandaguestroomforpeoplewhowillarriveinthenurseryandneed stowait.
  - Toilets and restrooms must also be there for labours.

- **Soil ConditionandSterilization:**

  - The soil must be loam to sandy loam,looseandfriable,richinorganiccontentand well-drained.
  - Thesoil pH level should be7.0 (neutral).
  - The soil used must be free from stones , weeds and other foreign matter.
  - Soil solarisation can be done for sterilization.

Preparation of Potting Mixture: For Growing plants in good conditions, the use of a suitable pot mixture is essential. Pot mix containing three parts fibrous loam soil, one part well decay leaf manure and two parts will be cowdung manure prepared and treated with1% formal insolution for sterilization of mixture.

Specific types of potting mixture are required for specific crops.Such as

Chrysanthemum-Chrysanthemum mixture. They constitute**:**

INGREDIENTS	**QUANTITY**
Heavy Loam Soil	1bucket/10L byvolume
Well rotten cowdung +Leafmould@2:1ratio	3.3L approx.
Horn meal	3 handfuls

Bone meal	2 handfuls
SSP	2 handfuls
MOP	3tsp
Magnesium Sulphate	2tsp
Framechalk	3tsp

For Zinia/Balsam(SeasonalFlowers)

INGREDIENTS	QUANTITY
Loam Soil	60L
Compost/Cowdung	15L
Powdered oilcake (Mustard,neem,peanut)	1kg
SSP	250g
MOP	150g
Magnesium Sulphate	50g

Dahlia-

INGREDIENTS	**QUANTITY**
Loam soil	45L
Compost	20L
Rallymeal /Sterameal	1500g

OR

INGREDIENTS	**QUANTITY**
Sandy soil	45L
Compost	20L
OilCake(Mustard,Neem,Peanut)	1000g
DAP	300g
MOP	100g

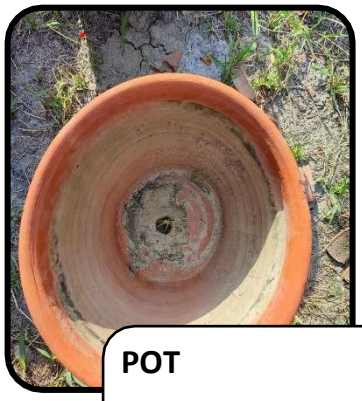
Rose/OtherHerbaceousplants-

INGREDIENTS	**QUANTITY**
SandyLoamsoil	50L
ClaySoil	10L
Leafmould	1L
Cowdung/Compost	10L
Hornmeal	1kg
Bonemeal	250g
SOP	100g

The chemical fertilizers and compost are mixed priorly with the soil for obtaining good and quick results.

Some special kinds of fertilizer mixtures are available for different flowers.

Planting in Pots:

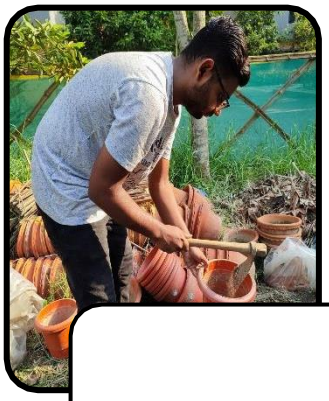


POT

- Empty pots are taken
- Check wheather the pots are in good condition and

STONECHIPS

- Stone chips are kept inside the pots covering the holes.



ADDSOIL

- Add the prepared mixture of soil in the pots

READYTOPLANT

- After soil is added, the pots are ready for planting
- Make sure that the soildoesnthaveanyclot

FULLGROWNPLANTS

- After planting, giving the right amount of nutrients and water are very necessary for the plant forhealthy growth

- **FertilizerApplication:**LiquidNPK19-19-191g/Lwater(Applicationthtrough rose cane)

- **Irrigation:**
  - Sprinkler irrigation is used.
  - Watering with rosecane is usually followed.

- **SpecialInter-CultureOperation:**
  - Regular hoeing operations keep crop weed free and provide aeration to the root system.
  - Weeding must be done.
  - Pinching and Deheading of flowering plants are practised.
  - Staking is done to provide support to the growing plant.

PESTANDDISEASES:

- **PEST:**

PEST	MANAGEMENT
Aphids	Dimethoate2ml/l
Thrips	Dimethoate2ml/l
Whitefly	Imidacloprid0.6ml/l
Caterpillar	Chlorpyriphos@2ml/l
RedSpidermites	Spinosad45%
Leafminer	Malathion@1ml/lofwater

- **DISEASE:**

DISEASE	MANAGEMENT
Powdery mildew	Foliar spray of Callixin@0.1%
Alternaria leaf spot	Foliar spray of Mancozeb@2-3g/lofwater
Bacterial wilt	Seed treatment with Bavistin@2g/kgseeds
Dieback	Pruning can be done.Saaf can be applied@2-3g/lof water
Stem & root rot	Spray Thiophanate methyl @ 0.1%

INTERCULTURALOPERATION:

A. FERTILIZER

1.**ORGANICMANURE:**Cowdung,mustardcake,BoneMeal,HornMeal,Vermicompost.

2. **CHEMICALFERTILIZER**:LiquidNPK19-19-191g/Lwater(Applicationthroughrosecane)

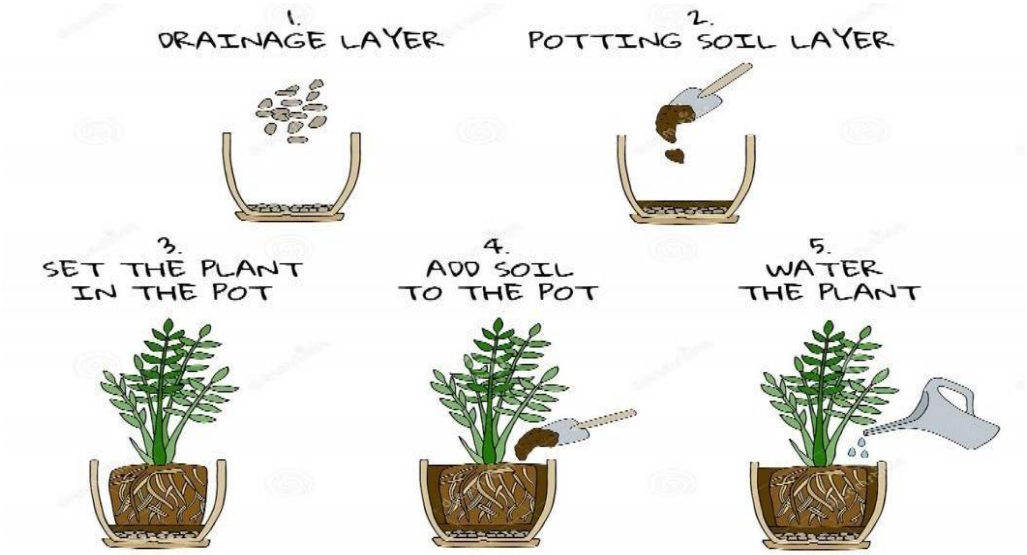
Fig: ChemicalFertilizerapplicationthroughrosecan

3. **FOLIARFEEDING:**LiquidNPK19-19-191g/Lwater(Applicationthtroughrosecane)

B. PROPAGATION: Direct from seed (For Balsam, marigold, Zinnia etc.)**Vegetative propagation:** stem cutting (for philodendrons,chrysanthemum,dahlia, marigold etc.)
Clumpseparation: PeaceLily, Gerbera

T-budded Rose plant

C. TYPESOFPOT: Earthenpot, Ceramic,otherstylishpots
D. POTTINGANDREPOTTINGMETHODS:



E. SHADEOR COVERFOR SEEDLINGS:50%shadenet
F. WEEDING,HOEING&MULCHING: Doneonregularintervals
G. STAKING: With thehelp ofbamboo stick,wooden stick.
H. TOPDRESSING: LiquidNPK19-19-191g/Lwater(Applicationthroughrosecane)
I. PRUNINGOF DRIEDFLOWERS ANDLEAVES: As perthenecessity

Labelling ofstickers/Description:

- After the plants are ready for sale in the market the pots in which they are planted are ready for labelling.
- We used350 white ceramic potsand 350 stickers with tags–University Name, Logo, and Department Name.
- The pots are all off-white in colour and the stickers are transparent.
- After that, the pots are covered with some fancy-looking white pebbles giving it anaesthetic and beautiful look.

Fig: Potted plants ready for sale

III.Cost and Profit Analysis:

Business Plan:-Production and Selling of potted plants (ornamental)

Assumptions	1. Potted plants of 3'',6'',and 12'' pots of different ornamental plants will be sold						
	Sale price:						
	3" pot(Rs. Pot)	40					
	6" pot (Rs Pot)	60					
	12"pot(Rs Pot)	70					
	Plant material cost / pot (Rs.)	30					
Output		1	2	3			
		1st yr	2nd yr	3rd yr	**Total**		
1	a)Capacity (no.of 3'' poted plants per year):	100000	200000	300000	**600000**		
	b)Capacity (no.of 6'' poted plants per year):	50000	100000	1,50,000	**300000**		
	c)Capacity (no.of 12'' poted plants per year):	25000	50000	100000	**175000**		
					1075000		
2	Sale price of each category potted plants						
	yearwise value of 3'' poted plants per year):	40,00,000	80,00,000	1,20,00,000			
	yearwise value .of 6'' poted plants per year:	3000000	60,00,000	9000000			
3	yearwise value of 12'' poted plants per year):	17,50,000	35,00,000	7000000			
	Total income(Rs.)	**87,50,000**	**1,75,00,000**	**2,80,00,000**			
Inputs	**Total income(Rs. Lakh)**	**87.50**	**175.00**	**280.00**			
A. Capital Cost/							
	net house	10,00,000					
	Source of irrigation	2000000					
	pots 3'',6'',12'' size						
	Cost of planting material	32250000					
	Tube well/water source cost	20,00,000					
	Electricity connection cost	20000					
	Farm Impliment cost	50000					
	Misc.	10000					
	Total (Rs.)	**3,73,30,000**					
	Total (Rs. lakh)	**373.3**					
B.	**Running Cost/variable**						
	Annual Land rent cost	10000					
	Power cost/Electric bill	2000					
	Annual Fertiliser consumption (Rs)	30000					
	Annual Manpower salary(2 nos of labourer)	1,20,000					
	Annual Labour wages (piece rate)	200000					
	Annual pesticides consumption (Rs)	20000					
	Annual packaging cost (Rs)	10000					
	Annual Transport cost(if any)	50000					
	Annual Marketing cost	100000					
	Annual Insurance amount	10000					
	Vermicomposts	50000					
	Organic manures like bone meal etc	100000					
	sands	100000					
	Garden soils	50,000					
	Total variable cost (Rs.)	**732000**					
	Total variable cost (Rs. lakh)	**7.32**					
	Total cost (Fixed cost+variable)	**373**	7.32	7.32	7.32	7.32	

Year>>>	**1**	2	3	4	5	
Total cost (Fixed cost+variable)(Rs. Lakh)	**373.30**	0	0	0		
Variable cost	**7.32**	**7.32**	**7.32**	7.32	7.32	
Total cost (Fixed cost+variable)(Rs. Lakh)	**380.62**	**7.32**	**7.32**	**7.32**	**7.32**	
Income	**88**	**175**	**280**	280	280	
Net income	-293.12	167.68	272.68	272.68	272.68	
DF @15%	**0.870**	**0.756**	**0.658**	**0.572**	**0.497**	
Discounted cost @15% DF	330.97	5.53	4.81	4.19	3.64	349.15
Discounted benefit @15% DF	76.09	132.33	184.10	160.09	139.21	691.82
NPV @15% DF	342.67					
BCR @15% DF	1.98	:1				
IRR	67%					

TERM LOAN REPAYMENT SCHEDULE

							TFO		380.62
							Margin @20%		76.124
							Bank loan		304.50

YEAR	Loan Outstanding @ beginning of year	Intt @10%	Net Income	Repayment		Total out go	Net Surplus	Loan Outstanding @ end of year	DSCR
				Principal	Interest				
1	304.50	30.4496	87.50	50	30.4496	80.4496	7.05	254.50	1.09
2	254.50	25.4496	167.68	150	25.4496	175.4496	-7.77	104.50	0.96
3	104.50	10.4496	272.68	104.50	10.4496	114.9456	157.73	0.00	2.37
							Total DSCR		4.42
							Ave DSCR		1.47

IV. SWOTAnalysis:

STRENGTH	WEAKNESS
1. Transportation Facilities are good. 2. Labour wages are reasonable. 3. Increasing demand or both indoor and outdoor ornamental potted plants. 4. Departments related to landscape and environment are available in Universities. 5. Increase in municipal sector	1. Climate conditions are not appropriate in all regions of the province. 2. Enterprises do not have organized structures. 3. Storage packing and marketing problems. 4. Some input costs are high. 5. Poor security and disloyal customers

SWOT

OPPORTUNITY	THREATS
1. High demand for flowering Urban Areas. 2. Green house production. 3. Festive seasons and special occasions. 4. Export Opportunities domestically and internationally.	1. Unfavourable weather conditions. 2. Competition from substitute products (artificial flowers) and well established nurseries. 3. Fluctuating Sales. 4.Difficulty in acquiring capital

Conclusion:

Production and Selling of Ornamental potted plants are a very highly profitable business. Many are trying to set up this business. If the cost price for production of one plant is Rs.100 then it can be sold easily between Rs.180 to Rs.220 which is almost double the cost of production. This is a very rapidly growing industry and common in mostly Urban places. Ornamental plants serve the purpose of beauty, aroma and natural air purifiers in residential as well as outdoors and offices. This industry can set a benchmark for young entrepreneurs who are interested in floriculture and can lead a successful carrier in future.

V .Project summary:

As evident from the economics of the project and benefit cost ratio (1.24:1) of Tuberose cultivation, it iseconomicallyoneofthemostprofitablebusinessoptionsfortheentrepreneurs.

RiskManagement:

5. Crop failure due to adverse climatic condition
6. Poor quality seedling leading to poor cropstand.
7. Lack of vitality of bulb.
8. Disease problems.

VI. Mitigationplan:

1. Financial loss due to Crop failure is being covered through crop insurance policy

2.Poorcrop stand is being compensated through consumerprotectionAct.

3.Adequate plant protection measures to protect the crop from the initial stage to keep it healthy.

VII. Environment Impact Assessment.

Crop cultivation in high land is generally eco-friendly and climate resilient and necessary compliances as prescribed by the climate regularity body are duly adhered to.