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## Farming of Cucumber in Doon Valley of Uttarakhand, India

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**Abstract:** Cucumber is one of the important vegetables, which contains high contents of vitamins, dietary fibers, and also the medicinal properties. The demand of cucumber remains in the society, especially the one which is raised organically. The present study, therefore, aims to find out farming practices of cucumber and also the economic benefits as gained by its growers in Doon Valley of Uttarakhand state in India. Semi-structured questionnaire surveys and face-to-face interviews were conducted among the cucumber growers in the study area, apart from visiting their farmlands for gathering firsthand information on various farming practices and subsequent economic returns. The economic returns seemed to be not very encouraging when the cost of self manpower was taken into account for raising cucumber. The farmers did not count the cost of their self labour for growing cucumber hence they perceived the profit margin beneficial.

**Keywords:** Vegetables; Cucumber; Farming practices; Economic returns; Doon Valley

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### Introduction

Worldwide, there is a huge diversity of vegetables, which have been a part of human consumption from time immemorial. A large number of these vegetables are consumed as accessory foodstuffs to enhance the food taste by eating either raw or cooked [1-3]. Generally, the nutritionists encourage people to consume adequate vegetables because the vegetables are rich in vitamins, minerals and dietary fiber

[4,5]. At the same time, they contain low fat and carbohydrates. Cucumber is one such important vegetable that contains high contents of vitamins and dietary fibers. It helps to rehydrate body and improves digestion. Besides, it is considered good for skin, hair, and reducing cholesterol in human body. The oil extracted from its seeds is also used as medicine and tonic [5-7].

Cucumber plant is a creeping vine that bears cylindrical fruits. It is a widely cultivated vegetable, at present. Being capable of giving high yields and so that the high economic returns within a short period of time, the farmers have inclined to raise cucumber farming at the large scale. Being a cash crop, it attracts the attention of growers more than the traditionally cultivated crops [8]. The demand of organic cucumber is increasing because the acceptability of organic farming is growing across the countries [9]. With this background, the present study aims to find out the economic benefits gained by the growers of cucumber. The study further explores the farming practices of cucumber and problems faced by its growers.

### Materials and Methods

The present study was conducted in Doon valley of Uttarakhand state in India. Doon valley is well-known for its historical Dehradun city, which is at present the capital of Uttarakhand. It is a wide valley located in the foothills of the Himalaya between 30°31' N and 78°04' E. The study area, which was located in the outskirts of the city, was undulating with an average elevation of 450 m above mean sea level. Annually, it receives about 1900 mm rainfall, in which July and August contribute highest amount. It experiences relatively high and low temperature, which exceeds on an average upto 37°C during summer and goes down to about 8°C during winter [10]. There are a few forest patches predominated by *Shorea robusta*, locally called as sal. Because of the unique climatic, topographical and edaphic conditions, historically Dehradun was known for production of high-quality farming produce, including basmati rice.

The intensive study on cucumber farming was carried out in the villages of Banjara and Navada, located in the outskirts of the city Dehradun. A semi-structured questionnaire survey was conducted among the vegetable growers in Dehradun district of Uttarakhand state in India. Apart from face-to-face interviews of the cucumber growers, their farmlands were visited continuously for

gathering information on various farming practices of cucumber, which include land preparation, seed sowing, irrigation, and harvesting. The farmers were also observed while marketing the produce to prospective purchasers. Besides, various problems as faced by the growers of cucumber were also recorded.

### Results and Discussion

#### Land preparation for farming

In the first week of March, with the preparation of land the farmers in the study area started various farming practices for growing cucumber (**Table 1**). The land was ploughed and the unwanted matter, including pebbles and last sown crops residues were removed from the field. The land was ploughed following removal of unwanted matter before irrigation. After irrigation, the land was ploughed again twice. The compost was spread in the field in the form of farm yard manure (FYM). About 2965 kg of FYM per ha were spread in the field and the land was ploughed again twice to mix the FYM properly with the top soil. Now the land was ready for sowing seeds. The farmers in the study area hold small land area for agriculture, which is less than one hectare per family. Some of the farmers, who do not own land, have a barter system for growing cucumber. They give some cereals (mainly rice and wheat), pulses or money, depending on the deeds of the landowners in return of growing crops in their land.

**Table 1:** Costing of cucumber farming (per hectare agricultural land) in the study area

Activities	Cost in Rupees per ha
Purchase of seeds (3.2 kg)	50000
Ploughing	55000
Irrigation through tube bell (at every 5-7 days interval after seed sowing)	15800
Weeding (9 times during the entire farming)	53000
Farm yard manure	44460
Grass fencing	24000
Skilled labour charges for erecting grass fencing	19760
Plastic rope for the purpose of fencing	4400
Pesticide	880
Self labour cost for guarding, plucking and marketing of cucumber (two family member @ Rs 300 per day for four months)	62000
	<b>329300</b>

**Seed sowing**

About 3.2 kg seeds per ha were sown in the agricultural land prepared for cucumber cultivation. After sowing seeds continuous weeding was done at every 10 days interval. Seeds were sown manually in rows to rows by first week of April. Within the rows about 30 cm distance was maintained between seed to seed whereas 90 cm distance was maintained between rows to rows. The farmers selected hybrid seeds as they were informed that such seeds produce fruits from the base of every leaf that attaches a leaf to the plant stem. This indicates that farmers were looking for high yielding seeds. The seeds started germinating after 9 days of their sowing in the field. The seeds were sown again wherever the gaps or the empty areas were noticed due to poor viability and germination of some of the seeds.

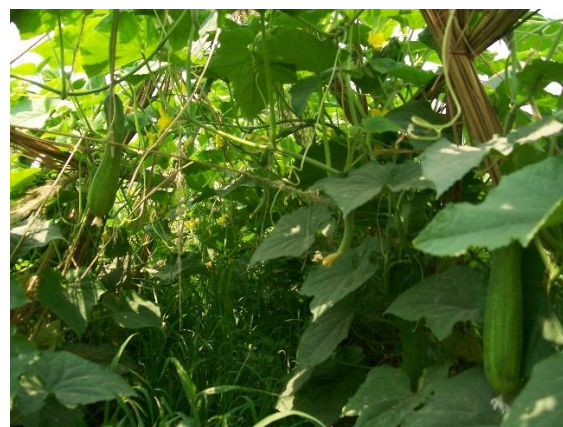
**Fencing and support**

Twenty-five days after seed germination, the grass fencing was erected so that the cucumber plant could get support to climb up. Otherwise the fruits may spoil on the ground. The fencing, which looked like a tent shape and erected by the skilled labours, was made up of a tall grass species locally called as Sarcanda (*Saccharum bengalense*) (Figure 1). A total 890 bundles of Sarcanda per hectare were used in cucumber cultivated land area. The tendrils of cucumber plant grabbed such fences to climb rather than to spread on the ground. It not only saved the ground space but also helped in easy harvesting of fruits. As the plants started growing, the farmers encouraged them to climb up by gently positioning the emerging vines on such fences (Figure 2).

**Figure: 1:** Bio-fencing for protection and climbing of cucumber plants - Photo by CP Kala



**Figure: 2:** Cucumber farms in the study area - Photo by CP Kala



**Figure: 3:** Collection of cucumber for sale in the local market - Photo by CP Kala



### Weeding and irrigation

Appropriate irrigation and weeding are required for good yield of cucumber. The farmers in the study area began to irrigate the land after five days of seed sowing. Generally, the ground water uplifted through tube well was used for this purpose. Since the cucumber was raised during summer, it was irrigated frequently at the interval of 4-7 days depending on the intensity of heat and rainfall amount and frequency. Minimum 4 times irrigation were done, monthly. The weeding was also carried out frequently at 8-10 days interval for the good growth of cucumber. About 10 times weeding was done, manually. The irrigation and weeding were done simultaneously with harvesting, as well.

### Treatment of pests

The farmers in the study area, generally, used chemicals when their crops were infected by pathogens or pests. In fruiting stage, the cucumber leaves were attacked by some pests therefore the farmers were forced to spray neon. The amount of spray depended on types of insects or pathogens. After 15 days of seed germination the first spray of neon was done. For killing pests and pathogens neon was sprayed by mixing with water.

### Harvesting of cucumber

The first slot of cucumber was ready to harvest in 55 days as its harvesting began on the beginning of third week of May (Figure 3). On the very first day of harvesting about 345 kg of cucumber was collected per hectare. Since then cucumber was harvested at every alternate day with various quantities (Table 2).

**Table 2:** Production and earning by growing cucumber (per hectare agricultural land) in the study area

Weekly	Production (kg/ ha)	Earning (Rs/ ha)
May 17 to May 23, 2018	1380	27600
May 24 to May 30, 2018	2420	48400
May 31 to June 6, 2018	6900	138000
June 7 to June 13, 2018	7410	148200
June 14 to June 20, 2018	2370	47400
June 21 to June 27, 2018	1080	21600
	<b>21560</b>	<b>431200</b>

### Marketing

The cucumber produced during summer season was generally sold easily in the nearby markets. Being an organic produce, it had a good demand. The farmers sold out cucumber either to the local mandi (market centre) or as a roadside vendor. At every alternate day, a farmer sold out cucumber at the cost of Rs 20 per kg.

### Division of labour

Both man and woman members of the family contributed in farming cucumber. The land was ploughed by the male members of the family however weeding was, generally, done by the female members. Harvesting of cucumber was done by both the genders, depending on their availability. Irrigation, grass fencing and



marketing of produce were, usually, looked after by the male folks.

### **Economic returns**

The total cost of cucumber farming in the present study area was estimated Rupees 329300 per ha (**Table 1**), however the total returns on the production was estimated Rupees 431200 (**Table 2**). In monetary terms, the profit margin was of Rupees 39900 per ha only, which seems to be not very encouraging for farmers. Nonetheless, the farmers do not count the cost of their self labour in farming cucumber, which exceeds Rupees 62000 per ha. They perceive that cucumber farming is beneficial as it gives them good return, which they count about Rupees 101900 per ha that include the costing of their self labour. Generally, the land holding of farmers in the study area is even less than a hectare per family.

### **Problems and precautions**

There were risks associated with cucumber farming. The natural calamity in terms of hail storm during summer was one of the major problems to damage cucumber crops. The strong winds also destroyed grass fences and so that the cucumber plants climbing on such grass fences. Besides, cucumber was also infested by pathogens. In the present study area, stray dogs were seen damaging crops as the farmlands were close to the human habitations. The dogs dug out soil, which spoiled tender plants. The farmers perceived that since the farmlands were surrounded by fences and concrete buildings, the environment was not conducive for retaining moisture and so that the production of crops was impacted.

There is a rampant migration from hills to Dehradun, which has changed the socioeconomic and environmental conditions of the city and its adjacent areas. Dehradun has been known for centuries for production of quality agricultural produce, including basmati rice. At present, most of the lands in and around the city have been taken over by concrete buildings, which has not only reduced the yield

of the agriculture produce but it has also changed the ecosystem and environment for crop production.

Farmers in the study area have been practicing crop rotation system and they grow cucumber during summer only. This helps to maintain the soil fertility. Studies conducted elsewhere have reported that crop rotation supports microbial diversity in the soil and so that the yield and quality of the cucumber [11]. Though, cucumber may be cultivated in wide range of soils, the sandy and clay loam soils are considered good for its farming. Besides soil types, climatic conditions and availability of irrigation facilities are important factors for crop yield. The temperature of the present study area is conducive for the growth of cucumber. Apart from various environmental and ecological factors, the farm management practices are equally important for production of cucumber.

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