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# Care and Handling Problems of Cutflowers – A Problematic Study

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## Introduction

Cutflowers are parts of plants, characteristically including the blooms or inflorescenses and some attached plant materials, but not roots and soil. Cutflowers industry is a branch of floriculture industry. In Tamil Nadu, small-scale flower production initially started in late seventies by some innovative farmers with the production of tuberose, but large scale commercial production was started in mid eighties in Hosur of Kirushnagiri district (Sultana, 2003). The most common, commercially grown flower species in Tamil Nadu are tuberose (*Polianthes tuberose*), rose (*Rosa indica*), marigold (*Tagetes erecta, T. patula*), gladiolus (*Gladious* spp.) and orchids. Tamil Nadu is well suited for cutflower and foliage production due to its favourable climate and other conditions such as scope to expand cultivation in unutilized homestead lands, cheap labour, relatively low capital investment in contrast with high value addition and good prospect for exports. However, floriculture has not received any direct attention or organized intervention for development. Agriculture is almost entirely the private sector initiative in an unorganized way and support from the government. Therefore, if the flower industry is explored by farmers, traders, exporters and policy makers, it can significantly contribute to the national economy by earning foreign exchange, generating employment and increasing GDP. Nevertheless, there is a lack of agribusiness studies on floriculture in Tamil Nadu. The present study thus attempts to cover the whole agribusiness structure of cut flowers as a commercial product. It may provide valuable information to the farmers, different intermediaries, policy makers of the Government and NGOs to formulate policy aimed at increasing production and distribution.

## Floriculture

Floriculture has become an important commercial activity in the agriculture sector owing to the steady rise in international demand for floricultural products, and immense potential it holds in generating remunerative self-employment among small and marginal farmers, and earning the foreign exchange.


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Floriculture can be defined as cultivation/production of flowering and foliage plants, garden-bedding plants, cut flowers and greens under controlled conditions mainly for commercial purposes.

According to international trade classification, floriculture products encompass (a) bulbs, tubers and tuberous roots, (b) other live plants (including trees, shrubs, bushes, roots, cutting and slips), (c) cut flowers and flower buds, fresh dried, dyed, bleached, impregnated or otherwise prepared, and (d) foliage, branches and other parts (other than flowers and buds) of trees shrubs, bushes and other plants and mosses, lichens and grasses, being goods of a kind suitable for bouquets or ornamental purposes, fresh, dried, dyed, bleached, impregnated or otherwise prepared.

Cutflowers are the most important floricultural product in the international floricultural trade. The most traded varieties are Roses, Carnations, Chrysanthemums, Dahlia, Gargera, Gerbera, Gladiolus, Gypsophila, Liastris, Nerine, Orchids, Poinsettia, Archilea, Anthurium, Tulip, and Lilies.

**Product**

Cutflower includes the blooms and some attached plant materials, not including roots and soil. Fresh cut flowers are highly perishable as they maintain only limited life supporting processes by absorbing water through their stems. Fresh cut flowers are used for decorative purposes such as vase arrangements and bouquets at formal events; designs for weddings and funerals; gifts on occasions, and in times of illness, and at holidays; corsages and boutonnieres; and informal displays to beautify homes and public places.

Preserved flowers are fresh cut flowers that have been dehydrated, preserved with a chemical solution and then air- or oven-dried. They may be used in boutonnieres, corsages, wreaths, formal and informal displays, and similar ornamental articles. Preserved flowers, known in the industry as “everlasting flowers” or “everlastings,” are not as perishable as fresh cut flowers.

Foliages include leaf, stems and parts of plants other than flowers used for decorative purposes in bouquets; in formal and informal displays; for plants caping and landscaping; ferns and mosses.

Other plant materials that are traded include young plant material, which still has to be cultivated in the importing country, before it can be sold to the consumer, *in vitro* cultures prepared by micropropagation and tissue culture techniques, rooted and unrooted pot plant cuttings, bulbs, tubers, tuberous roots, corms, crowns and rhizomes. Finished plants are plants

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that are traded in the markets as saleable products and need only to be acclimatized before they can be sold.

**Indian Floriculture Industry Present Status**

In spite of its long and close association with floriculture, India's record of commercial activities in this field is not very encouraging indeed. It is alarming to see that it is still in its infancy. The information on the area under floriculture and the production achieved is highly inadequate. As commercial and scientifically managed floriculture is an activity only of a recent origin, there are not many large farms engaged in organized floriculture. In most part of the country, flower growing is carried out on smallholdings, mainly as a part of the regular agriculture systems. The total business of floriculture products in India was Rs.75066 lakh, while it increased to Rs.76732 lakh in 2013 (Horticulture Database, 2013).

**All India area, production of flowers**

| Year | Area (in '000 HA) | Production | |
|---|---|---|---|
| | | Loose (in '000MT) | Cut (in lakh Nos.) |
| 2006-07 | 144 | 880 | 37175 |
| 2007-08 | 166 | 868 | 43654 |
| 2008-09 | 167 | 987 | 47942 |
| 2009-10 | 183 | 1021 | 66671 |
| 2010-11 | 191 | 1031 | 69027 |
| 2011-12 | 254 | 1652 | 75066 |
| 2012-13 | 233 | 1729 | 76732 |

Above the table shows that in India for the past 7 years the total area of cultivated production of flower and value significantly increased year by year. But in the years 2012-2013, the total area of flowers cultivated decreased when compared to the previous year 2011-2013. Because export opportunities were less in 2011-2012, Agriculture was not increased to cultivate of flower in 2011-2012.

Floriculture in India is viewed as a high growth Industry. Commercial floriculture is becoming important from the export angle. The liberalization of industrial and trade polices paved the way for development of export oriented production of cut flowers. The new seed policy had already made it feasible to import planting material of international varieties. The

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government of India offers tax benefits to new export oriented floriculture companies in the form of income tax holidays and exemption from certain import duties.

Agriculture and processed food product Export Development Authority (APEDA) responsible for export promotion and development of floriculture in India grants subsidies for establishing cold storages, pre-cooling units, refrigerated vans and green houses and air freight subsidy to exports. It has been found that commercial floriculture has higher potential per unit area than most of the field crops and is therefore a lucrative business.

**Major Cut Flower Crops**

Rose is the principal cut flower grown all over the country, even though in terms of total area, it may not be so. The larger percentage of the area in many states is used for growing scented rose, usually local varieties akin to the Gruss en Tepelitz, the old favourite to be sold as loose flowers. These are used for offerings at places of worship, for the extraction of essential oils and also used in garlands. For cut flower use, the old rose varieties like Queen Elizabeth, Super Star, Montezuma, Papa Meilland, Christian Dior, Eiffel Tower, Kiss of Fire, Golden Giant, Garde Henkel, First Prize, etc. are still popular. In recent times, with production for export gaining ground in the country, the latest varieties like First Red, Grand Gala, Konfitti, Ravel, Tineke, Sacha, Prophyta, Pareo, Noblesse. Virsilia, Vivaldi, etc. are also grown commercially (Narendra, 1998).



**Rose**



**Tuberose**



**Gerbera**


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**Chrysanthemums**



**Anthurium**



**Carnation**



**Bird of Paradise**

**Problems related to post-harvest and handlings of cut flower**

In order to measure the problems related to post-harvest and handlings of cut flowers, a seven item scale was used which was originally developed by Armitage et al. (2003). The items are 'knowledge on post harvest and handling techniques is inadequate', 'post harvest losses are high', 'adequate cold storage facilities and capacity are poor', 'electricity cost and diesel cost are high', 'flower are not properly handled', 'cutting of flowers is not properly done', and 'bunching of flowers is not properly done'.

**Problems related to Cold storage during logistics**

The items that measure the problem related to cold storage during logistics were adopted from Finger, et al. (2003). The items namely 'relative humidity in walk-in-cooler cannot be maintained properly', 'temperature in the refrigerator cannot be maintained properly', 'cold storage space is not sufficient during the seasonal time', 'cut flowers may not be arranged properly in cold storage' and 'cut flowers get damaged when stored with other products' were included.

**Problem related to packing**


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Byczynski's (2002) scale that measures packaging related problem towards cutflower production is adopted in this study with the items namely 'applying of chemical during packing is not properly done', 'cut flowers are not properly arranged in packs', 'stems or flowers may break during packing', 'flower size during packing is not arranged properly' and 'as workers move in and out it is very difficult to maintain constant temperature and relative humidity in the cooler (walk-in-cooler)'.

**After Post-harvesting**

**Packing.**

There are many shapes of packing containers for cut flowers, but most are long and flat and a full telescoping design (top completely overlaps the bottom). This design restricts the depth of the flowers in the box, which may in turn reduce physical damage of the flowers. In addition, flower heads can be placed at both ends of the container for better use of space. With this kind of flower placement, whole layers of newspaper have often been used to prevent the layers of flowers from injuring each other. The use of small pieces of newspaper to protect only the flower heads, however, is a better practice, since it allows for more efficient cooling of flowers after packing. It is critically important that containers be packed in such a way that transport damage is minimized.











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Some growers anchor the product by using enough flowers and foliage in the box so that the package, after banding, holds itself firmly. To avoid longitudinal slip, packers in many flower-producing countries use one or more "cleats". These are normally foamor newspaper-covered wood pieces that are placed over the product, pushed down, and stapled into each side of the box. Padded metal straps, high density polyethylene blocks, and cardboard tubes can also be used as cleats. The heads of the flowers should be placed 5 – 10 cm from the end of the box to allow effective pre-cooling and to eliminate the danger of petal bruising should the contents of the box shift. Another system commonly employed to secure flowers is an elastic strap, anchored in the base of the box, that is stretched over the stems of the flowers after packing. Some flowers lend themselves to packing in a manner where the stem bases of some bunches are placed against the ends of the box. The rest of the flowers are packed normally (5-8 cm from the end of the box), and the conical shape of typical bunches means that all the flowers are well secured.

**Box design and construction**

Much can be achieved in improving box design and construction. There are literally more than a thousand box sizes used in the flower trade, and the quality of card used in the boxes is quite variable. The strength of cardboard falls rapidly at high humidity, and this is why boxes constructed with poor quality card may collapse, particularly where there are major changes in temperature and resultant condensation in the postharvest chain. The industry should move to a small number of box sizes designed to fit the standard international pallet, and should use high quality card. White card speaks of high quality, and allows the grower to highlight the product with printed designs. A major flaw in the design of some boxes is that the pre-cooling vents are pre-formed and not sealed. This means that they become ‘fast warming’ vents when the box is handled at high temperatures. The standard ‘California’ box has a simple sealable flap system that is very suitable for flower boxes that may be exposed to Pro flora bulletin 2009 - 16 - ambient temperatures. After pre-cooling the flaps are sealed, and the flowers are thus less exposed to external temperatures.

The flaps on the box provide important extra stiffness to the corners, so if staples are to be used, there should be sufficient (five) to ensure a rigid double sheet of cardboard. Three up the outside corner, one on the inside bottom corner, and one more or less in the middle of the flap. Many marketing chains no longer permit the use of staples for securing the side flaps of the boxes. Where staples are no longer allowed, replace them with a fast-setting cement (hot glue, for example) with similar placement, rather than a piece of tape around the outside

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edges. Ingenious folded box designs are now widely used in the produce industry, and an adaptation for flowers would be worth exploring.

One other suggestion for strengthening the box would be to form an extra triangular strut in the corners of the box bottom. Since there is an air-gap between the flowers and the end of the box, the triangle would not reduce packing volume, and would greatly increase corner strength.

**Packing systems**

The costing of air transport has led to widespread use of packing systems that are detrimental to good quality in flowers. Because flower freight is typically based on volume rather than weight, producers commonly over-pack their boxes. The result is a rounded box that does not stack well, where the product, not the box, carries the load, which cannot be pre cooled effectively, and where the box can easily fail. Quality flowers result from packages where the box protects the flowers. Overpacked boxes cannot do that. The pressure to increase the number of flowers in the box explains the tendency to pack the flowers right up to the end of the box. This defeats the forced air pre-cooling system, which depends on a 5-8 cm 'plenum' at each end of the box to distribute the cool air to all the flowers. Warm, bruised flowers, with a poor potential vase life are the inevitable result of this practice.

**Cooling**

By far the most important part of maintaining the quality of harvested flowers is ensuring that they are cooled as soon as possible after harvest and that optimum temperatures are maintained during distribution. Most flowers should be held at 0-2o C. Chilling-sensitive flowers (anthurium, bird-of-paradise, ginger, tropical orchids, and heliconias) should be held at temperatures above 10o C.

Individually, flowers cool (and warm) rather rapidly (half-cooling times of a few minutes). So, while individual flowers can be cooled quickly, it is also true that individual flowers brought out of cool storage into a warmer packing area will warm quickly and develop condensation prior to packing. The simplest method of ensuring that packed flowers are adequately cooled and dry is, therefore, to pack them in the cool room. Although this method is not always popular with packers, will probably increase labor cost and may slow down packing somewhat, it ensures a cooled, dry product.

Once packed, cut flowers are difficult to cool. Their high rate of respiration and the high temperatures of most greenhouses and packing areas result in heat build-up in packed flower containers unless measures are taken to ensure temperature reduction. It is therefore necessary to cool the flowers as soon as possible after packing. Forced-air cooling of boxes

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with end holes or closeable flaps is the most common and effective method for pre-cooling cut flowers. In forced-air cooling, refrigerated air is sucked or blown through a packed box of flowers to reduce their temperature quickly. Most flowers can be cooled to recommended temperatures in 45 min to an hour, and some cut flowers can be cooled in as few as 8 min. For small volumes of packed flowers, this is done by stacking boxes around a fan inside an existing cooler. In larger systems, many fans are permanently mounted against a wall, and pallets or cartloads of flower boxes are positioned next to the fans. The refrigeration system needs to be carefully designed and sized for forced-air cooling.

**Cooling Time Calculations**

The time necessary to reach a desired temperature is expressed in terms of a cooling curve. The seven-eighths cooling time, or the time required to reduce the temperature of the flowers seven-eighths of the way from the initial temperature to the temperature of the cooling air, is considered the target for a commercial cooler. This relationship is exemplified in the figure.

Note that the rate of cooling becomes very slow as the temperature of the flowers nears the temperature of the refrigerated air. Consequently, flowers are seldom completely cooled to the temperature of the cooling air. In the flowers being cooled depicted in this figure, half an hour of cooling is required to reach 37.5 F (seven-eighths cooling). More than 2 hours cooling would be required for the flowers to approach the temperature of the cooling air (32 F).

Care must be taken to pack in such a way that air can flow through the box and not be blocked by the packing material. In general, packers use less paper when packing flowers for pre-cooling. The half-cooling time for forced-air cooling ranges from Pro flora bulletin 2009 - 18 - 10 to 40 minutes, depending on product and packaging. Flowers should be cooled for three half-cooling times (by which time they are 7/8 cool).

**Fans**

Forced-air coolers use squirrel cage (centrifugal) or propeller (axial flow) fans. Centrifugal fans are much quieter than axial flow fans and can more air against higher static pressures, but may require greater horsepower to operate. Fans are selected based on two criteria – the required airflow, measured in cubic feet per minute (cfm), and the required static pressure, measured in inches of water. The specific requirements are determined by the type of flower, the number of boxes, and venting of the boxes, and the rate of cooling desired.

The airflows and pressures needed to cool a full-sized ‘California’ box of different types of flowers are depicted in the following table. In designing a pre cooler, the airflow

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(L/sec) required can be estimated by multiplying the required L/sec per box by the number of boxes that will be cooled, and adding 25% to allow for air leaks. The number of boxes to be cooled should be based on the maximum number handled on a peak day (such as the period just before a holiday). In is not advisable to use higher airflows than those listed in the table. They will not significantly increase the cooling rate, and will require excessive amounts of energy. The pressure drop for the system is equal to the pressure drop across one box plus 25 percent additional pressure as a safety factor. Do not attempt to cool boxes stacked end to end.

**Forced-air cooling** static pressures, airflows, and cooling times required to cool standard boxes of specific flowers Static pressure 1.25 cm 2.5 cm 5 cm Flower species Airflow 7/8 cooling time Airflow 7/8 cooling time Airflow 7/8 cooling time L/sec/bo x Minute s L/sec/bo x Minute s L/sec/bo x Minute s Carnations 33 48 42 40 52 35 Chrysanthemum s 38 62 61 58 99 54 Gypsophila 80 10 22 8 -- -- Roses 66 34 94 25 136 20 Statice 71 40 99 18 132 13 *Carnation box size 122x53x30 cm, with two 5-cm diameter vent holes in each end, 23 kg gross weight *Chrysanthemum box size 57x21x12 cm with two 2-inch diameter vent holes in each end, and 7 kg gross weight; 9 kg box will allow 50% less air through the box. *Gypsophila box size 107x53x30 cm with two 7.5 cm diameter vent holes in each end *Rose box size 122x53x30 cm, with two 5 cm diameter vent holes in each end, 20 bunches per box. *Statice box size 107x53x30 cm with two 7.5 cm diameter vent holes in each end and gross weight of 34 kg. If the packages are to remain in a cool environment after pre-cooling, vents may be left open to assist removal of the heat of respiration. Flowers that are to be transported at ambient temperatures can be packed in polyethylene caskets, foam-sprayed boxes or boxes with the vents resealed. Ice that is used after pre-cooling is only effective if it is placed so that it intercepts heat entering the carton (i.e. it must surround the product), and care must be taken to ensure that the ice does not melt onto the flowers or cause freezing damage.

**Cooling for Aqua packs**

A marked trend in recent years has been to pack flowers vertically in boxes that have water (hopefully containing a least a biocide) in the bottom. Considerations of weight and the potential for spills mean that when such boxes are used for air transport, they are packed without addition of solution (which may be added after transport). Pre-cooling of these boxes represents a particular challenge. Palletized Proconas can be placed against a modified plenum designed to draw air down through the flowers and out of the ventilation grids and handholds in the hamper bottoms. Padding above the air gap in the plenum seals air from the

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bottom of the boxes and the pallet. A strip of canvas or sheet of fibreboard around the bottom of the boxes and the pallet ensures that air is drawn down through the boxes.

**Vacuum cooling**

While research documenting the use of vacuum precooling for floral crops dates back to the 1950s, few such systems have been used commercially. More recently, however, vacuum coolers have been installed in flower marketing terminals (mostly near airports but also by a few growers) as a means of removing heat from packed flowers. Vacuum cooling is based on the fact that water boils at lower temperatures at lower pressures. At about 1/10th atmosphere pressure, water boils at 0°C. When flowers or plants are placed at these low pressures, the water in their cells 'boils', removing heat. Although these systems cool leaves, stems, and growing media promptly and efficiently, flower petals often cool somewhat more slowly, because water cannot escape readily from them. Essentially the same seven eighths precooling time (or possibly 10-15 minutes less) is required to vacuum cool flowers as for the forced-air cooling systems. When used at or near airports, these systems serve as a useful 'backstop' for flowers that have not been properly cooled by growers and/or shippers. However, in some cases it can be many hours before packed flowers arrive at the airport or trucking The downdraft system is efficient, with a half cooling time of less than 10 min. - 21 - dock, which suggests that they may have already deteriorated significantly before being placed in a vacuum cooler. Some advantages of vacuum cooling methods include that paper and plastic packaging materials in the boxes do not affect the efficiency of cooling, free water is removed, boxes can be stacked in any manner in the precooler, and it can work equally well with dry packs and wet packs for cut flowers and greens and for potted plants. The main disadvantage is the high capital cost of the equipment. In a centralized facility this high cost can be offset by the high throughput of boxes that these systems can achieve.

**Quality Control**

There are few official grade standards for cut flowers. Some marketing channels, for example the British mass market chains and the Dutch auctions, have internal quality control systems that provide a check on quality of flowers. The most important quality parameter is "freshness" or vase life. This parameter is difficult to assess visually, but because of its importance, producers and receivers should set up a "quality control" program that would involve evaluation of the vase life of representative flowers on a continuing basis.

**Research Methodology**

This study has made an attempt to analyze the production and distribution problems of cut flower producers in Tamil Nadu. The respondents are cut flowers producers and

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distributors (sometimes producer may also be a distributor) from Hosur (Dharmapuri district), Kodaikanal (Dindugal district), Ooty, Cunoor and Kothagiri (Nilgiri district). This study analyses the trends in cut flowers, area of cultivation, production, price, export and import. This analysis brings the focus on inter-district variation over the years with respect to production of cut flowers.

The study makes use of both phenomenological (qualitative) approach and positivist (quantitative) approach. The phenomenological paradigm is concerned with understanding human behaviour from the researcher's own frame of reference. Such an approach allows for theory to be developed from empirical reality, which indeed is an aspect of inductive research. The use of a focused interview schedule takes a phenomenological context of the research whereas the analysis of the survey data is a complete positivist approach to the research. The positive approach seeks the fact or causes of social phenomena, with little regard to the subjective state of the individual (Collis et al. 2003). This is for conceptual and theoretical explanation to be developed and then tested by empirical observation, which is an aspect of deductive research.

**Objectives**

1. To study the overview about cut flower industry in Tamilnadu to know the present situation.
2. To investigate the impact of various problems related to production and Packing problems

**Analysis and Interpretation**

Mean and Standard deviation of respondents opinion about the problems related to post – harvest and handling of cut flowers

| | **Mean** | **Std. Deviation** |
|---|---|---|
| Knowledge on post harvest and handling techniques is inadequate | 2.77 | 1.218 |
| Post harvest losses are high | 4.01 | 0.771 |
| Adequate cold storage facilities and capacity are poor | 4.29 | 0.713 |
| Electricity cost and diesel cost are high | 4.33 | 0.753 |
| Flowers are not properly handled | 3.23 | 1.196 |
| Cutting of flowers is not properly done | 2.76 | 1.198 |
| Bunching of flowers is not properly done | 2.79 | 1.119 |


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The table shows the respondents' opinion about the mean and standard deviation of various problems related to post – harvest and handling of cut flowers. While observing the table, it is clear that the high electricity cost and diesel cost is the major problem faced by cultivators along with (mean = 4.33; SD = 0.753), inadequate cold storage facilities and capacity (mean = 4.29; SD = 0.713), and high post harvest losses (mean = 4.01; SD = 0.771). It is also noted that improper cutting of flowers (mean=2.76; SD=1.198), inadequate knowledge on post harvest and handling techniques (mean=2.77; SD=1.218) and improper bunching of flowers (mean=2.79; SD=1.119) are not the major problems related to post-harvest and handling of cut flowers.

**Mean and Standard deviation of the respondents' opinion about the packing related problem**

| | **Mean** | **Std. Deviation** |
|---|---|---|
| Applying of chemical during packing is not properly done | 2.20 | 0.630 |
| Cut flowers are is not properly arranged in packs | 2.75 | 0.923 |
| Stems or flowers may break during packing | 3.86 | 0.679 |
| Flower size during packaging is not arranged properly | 3.07 | 1.211 |
| As workers move in and out it is very difficult to maintain constant temperature and relative humidity in the cooler (Walk-in-cooler) | 4.29 | 0.835 |

Mean and standard deviation of respondents' opinion about packing related problem are given in the table. While observing the table, difficulty in maintaining constant temperature and relative humidity in the cooler (mean=4.29; SD=0.835) is a major problem related to packing. Other major problems are breakage of steam during packing (mean=3.86; SD=0.679) and improper arrangement of flower based on size during packing (mean=3.07; SD=1.211). However, improper arrangement of cut flowers (mean=2.75; SD=0.923) and improper applying for chemical during packing (mean=2.20; SD=0.630) are not major problems of packing. Because generally workers in cut flowers industry have experience in arranging cut flowers, they might be facing problems in arranging flowers based on size. Moreover, applying of chemical is a routine process and hence, it is not a major problem during packing. Hence, it is concluded that difficulty in maintaining constant temperature and relative humidity in the cooler during packing is the major problem faced by cultivators.

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**Mean and Standard deviation of the respondents' opinion about the overall dimensions of production problem**

| | Mean | Std. Deviation |
|---|---|---|
| Purchase of Seedling | 3.57 | 0.372 |
| Fertilizer | 3.92 | 0.462 |
| Finance | 4.12 | 0.311 |
| Pests and Disease | 3.17 | 0.435 |
| Post Harvest | 3.45 | 0.407 |
| Infrastructure | 4.26 | 0.454 |
| Information Dissemination | 3.84 | 0.907 |
| Technical | 3.36 | 0.550 |
| Labour | 3.97 | 0.344 |
| Packing | 3.23 | 0.392 |

Mean and standard deviation of respondents' opinion about the overall dimensions of production related problems given in the table. While observing the table, the problem related to infrastructure facilities (mean=4.26; SD=0.454) is the major problem in cutflower productions. Other major problems are finance (mean=4.12; SD=0.311) and labour (mean=3.97; SD=0.344) which are the key for the success of any business. Problems related to fertilizer, manures and pesticides (mean=3.92; SD=0.462) and information dissemination (mean=3.84; SD=0.907) are the other problems that are faced by the cultivators of cutflowers. Though cultivators are familiar in purchasing, they still face problems related to purchasing of seedlings (mean=3.57; SD=0.372). Post-harvest handling of cutflowers (mean=3.45; SD=0.401) and technical aspects in cutflowers production (mean= 3.36; SD=0.550) are also gaining importance in the production of cutflowers. However, packing, and pests and diseases are gaining less importance with respect to cutflower production. Hence, it is concluded that infrastructure facilities, finance and labour are the major problems related to production of cut flowers.

**Discussions**

In the present context cutflower cultivators are facing a lot of hardships because of labour problem. The same may be resolved through scientific farming and by adhering to the modern technological aids transporting through conveyors, drip irrigation and packing machines

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- Technical training is important for cultivators and distributors to voluntary organization, gain knowledge on grading, pricing, strategies, attractive packing, etc. Institutions like NGOs, etc. can also join the government in this endeavour.
- Technical training is important for cultivators and distributors to voluntary organization, gain knowledge on grading, pricing, strategies, attractive packing, etc. Institutions like NGOs, etc. can also join the government in this endeavour.
- The absence of refrigerated infrastructure for transportation and sale of flowers affects the quality of flowers resulting in realizing lower returns by the cultivators. The provision of cold chain facilities thus assumes greater importance. The needed infrastructure for these purposes could be established by forming a viable cultivators association which in turn could mobilize the needed resources from National Horticulture Board and State Government. Promotion of scientific grading, packing and storage by developing the adequate infrastructural facilities is essential for a sustainable growth of the cutflower industry.

**Conclusions**

This study focuses on the major problems of cutflower distributors. It is observed that there is a lot of scope to reduce the stated problems of packing and handling of cutflower. The intensity of the problems also varies based on socio-economic factors. Training the laborer in packing and warehousing section technically and attitudinal change will prepare them mentally to adopt themselves to the changes. This would help to decrease the intensity of handling problems and also to motivate the labors who are all involved in packing and moving activities. The laborer needs to utilize their skill and knowledge, to enhance the efficient output and this in turn will raise their standard of living and also increase national economy.

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