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ECONOMIC FEASIBILITY ANALYSIS OF GERBERA PRODUCTION UNDER OPEN CONDITION

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ABSTRACT

A field experiment was conducted at AAU-Zonal Research Station, Diphu to determine the economic feasibility of gerbera cultivation and identify the most prominent black-centred cultivar suitable under open conditions in the Hill Zone of Assam. Altogether, five cultivars of healthy, disease-free black-centred Gerbera plants were evaluated in a Randomised Block Design. The data on growth and flowering characteristics, flower quality such as stalk length and flower size was recorded for the three years of the experiment from 2020-2022. The number of suckers per plant and number of flowers per clump were found to be highest in the variety Faith with the longest shelf life under open field conditions. The gross returns, net return and benefit-cost ratio were found to be highest for the variety Faith followed by the variety Sangria. From the results of the experiment, it is inferred that the variety Faith and Sangria are economically feasible for commercial production under open conditions in the Hill Zone of Assam.

Key Words: Gerbera flower, black centred, variety, costs and returns.

Introduction

The presence of green plants and many colouring flowers in the environment makes the nature beautiful where mankind can enjoy the scenic beauty. Among the flowers, the common sunflower is a well-known flower for its bright yellow petals and cheerful beauty. Gerbera (*Gerbera jamesonii* Bolus) is a member of the sunflower family and one of the common ornamental plants available belonging to the Asteraceae family. The name of the genus *Gerbera* was given after Traugott Gerber who was a German botanist and medical practitioner and that of the species *jamesonii* after Captain Jameson (Das and Singh, 1998). The gerbera flower is a symbol of beauty, purity, and innocence. Among the species of the genus *Gerbera*, only *Gerbera jamesonii* is grown for commercial production purposes as a cut flower which has got a good demand in the national and international markets. Gerbera is a tall leafless stalk and daisy-like blooms and is a beautiful flower crop. It is popularly grown as a cut flower due to its extended vase life (Khosa *et al.*, 2011) and can be cultivated in a variety of climates across the world. In India, the states

of Karnataka, Tamil Nadu, Maharashtra, West Bengal, and Sikkim are the largest producers of gerbera production. Gerbera flowers are in high demand in European marketplaces almost all the year round (Salunke *et al.*, 1989)

Gerberas flowers are generally used as cut flowers for making bouquets and as pot plants required for traditional festivals and special occasions. Gerbera flowers are also used either as fresh or dried flowers for creative flower arrangements. A variety of floral designs can be made from gerbera flowers (Emongor, 2004). Gerbera flowers are mainly utilised as gifts on important occasions such as birthdays, marriage anniversaries, friendship day, wedding parties, funerals and many more. It is also used in cosmetics to make nail paints, lipsticks, fragrances and therapeutic applications. For example, it is used for the creation and preparation of traditional Chinese medicine viz. tu-er-feng which is prepared from gerbera plants and used for treating colds, coughs, mouth sores, and rheumatism. It works as an anti-spam agent and lowers the risk of cancer. (Bose *et al.*, 2003).

Gerbera is quite sensitive to extreme climates like

temperature, cold, and rainfall and is susceptible to heavy rain and flooded situations. Gerbera may be cultivated in a variety of soil types, but it thrives in loamy soil with an adequate quantity of moisture. The optimum temperatures is approximately 24°C during the day and around 15°C at night which are ideal for its growth, yield, and flower quality (Reddy, 2016). Gerbera may be cultivated in a poly house or in the open field condition. Since open circumstances are not ideal for gerbera flower quality, a poly house is an excellent alternative for improved development and production of its flower. Therefore, cultivars are cultivated under controlled circumstances in order to meet quality and quantity criteria (Choudhary *et al.*, 1998). Gerberas which are grown under protected conditions produce more yield and maximum side shoots. Protected conditions protect the plants from high winds, pests, diseases and other climatic conditions and also provide a favourable environment for the good growth of the plants (Khan, 1995). To meet the high market demands, gerbera flowers must be of excellent quality and therefore, gerbera plants are produced under protected conditions, the market value of gerbera flowers will be increased. The crop is produced in totally protected climates under-regulated poly house or greenhouse settings for maintaining the required temperature. Semi-protected circumstances are used in locations near the equator, where the temperature can be controlled for optimum growth and blooming quality of flowers. Growing gerbera in such protected conditions involved a high investment cost for which the small and marginal farmers cannot afford it. As such, due to high investment costs under protected condition, gerbera can also be grown under open conditions. Besides, gerbera can successfully be grown both in the plains as well as in the hills.

The district of Karbi Anglong comprising of hills and plains, is situated in the central part of Assam. The district experiences different climates in different parts of the region due to the variations in the topography. The winter generally begins in November and continues till February while the rest of the months it is summer where the atmosphere becomes sultry. The temperature in summer ranges from 23° Celsius to 32° Celsius, while in winter, it ranges from 6° Celsius to 12° Celsius. The district receives an average annual rainfall which varies between 1000-1900 mm. Agriculture is the main occupation for the majority of the people of the district and more than 70% of them belong to marginal and small farmers who depend upon agriculture for their livelihood. Therefore, there is a need to raise the income level of these farmers through the diversification of crops and other related activities. As the climate of Karbi Anglong District is quite

favourable for commercial production of gerbera there is a scope for introducing it in crop diversification for increasing the income level of the farmers and for sustainable rural livelihood. Besides, its cultivation can also overcome the risks faced by the farmers due to the prevailing climate change. As gerbera is grown mostly in protected conditions like poly-house etc. the costs of production will also be high for which the small and marginal farmers cannot afford to invest in such venture. Therefore, to overcome these problems an experiment on the production of black-centred gerbera under open field conditions for the hill zone of Assam was conducted at AAU-Zonal Research Station with the objectives of finding out the economic feasibility of gerbera cultivation and the most prominent cultivar suitable under open field condition in the Hill Zone of Assam.

Materials and Methods

The trial was conducted in Randomized Block Design with 5 varieties of Black centred Gerbera:

1. Sangria (red)
2. Dalma (white)
3. Pink Elegance (pink)
4. Bastion (orange) and
5. Faith (yellow).

Data on the different characteristics of gerbera flower like number of suckers per plant, number of flowers per clump, shelf life and vase life were recorded for the three years of the experiment. Data on the various inputs used for the production of gerbera and the prevailing market price of gerbera flowers was also collected to estimate the cost and returns of gerbera production under open conditions.

Gross return was estimated by taking the total number of flowers per clump and multiplying it by the plant population per hectare and again multiplying by the prevailing wholesale market price of gerbera flower per piece.



Fig. 1: Performance of gerbera varieties under open condition.

Table 1: Distinct characteristics of gerbera flower.

Varieties	Number of suckers/plants				Number of flowers/clumps				Shelf life (days)			
	2020	2021	2022	Avg.	2020	2021	2022	Avg	2020	2021	2022	Avg
Sangria (Red)	3.5	3.3	3.0	3.3	31	29	30.3	30.1	16.0	16.5	17.5	16.7
Dalma (White)	3	2.5	2.5	2.7	24.8	27	27	26.3	13.0	13.5	13.8	13.4
Orange (Bastion)	3	3	3.0	3	27.8	27.25	28	27.7	13.9	13.6	14.5	13.9
Pink elegance (Light pink)	3.5	3	3.00	3.2	26	25.5	26.5	26	14	13	14.3	13.7
Faith (Yellow)	4	4	3.75	3.9	32.8	31.75	32.5	32.3	18.3	19.0	20.5	19.3
SED(±)	0.24	0.24	0.21	0.23	0.7	0.77	0.78	0.7	0.5	0.5	1.3	0.8
CD at 5%	0.53	0.53	0.5	0.5	1.4	1.68	1.7	1.6	1.0	1.2	2.8	1.7

The cost of production takes into account the cost of all the inputs which were utilized in its production right from land preparation to harvesting and post-harvest operations. It includes the cost of inputs such as seed, manures and fertilizers, human labour and machine/ bullock labour. Only the operating costs were taken into consideration while calculating the cost of cultivation of gerbera.

Net Returns refers to the returns calculated by deducting the total cost of production from the gross returns. It is the indicator that shows the profit or loss earned by the farmers by investing in gerbera flower production.

Benefit Cost Ratio is obtained by dividing the gross returns by the total cost of production.

Results and Discussion

The data on the distinct characteristics of the gerbera flower was recorded for the three years of the experiment and the results are presented in Table 1. From the recorded data on flower characteristics of gerbera, it can be observed that black centred variety Faith (yellow) produced the highest number of suckers per plant (3.9), the highest number of flowers per clump (32.3) and has got more number of shelf life at 19.3 days as compared to other varieties. This variety was followed by the variety

Sangria (Red) with 3.2 numbers of suckers per plant, 30.1 numbers of flowers per clump and 16.7 days of shelf life.

The vase life of black-centred gerbera flowers was also recorded for the five varieties during the three years of experiment and the result is presented in Table 2 and Fig. 2. From the mean data, it is found that the varieties Pink Elegance (Light pink), Sangria variety and Dalma (White) have more vase life days with an average of 7.91 days, 7.33 days and 7.08 days respectively. Vase life quality of cut flowers is considered one of the most crucial factors for customer satisfaction and purchase (Vehniwal and Abbey 2019). Therefore, adding nutrients or any extracts of organic substances may extend the vase life of any cut flowers.

The cost of gerbera production takes into account all the inputs including human labour, machine labour, seeds, manures and fertilizers irrigation costs etc. The estimated cost of production gerbera flower production in one hectare is given in Table 3. The results given in the Table revealed that the total working capital for the production of gerbera flower is Rs. 1,35,300 per hectare and the interest on working capital comes to Rs. 16,236 per hectare. Therefore, the total cost of production estimated for one hectare of land is Rs. 1,51,536. Among the different items of costs involved, it is observed that human labour and planting material are the major costs of production constituting 32.6 per cent and 32.5 per cent

Table 2: Vase life (days) of different varieties of black centred gerbera.

**Fig. 2:** Vase life of different varieties of gerbera.

Varieties	Vase life (days)			
	2021	2022	2023	Mean
Sangria (Red)	7.75	6.75	7.5	7.33
Dalma (White)	7.25	7.25	6.75	7.08
Orange (Bastion)	5.5	5	5.5	5.33
Pink elegance (Light pink)	8.25	7.75	7.75	7.91
Faith (Yellow)	6.25	5.75	6	6.00
SED(±)	0.37	0.36	0.28	0.33
CD at 5%	0.81	0.79	0.62	0.74

Table 3: Cost of production of Gerbera (per hectare).

Sl. No.	Particular	Qty	Gerbera		
			I year	II year	Total
1.	Hired human labour	72@350/MD	25200 (21.8)	18900	44100 (32.6)
	Machine labour		8400		8400 (6.2)
2	Planting material @ 40/plant		44000	-	44000 (32.5)
3	Farm yard manure		18000	8000	26000 (19.2)
4	Irrigation charges		3500.	3500	7000 (5.2)
5	Land revenue		400	400	800 (0.60)
6	Transportation charges		2000		2000 (1.5)
7	Misc charges		1500	1500	3000 (2.2)
8	Working Capital (W.C.)		1,03,000	32300	135300 (100)
9	Interest on W.C. @ 12 % / annum for the crop duration		12360	3876	16236
10	Total cost		1,15,360	36176	151536

of the total working capital. The second major item of cost is farm yard manure (FYM) which formed 19.2 per cent of the total working capital. Application of FYM aims at efficient and judicious use of all major resources of plant nutrients present in the soil to obtain sustainable production with minimum deterioration to soil health and least disturbance to the plant-soil-environment relationship. Moreover, the higher flower production potential of gerbera was also acquired with the addition of organic manure (FYM, which prolongs the shelf life of gerbera flowers in field conditions (Parya, 2017). This might be due to the fact that the supply of nutrients is more balanced under an integrated plant nutrient supply system, which helps to keep plants healthy with a low incidence of insect pests and diseases (Prasad and Gill, 2007).

The return analysis for gerbera flower production was also carried out for the black-centred variety Faith and Sangria and presented in Table 4. From the result of the experiment, it is found that the average production of flowers per plant is 32 numbers for Faith while it was 30 numbers for the variety Sangria. In one hectare land the plant population of gerbera flowers is 1100 numbers. Therefore, the overall production of flowers of gerbera in one hectare of land under open conditions was 35,200 numbers for Faith and 33,000 numbers for Sangria.

Using the prevailing wholesale market price of gerbera flower as Rs. 10/- per flower the gross return of gerbera flower production is estimated at Rs. 3,52,000/- and Rs. 3,30,000/- per hectare for Faith and Sangria respectively. The net return is obtained by deducting the total cost from the gross return and the net return for Faith is Rs. 2,00,464/-per hectare and for Sangria Rs. 1,78,464/- per hectare. The benefit-cost ratio calculated was found to be 2.32:1.00 and 2.2: 1.00 for Faith and Sangria respectively. This indicated that for the per rupee

investment of gerbera flower production, the net profit will Rs. 1.32 and 1.2 for the variety Faith and Sangria respectively. From the results, it is revealed that if the variety Faith or Sangria of black-centred gerbera is cultivated in one hectare of land under open conditions, then its profit will be higher by 12% as compared to other varieties.

Conclusion

From the above results of the experiment conducted at AAU-Zonal Research Station, Diphu it can be concluded that gerbera when cultivated under open conditions can give a good return and the variety Faith produced the highest flower per plant with the highest net return and benefit-cost ratio. With the increasing risks due to climate change, the farmers can easily be motivated to go for crop diversification or take as an alternative enterprise to achieve an additional income from gerbera production. Adopting flower production as an enterprise will also help in employment generation for many rural and urban unemployed youths. From the study, it is inferred that gerbera flower production can be successfully

Table 4: Return from one hectare production of gerbera flower.

Particulars		Amount (Rs.)
Production of flowers (Var. Sangria)	30number × 1100 = 33000	
Rate of flower /piece	Rs 10/-	
Gross returns	33000 × 10	3,30,000
Total costs		1,51,536
Net Return		1,78,464
BCR		2.2
Production of flowers (Var. Faith)	32 × 1100 = 35200	
Gross returns		3,52,000
Net Return		2,00,464
BCR		2.32

carried out under open conditions in the Hill Zone of Assam and it is economically feasible for commercial production.

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