

Strawberry a profitable crop for urban area farmers

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Introduction:

In Bundelkhand, the farmers who have irrigation facilities and who save their crops from Anna animals get good benefits. In Banda, Mahoba, a large number of farmers have started cultivating fruits and vegetables with the help of farm ponds, solar power pumps, in which their profits have also increased. The farmers of Bundelkhand had suffered a lot in the drought. The farmers of this place do not cultivate crops other than bajra, jowar, wheat, due to which they get enough food grains, but they do not get any profit. In such a situation, the Social Development Institute, a non-governmental organization working for the farmers here, is teaching the farmers to earn with less expenditure by giving them seeds and seedlings of vegetables as well as strawberry. With this, the farmer can earn more profit in less land.

Strawberry is now being cultivated in Bundelkhand. This is expected to change the face of this area. The government is promoting the cultivation of strawberries. For this purpose, the Uttar Pradesh government has

organized Strawberry Festival in Jhansi. Along with the cultivation of strawberries, the farmers themselves should also learn the task of taking them to the market. So that they can do the work of packing strawberries fruits in less time. A box of 200 grams of 10 pieces costs up to Rs 60. In this way our farmers of Bundelkhand could earn good profit from strawberry crop instead of traditional crops.

The Strawberry farming business can be profitable only if it is marketed well. Farmers in India face difficulty in managing the warm [winter](#) climates. The All India Strawberry Growers' Association is greatly concerned about the decrease in the production of Strawberries during the past few years and is taking measures to improve the quality and quantity of production. Strawberry Farming in Greenhouse or Strawberry Farming in Polyhouse adapts similar conditions of outdoor Strawberry cultivation. However, Hydroponic Greenhouse Strawberry farming will have a different set of procedures.

Farmers get subsidy on strawberry cultivation

A farmer can produce strawberry up to

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four hectares, in which the cost per hectare remains up to 2 lakh 80 thousand. In such a situation, 40 percent of the cost i.e. about 1 lakh 12 thousand subsidy on one hectare is given to the farmers. This subsidy is available in three instalments. Subsidy of 60 percent of the cost amount is given in the first year, 20-20 percent of the cost amount in the second and third year.

About the Strawberry

Strawberry is the [fruit](#) obtained from a flowering plant belonging to a hybrid genus (*Fragaria* x *Ananassa*). Basically, the cultivated variety of strawberry is a cross between two different varieties i.e. *Fragaria Chiloensis* from western America and *Fragaria Virginiana* from Eastern America. It is a native plant of temperate regions. The fruit was first grown wild in France, later being cultivated for various purposes. It is [now widely](#) cultivated throughout Europe, the United States and Canada. In India, we can find strawberry farms in Nainital, Dehradun, Mahabaleshwar, Kashmir Valley, Kalimpong and Bangalore. The fruit of this plant is famous for its aroma and taste. Strawberries are found in a variety of products such as food, beverages, confections, perfumes, and cosmetics. Strawberry is a low-growing herbaceous plant with a fibrous root system and a crown with basal leaves. The plant is

also considered perennial in nature as its leaves remain green even during winters.

The leaves of the plant have serrated edges with a hairy texture. The flowers of the plant are either white or reddish in colour. The flowers grow in small clusters on slender stems emerging from the axils of the leaves. As the age of the plant increases, the roots of the plant become woody. The maternal crown of the plant develops runners that root and touch the ground; this is how plants grow vegetatively. Strawberry is not a true berry, rather it is considered an accessory fruit. Strawberry fruit contains many seeds and develops from an enlarged flower receptacle. The fruit is heart-shaped and the pulp inside is either white or deep red, depending on the cultivar. The length of the fruit varies between 2 to 5 cm. The fruit is expected to contain very few calories and carbohydrates. They are also low in unsaturated fats but contain omega-3 fatty acids and polyunsaturated fats. The fruit is also good in protein and mineral content.

Cultivars or varieties of Strawberry

Strawberries are generally divided into three different categories based on their growing season, namely June bearing, ever-bearing and day-neutral. There are many cultivars of strawberries available, but there are a few resistant cultivars used for cultivation:

Chandler: Fruits are large with hard skin, Fruit weight is 18 g, Fruits have good taste and colour, Used in sweets, Tolerant to viral attacks and physical damage.

Tioga: Berry weight is 9 g, fruit matures very rapidly, tolerant to viral attacks.

Torrey: Large fruit with medium firmness, produces many runners, berry weight 6 g, good quality fruit, tolerant to attacks.

Selva: Fruits are also available in off season, Fruits are conical or block shaped, Fruit weight is 18 grams, Good for sweets.

Belrubi: Fruit is bright red in color and conical in shape, fruit taste is sweet with acidic color, berry weight is 15 grams, good plant for runner production.

Fern: the fruit is a day-neutral and early ripening variety, vigorous variety, medium-sized scarlet fruits, excellent taste, fruit sweet or slightly sour to taste, berry weight 25 g.

Pajaro: Red colored fruit with large size and firm skin, tolerant to attacks and diseases.

Some ever-bearing varieties of Strawberries are Albion, Aromas, Diamante, Everest, Evie2, Evie 3 Fort Laramie, Hecker, Mara des Bois, Monterey, Portola, Quinault, Tribute, Tristar, San Andreas, and seascape

Soil and climatic requirements for growing strawberries

It is very clearly known that strawberries grow best in full sun, but high summer temperatures have a negative effect on the size and quality of the fruit. Cool temperature is helpful in the development of fruits. The roots are expected to experience less stress even in cooler climatic conditions. Environmental parameters such as temperature, light duration and light intensity are of utmost importance during strawberry cultivation. The optimum day temperature should be around 22 to 25°C and the night temperature is expected to be around 7 to 13°C. Frost is dangerous for plants. Strawberry plants should never be allowed to wither due to lack of water in the soil, so the plants have to be watered in sufficient quantity. Supplemental irrigation should be provided during summer in dry areas or areas with less rainfall, in winter. Too much rain or water supply can break the fruit, so attention should be paid to the required water supply for the plants. The plants require well-drained sandy loam or loamy soil with an average pH range of about 5 to 5.5. If the land is prepared well before planting and sufficient quantity of compost or organic manure is added to the soil, then plants can be grown even in clay soils. Soil which is highly saline in nature and prone to water logging is not suitable for strawberry cultivation.

Land preparation and planting of strawberries

The land selected for strawberry cultivation should have adequate air and water drainage facilities. Low-lying areas should not be preferred for these plants as they are subject to frost and other damage. The land which was earlier used for planting solanaceous crops like tomato, potato, pepper, brinjal etc. should be avoided for strawberry cultivation or they should be thoroughly fumigated before planting strawberries. Land that was used to plant sod should also be avoided. The land area should be cleared of stones, weeds etc. and plowed well to improve aeration. Mature manure is added to the soil to improve soil fertility. Sometimes lime is also added to the soil composition to correct the pH range. Planting strawberries should be done carefully so that the top of the plant is above the soil surface. Proper depth assessment should be done at the time of planting as planting too deep or too shallow can be dangerous. Planting is generally done in double rows with a row and slant distance of 20 x 20 cm. Plant to plant distance should be about 30 x 30 cm for early sowing and 10 x 10 cm for late sowing. Depending on the planting density, a maximum of 66,000 plants can be planted in one hectare of land. Before planting, raised beds are prepared on the ground and mulching is done with plastic material. The size of the

raised bed should be such that the width is 60 cm, the height is 45 cm and the path is 50 cm. The mulch is a black plastic sheet about 100 m long, 1 m wide and 30 to 40 microns thick. Organic materials such as straw can also be used as mulch and are expected to be much cheaper than plastic mulch materials. Transplanting is generally done in the months of March-April, September-October or January-February. Apart from raised bed method, strawberries can also be planted in other methods like matted row, hill system, spaced row, plastic mulch base etc.

Propagation of Strawberries

Strawberry plants are propagated by runners. Runners should be produced separately as they produce the true type of plants and carry most diseases to new plants. Runner for strawberry plants should be grown on the land where strawberry plants have not been planted for 3 to 4 years. Runners from the plant should be picked in the month of September and planted in polybags containing a mixture of soil, sand and well rotten farmyard manure for about a month.

Manure and fertilizer requirement for growing Strawberries

Lime and phosphorus elements should not be applied to the field after planting if they have already been applied during land preparation. The field has to be supplemented using nitrogen and potassium fertilizers

throughout the cultivation season. The level of potassium and nitrogen within the soil should be 20 to 30 mg/kg and 40 to 80 mg/kg respectively. Fertigation is the best and cost-effective way of fertilizing plants. After 20 to 50 days of planting 12:61:00 NPK @ 500 gm should be applied every other day, similarly 13:00:45 NPK @ 500 gm should be given in remaining days. After 50 to 60 days of planting 19: 19: 19 of NPK fertilizer @ 500 grams should be supplied on alternate days (Monday, Wednesday & Friday) and calcium nitrate @ 250 grams is supplied on the remaining days (Tuesday, Thursday & Saturday). 60 to 100 days after planting of Strawberry plants, 16:08:24 of NPK @ 500 grams is supplied on alternate days and 00:00:50 of NPK @ 250 grams should be supplied on the other days. The plants should be supplemented with 12 g of micronutrients once a week.

Irrigation requirements for growing Strawberries

The timing and frequency of irrigation depends on certain factors like soil type, water quality, climate of the place, season, type of fruit, mulch material and type of irrigation system used. If planting is done on sandy soil then water is supplied in small quantity at regular intervals i.e. in 2 to 3 days. For clay or loamy soil heavy irrigation is given at an interval of 4 to 5 days between each cycle.

Strawberry plants grown in warm climates require more irrigation than those grown in cooler regions. Various irrigation systems like overhead sprinkler, micro-sprinkler and drip irrigation can be used for strawberry cultivation. If drip system is being used, it should have 1 or 2 lateral lines of 16 mm thickness with drippers at every 30 cm. The discharge rate from the drippers should be around 2 to 4 liters per hour.

Intercultural practices of Strawberry field

Weeds in the field can be controlled either by mechanical or chemical techniques. Hand weeding is a laborious operation and is generally not preferred on strawberry land. The material used for mulching the field is paddy straw and black polythene film. Both these ingredients ensure good weed control, early harvest, reduce rot and increase crop yield. Strawberry plantings should be repotted to control plant density, maintain plant beds, and remove old plants. These strawberry plants grow too quickly and become overcrowded, which leads to diseases and reduced yields. Renewal can be done in the following ways:

- ✓ After 5-6 days of the last pick, the leaves of the plants 1 inch above the crown area are removed through a mower.
- ✓ The plants in rows are thinned either by hoe or harrow.

- ✓ Rows are narrowed to 6 or 8-inch width.
- ✓ The crops are fertilized after renovation.
- ✓ Selected herbicides should be applied if necessary.
- ✓ Light irrigation is given to stimulate new growth.

De-blossoming or removal of flowers is practiced to prevent fruit set and increase the production of runners. Generally, runners from a plant are allowed to root along the rows until a substantial crown has formed, but after that, all excess runners should be removed from the rows.

Pest and disease management of Strawberry Orchard

Diseases usually occur in those plants where the rainfall is more than normal. Some common diseases of strawberry plants that are classified as foliar diseases are powdery mildew, leaf scorch and spot; root diseases such as verticillium wilt, black root rot, red stele, etc .; Fruit rot like gray mould, anthracnose, rhizopus, leather rot etc. All these can be controlled either by using proper chemical treatment methods or proper distance between plants, avoiding fertilizers during spring, mulching soil beds, applying plant residues to the field can be destroyed immediately by removal from the soil, can be prevented by using cultural methods such as

chilling the crop. Fruit immediately after ripening, Using varieties with high disease resistance, providing proper aeration between plants, removing weeds etc. Common pests of strawberry plants are white grub, cutworm and root weevil. These can be controlled by using suitable chemical sprays. In some cases, soil fumigation is also helpful. Biological or organic control measures such as neem oil spray can also be used to deter the pests.

Harvesting and yield of Strawberries

Strawberry fruits are usually picked by hand during the early morning or late afternoon when temperatures are cooler. The fruits are harvested only after attaining full maturity i.e. the fruit is sweet in taste and red in colour. Harvesting is done either twice a week or every other day. The index finger and thumb should be used to pick the fruit. The fruit is separated from the stem by twisting about 2 cm. At the time of harvesting, care should be taken that the fruits do not get damaged, so they are kept in containers without heaps. Overripe fruits should be stored separately. Collected fruits should be protected from sunlight, hot wind and dirt. Small and large fruits should also be handled separately. The fruits ripen during February–April in the plains and during May–June in the hilly regions. Transparent plastic trays are used as a common packaging material for strawberries. Strawberry yields vary by season, region and

variety. The maximum yield from one hectare strawberry farm is expected to be around 25 tonnes in India.

Post-harvest handling of Strawberry fruits

Temperature is an important factor that determines the shelf life of strawberries. Fluctuations in temperature from harvest to sale have a great impact on the marketing of the produce. A hot climate destroys the fruits easily, so the best temperature to store these fruits is 0 to 2°C. Generally, the fruits are pre-cooled within an hour of picking and then kept in the refrigerator. The storage area should be cool and well ventilated. Under proper storage conditions, strawberry fruit can be preserved for up to 4 days. The unripe, red to pink fruits have a shelf life of about 7 to 10 days at 2°C. The fruit is wrapped with suitable wrapping material to create an artificial environment where oxygen is reduced and carbon dioxide is increased to maintain its quality of the fruits. Contamination and bruising can be minimized by wrapping the fruit properly.

Economics of Strawberry production:

The investment details for strawberry cultivation in one hectare of land are as follows. It is assumed that farming is done in a plain area as the cost and labor required for other areas like ghat areas may differ from this estimate. Agricultural work is also likely to involve family labour, but here we assume that workers (both men and women) are hired. The

average wage of both the categories of laborers (men and women) is the same, but the fees or wages of men and women differ depending on the state and location.

Consolation

Establishment of agro-based processing industry in the area will also directly benefit the farmer; the production here is completely chemical-free and pure. If the income of the farmer is to be doubled, then it is necessary that the value addition of the crop that is produced has to be done. Now a days people consume strawberries for nutrients and like such things which are beneficial for the body. For health infrastructure, focus will have to be on agriculture of Bundelkhand, due to organic farming, people's faith in the product will increase. Our farmers of Bundelkhand could earn good profit from strawberry crop instead of traditional crops.