

# 36 HYDROPONIC VEGETABLES GROWING



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## 1. INTRODUCTION

The project titled "Hydroponic Vegetables Growing" presents a viable micro and small-scale investment opportunity in the picturesque state of Uttarakhand, India. This profile serves as an informative reference for aspiring entrepreneurs seeking to explore the realm of hydroponics in Uttarakhand. Hydroponic vegetable cultivation offers a sustainable and efficient method of growing vegetables without soil, aligning with the state's vision of adopting modern agricultural practices.

## 2. PRODUCT & ITS APPLICATION

The core objective of the "Hydroponic Vegetables Growing" project is to engage in soilless cultivation of a wide variety of vegetables. These hydroponically grown vegetables find applications in various sectors, including:

- **Local Markets:** Hydroponically grown vegetables cater to the local market demand, providing fresh, pesticide-free produce to consumers in Uttarakhand.
- **Restaurants and Hotels:** The hospitality industry benefits from a consistent supply of high-quality vegetables for culinary preparations, ensuring a steady source of fresh ingredients.
- **Retail Chains:** Hydroponic produce can find its place on the shelves of retail chains, ensuring a year-round supply of locally sourced vegetables.
- **Exports:** With Uttarakhand's proximity to major export hubs, the project can tap into the export market, offering hydroponically grown vegetables to international buyers.
- **Institutional Buyers:** Educational institutions, hospitals, and corporate cafeterias can opt for hydroponic vegetables due to their quality, nutritional value, and sustainable cultivation method.

## 3. DESIRED QUALIFICATION FOR PROMOTER

Prospective entrepreneurs aiming to lead the venture in Uttarakhand require agricultural knowledge, especially in hydroponics, alongside strong business management skills. Understanding local soil conditions, climate, and crop preferences is crucial for tailored crop selection. A willingness to innovate in hydroponic techniques, crop varieties, and nutrient management is essential for optimizing yields. They need insights into local market trends, consumer preferences, and competition in the agricultural sector. Emphasis on sustainable practices, compliance with quality and safety standards, and a local network for smooth operations are necessary. Additionally, a customer-centric approach and adherence to regulatory requirements are vital for success in the venture.

## 4. INDUSTRY OUTLOOK AND TRENDS

The industry in Uttarakhand is set for expansion due to year-round cultivation, resource efficiency, and urban farming trends. Hydroponics conserves water, making it sustainable for regions with water scarcity. Urban and peri-urban hydroponic farming is gaining popularity, reducing transportation costs. Health-conscious consumers drive demand for pesticide-free, nutritious vegetables. Hydroponic systems offer customized nutrient solutions, yielding high-quality, disease-resistant produce. Local sourcing by restaurants and retailers further supports the growth of hydroponic ventures.

The Indian hydroponic market is expected to grow at a compound annual growth rate (CAGR) of 13.53% between 2020 and 2027. This is compared to the global hydroponic industry, which is estimated to grow at 6.8%. The global hydroponics market is divided into tomato, lettuce and leafy vegetables, pepper, cucumber, and microgreens. The tomato segment has the highest market share and is expected to grow at a CAGR of 7.7%.

## 5. MARKET POTENTIAL AND MARKETING ISSUES; IF ANY

The project in Uttarakhand holds significant market potential due to factors like fresh, pesticide-free produce, year-round availability, and urban demand. Quality, consistency, and export opportunities further enhance its appeal. However, entrepreneurs may face marketing challenges such as consumer education, price sensitivity, competition from traditional suppliers, and distribution hurdles. Regulatory compliance, understanding local preferences, and transparent sustainability claims are also crucial for success. Balancing pricing with profitability and effectively differentiating products are essential strategies to overcome these challenges and tap into the promising market for hydroponically grown vegetables in Uttarakhand.

Some of the major companies in the global hydroponics market include:

- AeroFarms Inc.
- AmHydro
- Argus Control Systems Ltd.
- Emirates Hydroponics Farms
- Signify Holding
- BrightFarms
- Freight Farms
- Green Sense Farms Holdings Inc.

Here are some hydroponic companies in India:

- **Urban Kisaan:** A Hyderabad-based startup that specializes in soil-less gardening.
- **Akarshak Hydroponics:** A company that provides equipment, systems, products, and services for indoor hydroponics.
- **Brio Hydroponics:** An Ahmedabad-based agritech startup that uses water instead of soil to supply nutrients to plants.
- **Nutrifresh:** A 10-acre hydroponic farm in Pune that produces exotic vegetables without pesticides, residue, or soil.
- **BitMantis Innovations Private Limited:** A company that is at the forefront of hydroponics in India.
- **Letcetra Agritech:** A Goa-based startup that is at the forefront of hydroponics in India.

Other hydroponic companies in India include: Nutrifresh, Balcony Crops, Evergreen Farms, Kamala Farms, Groflo Hydroponics.

## 6. RAW MATERIAL REQUIREMENTS

The project requires hydroponic systems, seeds or seedlings, growing media, nutrient solutions, water supply, climate control equipment, fertilizers, and skilled labor. Hydroponic infrastructure like nutrient delivery systems and growing trays is necessary, along with quality seeds or seedlings suited for hydroponic cultivation. Depending on the system, growing media such as perlite or rockwool may be used, along with nutrient solutions containing essential macro and micronutrients. Reliable water sources, climate control equipment, and additional fertilizers and supplements are needed for optimal plant growth. Some of suppliers for raw materials are:

- **Horticultural Impex:** No. 05, Panditwari, Near Etlantis Club, Dehradun-248007, Uttarakhand, India
- **Sugatu Global:** 100 Race Course Road, Dehradun(India)-248001 No. 100, Dehradun-248001, Uttarakhand, India
- **Mahogany Organics Private Limited:** Village Shyampur Post Office Ambiwala Prem Nagar, Near Akash Palace, Ballupur, Dehradun-248007, Uttarakhand, India
- **Kumar Enterprises:** 45 moti bazaar Dehradun, Dehradun-248001, Uttarakhand, India

## 7. MANUFACTURING PROCESS

The hydroponic vegetable cultivation process involves setting up the hydroponic system, preparing seedlings, managing nutrient solutions, controlling the climate, crop management, harvesting, packaging, and distribution. This includes establishing infrastructure like nutrient delivery systems, transplanting quality seedlings, preparing tailored nutrient solutions, monitoring environmental factors, implementing crop management practices, harvesting at the right time, packaging for freshness, and distributing to local markets or export destinations.

The Bureau of Indian Standards (BIS) has a Food Safety Management Systems (FSMS) Certification IS/ISO 22000:2005 scheme. This scheme grants FSMS Certification licenses to organizations that meet the requirements of IS/ISO 22000.

ISO standards for agriculture cover all aspects of farming, including irrigation, GPS, agricultural machinery, animal welfare, and sustainable farm management. ISO standards help promote effective farming methods and ensure that everything in the supply chain meets standards.

ISO standards for hydroponics farming include:

- IEC TC 65: Addresses process measurement, control, and automation
- IEC TC 17: Develops standards for switchgear and controlgear
- IEC TC 22: Standardizes power electronic systems and equipment
- IEC TC 44: Provides standards for the safety of machinery

## 8. MANPOWER REQUIREMENT

Sr. No	Particulars	No.	No of month in year	Wages/Salaries per month (Rs. In Lakhs)	Annual Expense (Rs. In Lakhs)
1	Self-employed	1	-	-	-
2	Skilled Person	2	12	0.2	4.8
3	Semi-skilled Person	2	12	0.15	3.6
4	Unskilled	4	12	0.12	5.76
	<b>Total</b>				<b>14.16</b>

## 9. IMPLEMENTATION SCHEDULE

Sr. No.	Activity	Time Required (in months)
1	Acquisition of premises	1
2	Construction (if applicable)	1.5
3	Procurement & installation of Plant & Machinery	2.5

4	Arrangement of Finance	1
5	Recruitment of required manpower	1
6	Total time required (some activities shall run concurrently)	3

## 10. COST OF PROJECT

Sr. No	Particulars	Annual Expenses (Rs. in lakhs)
1	Land	-
2	Building (Rented)	-
3	Plant & Machinery	6.95
4	Equipment and Furniture Exp.	2.45
5	Misc. Fixed Asset	0.02
6	Preoperative & Preliminary Exp.	0.15
7	Working Capital	1.50
	<b>Total Project Cost</b>	<b>11.07</b>

## 11. MEANS OF FINANCE

Bank-term loans are assumed @ 60%

Sr. No.	Particulars	Annual Expenses (Rs. in lakhs)
1	Promoter's contribution	4.43
2	Bank Finance	6.64
	<b>Total</b>	<b>11.07</b>

## 12. LIST OF MACHINERY REQUIRED

### A. Machinery

Sr. No	Particulars	Unit	Price per Unit (Rs. in lakhs)	Total Amount (Rs. in lakhs)
1	Hydroponic Growing Systems	1	1.50	1.50
2	Climate Control Equipment	1	0.80	0.80
3	Nutrient Solution Mixing and Delivery System	1	0.50	0.50
4	Seedling Transplanting Equipment	1	0.20	0.20
5	Environmental Monitoring Sensors	1	0.30	0.30
6	Crop Management Tools	1	0.15	0.15
7	Harvesting Equipment	1	0.25	0.25
8	Packaging Machinery	1	0.40	0.40
9	Water Filtration System	1	0.35	0.35
10	Laboratory Equipment (for nutrient analysis)	1	0.30	0.30
11	Backup Power Generator	1	0.70	0.70
<b>Total Amount</b>				<b>5.45</b>
Tax, Transportation, Insurance etc.				1.00
Electrification Exp.				0.50
<b>Grand Total Amount</b>				<b>6.95</b>

## B. Furniture & Equipment

Sr. No	Particulars	Unit	Price per Unit (Rs. in lakhs)	Total Amount (Rs. in lakhs)
1	Computer & Printer	2	0.85	1.70
2	Weighing Scales	set	0.60	0.60
3	Office Furniture (Desks, Chairs, etc.)	10	0.15	0.15
	Total Rs.			2.45

1. Vison Polynets  
Sinner,B-111 Sinner Midc Area,  
Malegaon,Malegaon,Sinner,  
Nashik-422103, Maharashtra, India
2. HiMedia Laboratories Private Limited  
23, Vadhani Industrial Estate,  
Ghatkopar West, Mumbai - 400086,  
Maharashtra, India
3. Hindustan Agri  
Shop No 1, Gat No 182,  
Paud Road, Bhukum, Pirangut,  
Pune - 412115, Maharashtra, India
4. India Green Organics  
No. 7, Rajaji Nagar, Main Road, Madipakkam,  
Chennai-600091, Tamil Nadu, India

## 13. SALES REALISATION

Sr. No	Product	Sales in Lakhs
1	Hydrophobic Vegetables	45.00

*\*The annual production of hydrophobic vegetables is 25,000 kgs*

## 14. PROFITABILITY CALCULATIONS

Sr. No	Particulars	Annual Expenses (Rs. in lakhs)
A.	Sales realisation	45.00
B.	Cost of production	
i)	Raw materials	18.00
ii)	Utilities	0.50
iii)	Manpower Cost (Salaries/wages)	14.16
iv)	Administrative expenses	0.70
v)	Packaging Cost	0.09
vi)	Material Lost Cost	0.09

vii)	Selling & distribution expenses	2.04
viii)	Repairs & maintenance	0.00
ix)	Rent	0.40
x)	Interest	0.75
xi)	Misc. expenses	0.00
	Total (B)	36.73
	Gross profit/loss (A – B)	8.27
	Less: Depreciation	0.91
C.	PBIT	7.36
D.	Income-tax	3.50
E.	Net profit/loss	6.25
F.	Repayment (Annual)	0.64
G.	Retained surplus (E-F )	5.62

## 15. BREAKEVEN ANALYSIS

(Rs. in lakhs)

Fixed cost	
Land & Building Rent	0.40
Depriciation	0.91
Interest	0.75
Manpower	4.25
<b>Total Fixed cost</b>	<b>6.31</b>
Variable cost	
Raw materials	18.00
Utilities	0.50
ManPower	9.91
Administrative expenses	0.70
Selling & distribution expenses	2.04
<b>Total Variable cost</b>	<b>31.15</b>
<b>Contribution margin</b>	<b>20%</b>
Break-Even Point in Value	31.56

## 16. STATUTORY/GOVERNMENT APPROVALS

For entrepreneurs venturing into the "Hydroponic Vegetables Growing" project in Uttarakhand, India, it's vital to navigate the regulatory landscape and obtain necessary approvals. Here are key approvals and permits required:

- A. Business Registration:** Register the business entity with the appropriate government authorities, such as the Registrar of Companies (ROC) for private limited or LLP registration.
- B. Food Safety and Quality Standards:** Comply with food safety and quality standards set by the Food Safety and Standards Authority of India (FSSAI) to ensure the safety of hydroponically grown vegetables.
- C. Local Agricultural Subsidies and Incentives:** Explore government schemes, subsidies, and incentives available for promoting innovative and sustainable agricultural practices like hydroponics.

## 17. BACKWARD AND FORWARD INTEGRATIONS

### A. Backward Integration

Backward integration in the "Hydroponic Vegetables Growing" project involves activities that bring the business closer to the source of raw materials and enhance control over the supply chain. Potential strategies for backward integration include:

1. **Seedling Production:** Consider establishing a seedling production unit to ensure a consistent supply of high-quality seedlings for hydroponic cultivation.
2. **Nutrient Solution Production:** Invest in the production of custom nutrient solutions tailored to specific crop requirements, ensuring quality control and cost-effectiveness.
3. **Growing Media Manufacturing:** Explore the possibility of manufacturing or sourcing hydroponic growing media such as perlite, coco coir, or rockwool to meet specific system needs.

### B. Forward Integration

Forward integration focuses on activities that take the "Hydroponic Vegetables Growing" business closer to end customers and markets. Potential strategies for forward integration include:

1. **Local Retail Outlets:** Establish dedicated retail outlets or farmer's markets in urban and suburban areas within Uttarakhand to directly sell hydroponically grown vegetables to consumers.
2. **Online Sales Platforms:** Develop a strong online presence through an e-commerce platform to reach a broader customer base, offering the convenience of online ordering and delivery.
3. **Restaurant and Hotel Supply:** Build partnerships with local restaurants and hotels to supply them with fresh hydroponic produce, ensuring a steady market and premium pricing.

## 18. TRAINING CENTERS AND COURSES

For entrepreneurs and individuals interested in pursuing hydroponic vegetable cultivation in Uttarakhand, it's essential to acquire the necessary knowledge and skills. Training centers and courses play a pivotal role in building expertise and understanding the nuances of hydroponics. Here is a list of notable training centers and courses relevant to hydroponic vegetable cultivation:

### 1. National Horticulture Board (NHB):

- NHB offers training programs and workshops on various aspects of horticulture, including hydroponics. These programs are conducted periodically and cover essential topics for hydroponic cultivation.

### 2. Indian Council of Agricultural Research (ICAR):

- ICAR institutes and agricultural universities often organize training courses and workshops on modern agricultural practices, including hydroponics. These programs provide in-depth knowledge and hands-on experience.

### 3. State Agricultural Universities (SAUs):

- Uttarakhand has its State Agricultural University, GB Pant University of Agriculture and Technology, which offers agricultural training programs. SAUs frequently include hydroponics in their curriculum.

### 4. Online Hydroponics Courses:

- Several online platforms offer hydroponics courses, making them accessible to individuals nationwide. These courses cover various aspects of hydroponic vegetable cultivation, from system setup to nutrient management.
- Swayam portal (link: <https://swayam.gov.in/>) can also be accessed for enhanced learning on business commerce, accounting, production, marketing, and areas of entrepreneurship.



## 5. Private Hydroponics Workshops:

- Private hydroponics enthusiasts and experts sometimes conduct workshops and training sessions. These practical workshops provide valuable insights and hands-on experience in hydroponic farming.

Entrepreneurs and individuals interested in hydroponic vegetable cultivation in Uttarakhand should explore these training options to gain the necessary skills and knowledge. These courses empower individuals to set up and manage successful hydroponic systems, contributing to sustainable and efficient agricultural practices in the region.

### Disclaimer

Only few machine manufacturers/institutes are mentioned in the profile, although many machine manufacturers/institutes are available in the market. The addresses given for machinery manufacturers/institutes have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not carry any recommendation.