



## **AGRICULTURE RECENT TRENDS IN VERTICAL FARMING AND ORGANIC FARMING**

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### **Abstract**

*Unpredictable use of a significant volume of compound manures is used in order to increase efficiency while keeping the wellbeing factor under control. The concept of "vertical farming" entails growing plants and raising animals on vertically inclined surfaces, such as high rises in urban areas where there is a lack of available land and space. The most well-known form of agriculture is organic farming, which doesn't use synthetic fertilizers or pesticides. We assessed the economic viability of organic farming in Haryana in the review. In order to accomplish this, we made contact with organic ranchers and visited Haryana's organically grown crops. An emphasis was placed on the evaluation of the important criteria that ranchers considered in their acceptance of and commitment to organic agricultural practices. A survey of the literature on the economic viability of organic farming has been undertaken.*

**Keywords:** *Agriculture, Vertical Farming, Organic Farming, Haryana, Economic Viability*

### **1. Introduction**

Since practically all of our workforce and population depend on agriculture and other cooperative activities, agriculture serves as the cornerstone of the Indian economy and provides a means of resolving the concerns of India's expanding population. It has been estimated that farming development of at least 4% is needed for India to achieve a two-digit Gross domestic product growth rate. Despite having the capacity to try to meet the needs of the constantly growing population, agriculture is facing various challenges, such as discontinuity of supply. It is undeniably true that India had a significant increase in farming during the period of environmental upheaval. The primary drivers of the increased farming productivity and

efficiency were the innovations required during the early stages of the green upheaval, which were supported by plans and further aided by agrochemicals, equipment, and water systems. Despite the fact that these innovations undoubtedly helped India's food security, a fundamental mistake was that ranchers who used these innovations still had to rely on purchased inputs. With manure and pesticide production being two of Green Upset's (GR) major contributions, the need for expensive energy sources and petroleum derivatives, which are linked to serious environmental and health issues, received a lot of attention. Modern agricultural farming practises based on the careless application of chemical inputs over the past many years have resulted in a loss of the natural environment's typical equilibrium and soil health.

Vertical farming (VF) is a horticultural technique that involves large-scale food production in elevated structures. It promotes organised creation and quick growth by managing environmental conditions and providing supplemental solutions for crops based on aqua-farming using cutting-edge nursery techniques. According to VF, combines the two fields of designing and natural sciences and has many uses in both society and the environment.

Delivering affordable food to urban areas has recently attracted significant funding and recognition in several academic and practical domains. While there are now few, very specific, and practical applications, there are difficulties in carrying out the VF. Whatever the case, the spatial distribution of VF demonstrates that the evaluation of the likelihood of VF for various environments or topographical regions as well as provincial traits is still very much in the early stages. Seasonal changes will then have an impact on yields because the plants will be grown indoors using controlled climate agricultural techniques. It is obvious that the diverse quantities and types of products that make up the VF don't just happen; they are actively flourishing in several cities across the globe with various local characteristics.

## **2. Review of Literature**

Our impression is that very few state-specific reviews consider the economic sustainability of organic farming in Haryana. However, there aren't many clear analyses that precisely analyses the economic effects of organic farming up till the end of India and for many other countries all at once. In the Chitwan region of Nepal, Adhikari examined the economic performance and yield

of organic and inorganic carrot production. It was taken into account that although organic creation framework had higher advantage cost proportion, inorganic creation framework had higher expenditure and income. This revealed that the adoption of an organic creation framework for carrots was more advantageous economically than an inorganic creation framework.

In order to develop both farming and advertising, Argyropoulos et al. focused on Greece's organic rural area. They demonstrated how unevenly organic farming is developing. For organic domestic animal farming, for example, more organic green grain is cultivated than is needed. Additionally, Greek (unlabeled) organic products are marketed as traditional, despite the fact that a wide variety of commodities are imported to satisfy the country's need for organic vegetables. They emphasize the value of developing a method of inspection that evaluates the presentation of organic farming frameworks, including the outcome of labeled organic products. It is advised that research be carried out in order to implement a more contemporary manner of financing organic farming in order to enhance a controllable organic rural region where farming, marketing, economy, and information are interconnected.

For Gujarat, Maharashtra, Punjab, and Uttar Pradesh, Charyulu and Biswas examined the creation costs of organic and nonorganic farming for cotton, wheat, rice, and sugarcane. They discovered that while the equivalent is lower in conventional farming for rice and wheat crops, the unit cost of creation is lower in organic farming for cotton and sugarcane crops.

Clark examined the advantages of organic and regular production frameworks on the typical Indiana homestead using the most recent net worth data available. It has been discovered that organic harvests can be just as serious and fruitful as conventional harvests when yield penalties are used. Organic creation is competitive and profitable due to its lower cost and sufficient cost expenses.

Using data from the Dutch region of Flevoland, Feinerman and Cornelis developed and implemented a model to determine the socially optimum acre sponsorship for a specific level of public consumption aimed at reviving organic farming. Their precise findings demonstrate that when the flexibility of the social government help capability increases, the degree of socially ideal per-hectare endowment increases. The level of ranchers' variability on the suitability of

developing organic yields (OCs), as well as the extent of associated legislative administrations, both significantly reduces the ideal sponsorship. Public administrations and ideal sponsorship are thus acceptable alternatives for strategies.

According to Just-Pope creative capacities, Gardebroek et al. examined the creation innovation and opportunity of organic and conventional arable ranches in the Netherlands. They conclude that organic ranches face greater result variety than conventional ranches because the internal variety of results is basically larger for organic farms. Their findings demonstrate that in the two types of homesteads, unobserved ranch-specific characteristics, such as management skills and soil quality, are important in understanding result changeability and creation risk. The results also demonstrate that both types of homesteads can be built on land with the highest degree of versatility. Due to traditional homesteads and other variable contributions to the case of organic ranches, work and other variable data sources have enormous creation flexibility. Compost and manures are risk-decreasing inputs on conventional ranches and risk-expanding inputs on organic homesteads. On both sorts of homesteads, other variable data sources and work increase risk; capital and land reduce risk.

By using summarized deviated detail that takes into account both a negative efficiency of pesticides and a harm lessening job for work and hardware for the Dutch arable farming area, Guan et al. examined the creation innovation and harm decrease interaction of conventional and organic farming frameworks. They discover that while organic farms rely mostly on the usage of hardware and modifications to social norms, conventional homesteads heavily rely on pesticides and equipment for harm reduction. The evidence of excessive manure use in conventional ranches unequivocally urges a supplement reduction.

### **3. Organic Farming**

The approach taken to ensuring global food security has caused great concern around the world. The concept of biosafety is currently being used at multiple levels in order to have a better, effective, and comprehensive methodology towards the global food security. Additionally, food promotion requires careful consideration because food production is still subject to the whims of the weather as well as many local, national, and international promotional requirements. Today,

however, emphasis is placed on food's look and quantity rather than the natural quality and necessity of the food grains. Food has been found to include pesticides and other manures that were used at the time of harvest enhancement. Similarly, the decreasing nature of food has resulted in an increase in various diseases, particularly various types of malignant development and various illnesses linked to weakened body resistance. Regarding the impact of commercializing agriculture on the climate, it has been discovered that this commercialization has a negative impact. Eutrophication, which is brought on by a heavy reliance on nitrogenous manures during crop production and results in a reduction of available oxygen in the water, is one of the factors that cannot be ignored. In extreme circumstances, it might also cause an algal growth. The fact that manures have a substantial impact on efficiency while also having an unfavourable impact on the climate when they persist for a considerable amount of time after filtering and running off, polluting the earth and water bodies, is an interesting reality. However, despite the practice of monoculture, the use of hybrid seeds has resulted in a major threat to local and indigenous varieties, which, if the underlying causes persist for the foreseeable future, are on the verge of losing their genetic diversity. With these findings, a crucial question for us to consider is how far we may push the alleged efficiency. We have strayed towards impracticality in order to meet the demands of the steadily growing population development. The outcomes were varied and terrible, including ranchers committing suicide in increasing numbers over time, pesticides degrading water bottles and circulating air through refreshments, increased biomagnified pesticide levels in our bodies, and a situation where Indians were not adequately supported. Despite the bleak picture given by various agrochemical and seed companies supported by various governmental authority tactics, it is astonishing how many people still go hungry. They are starving, and the food they eat has a huge potential to kill them. Then, at that time, the question of which vision we should adhere to or pursue in order to get rid of this terrible situation enters our minds.

#### **4. Vertical Farming**

Instead of growing crops in the ground, vertical farming involves growing them inside of buildings (such as high rises or former stockrooms), which recovers water and eliminates the need for soil. In a vertical ranch, there may not be any weather or other typical variables that

could hinder the production of food. When grown in controlled conditions with regular monitoring and regulation of ecological factors like light, moisture, and temperature, a wide range of plant species can achieve perfect growth rates throughout the entire year. The goal of the vertical farming method is to increase proficiency. It is possible to deceptively manipulate temperature, light, stickiness, and gases to facilitate indoor food and medicine production. Because closed development systems are used, synthetic substances are kept out of the environment. The moniker "father of vertical farming" references to the pioneering work he did in this area. There are some similarities between growing food vertically and using metal reflectors and fluorescent lighting in nurseries. Ranchers currently face a variety of issues. Fast urbanization and industrialization are reducing the amount of arable land, but they are also reducing the viability of traditional farming practices, which have numerous unfavourable effects on the environment. To care for the world's expanding population in an efficient way, methods for producing enough food should be improved. Adapted development media can be used to effectively create and protect assets related to land and water. Soilless agriculture could be successfully started and taken into consideration as a replacement solution for growing high-quality food plants, crops, or vegetables in the current circumstances.

It's important to keep in mind that there are three different types of vertical ranches. As small vertical ranches grow, high rise farming may follow. Environmentalists, urban ranchers, planners, agronomists, and health specialists have all joined this smaller-than-normal uprising to figure out how to survive in a future that will undoubtedly be food insecure and urbanized. Many professionals in advanced mechanics, aeroponics, hydroponics, and aquaculture have come together around the concept of vertical farming. Non-profit organisations have supported the vertical ranch concept with the aim of improving the local economy and climate. According to him, the vertical climate would have both ecological and economic benefits. He said that this man was responsible for developing plants on a winding rail framework. The concept of vertical farming was revived as the new century began by American scientist and health educator Dickson Despommier. He described it as "enterprise mass development of plants and creatures in high rises" in his definition. Utilizing hydroponics and aeroponics, two cutting-edge nursery innovations, it is possible to grow fish, poultry, organic products, and vegetables. The vertical

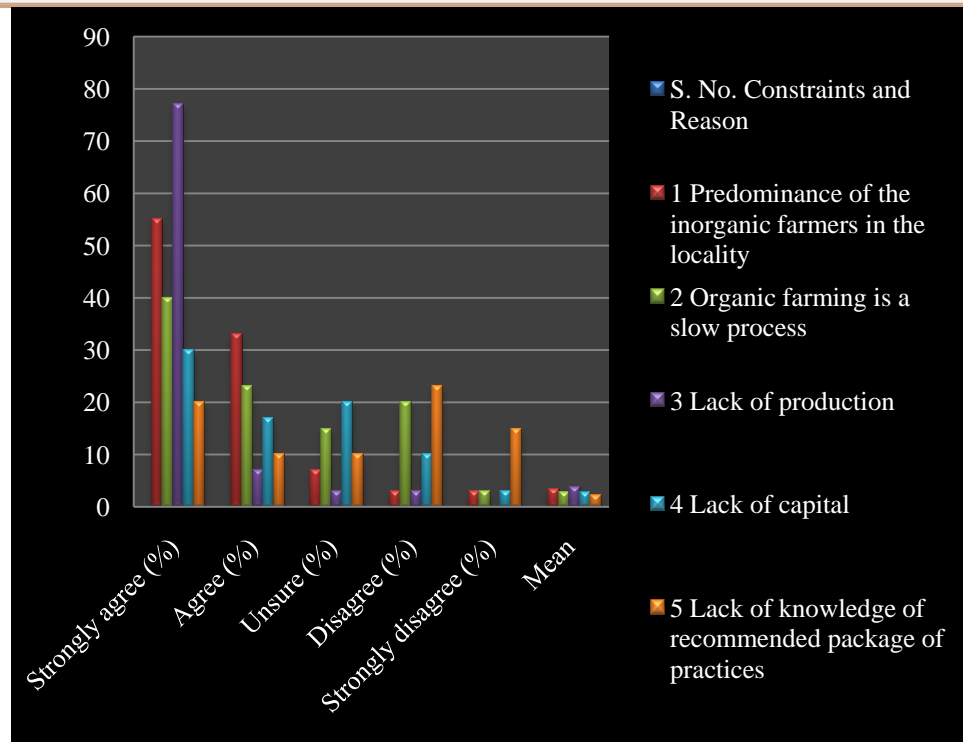
homestead supports cost-effective farming methods in contrast to traditional farming, which is defined as large-scale, outside agriculture that makes use of structures that include massive water systems, significant culturing, and extravagant use of composts, pesticides, and herbicides.

### 5. Experimental Analysis of Organic Farming Constraints

In addition to the central discussion, the individual meetings with the ranchers were guided by the timetable to identify imperatives in reception and continuing with organic farming. Tables 1, 2, and 3 each present information about current mandates, sources of organic statistics, and displays of organic produce in Haryana.

**Table: 1.Haryana's Organic Farming Production Restraints**

S. No.	Constraints and Reason	Strongly agree (%)	Agree (%)	Unsure (%)	Disagree (%)	Strongly disagree (%)	Mean
1	Predominance of the inorganic farmers in the locality	55	33	7	3	3	3.37
2	Organic farming is a slow process	40	23	15	20	3	2.83
3	Lack of production	77	7	3	3	0	3.73
4	Lack of capital	30	17	20	10	3	2.73
5	Lack of knowledge of recommended package of practices	20	10	10	23	15	2.23



**Figure: 1.Haryana's Organic Farming Production Restraints**

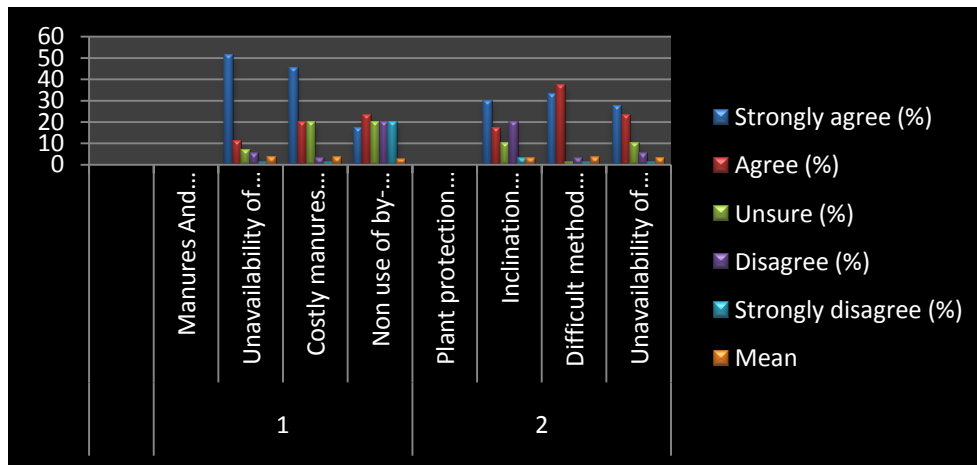
Table 2 provides an overview of the test respondents' requirements for organic development in relation to faces, bio-manure, and plant security.

**Table:2.Organic Farming in Haryana: Manures, Bio-Fertilizers, and Plant Protection Restraints**

S. No.	Constraints and Reason	Strongly agree (%)	Agree (%)	Unsure (%)	Disagree (%)	Strongly disagree (%)	Mean
1.	<b>Manures And Bio-Fertilizers:</b>						
	Unavailability of desired manures & bio-fertilizers and difficult method of its preparation	51	11	7	5	1	3.47
	Costly manures and bio-fertilizers	45	20	20	3	1	3.4
	Non use of by-product	17	23	20	20	20	2.27



	(many crops)						
2.	<b>Plant protection constraints:</b>						
	Inclination towards use of chemical pesticides	30	17	10	20	3	2.83
	Difficult method for preparation of bio-insecticides	33	37	1	3	1	3.17
	Unavailability of bio-pesticides	27	23	10	5	1	3



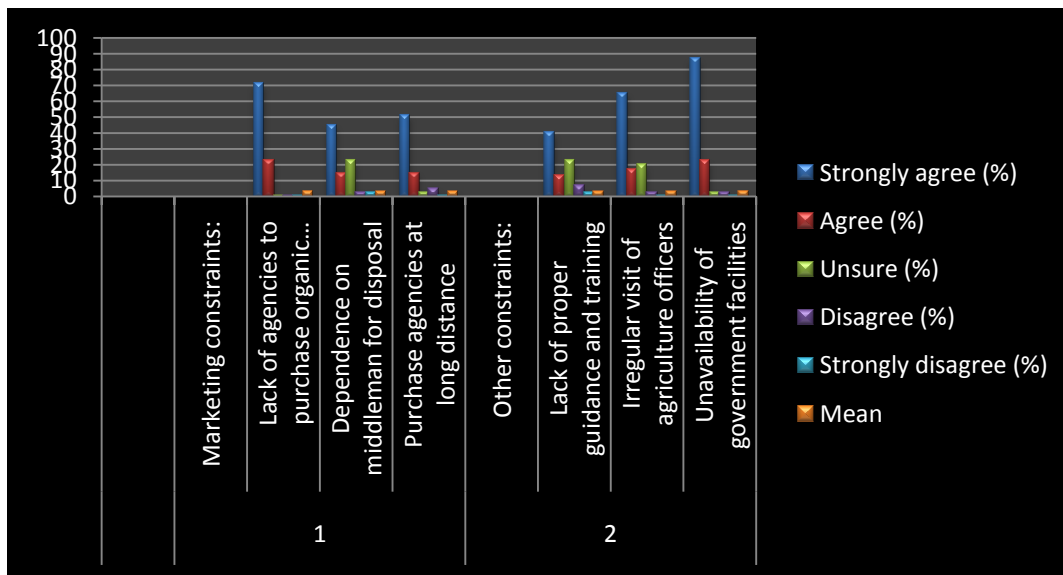
**Figure: 2.Organic Farming in Haryana: Manures, Bio-Fertilizers, and Plant Protection Restraints**

Table 3 lists the many showcasing and development restrictions for organic paddy that have been identified through investigation.

**Table: 3.Major Obstacles to Organic Farming in Haryana Include Marketing and Other Issues**

S. No.	Constraints and Reason	Strongly agree (%)	Agree (%)	Unsure (%)	Disagree (%)	Strongly disagree (%)	Mean
1	<b>Marketing constraints:</b>						
	Lack of agencies to purchase organic products	71	23	1	1	1	3.6

	Dependence on middleman for disposal	45	15	23	3	3	3.11
	Purchase agencies at long distance	51	15	3	5	1	3.3
<b>2</b>	<b>Other constraints:</b>						
	Lack of proper guidance and training	40	13	23	7	3	3.07
	Irregular visit of agriculture officers	65	17	20	3	1	3.23
	Unavailability of government facilities	87	23	3	3	1	3.5



**Figure: 3. Major Obstacles to Organic Farming in Haryana Include Marketing and Other Issues**

## 6. Result and Discussion

In Haryana, the potential of organic farming is mostly untapped. Some of the major obstacles to the growth of organic agriculture in this state have already been illustrated. Given these problems, significant areas of strength for a support system are crucial for the expansion of organic farming in Haryana. A few areas that require appropriate institutional support include: (1) Effective organic agriculture board preparation and a strong expansion network capable of providing the ranchers with enough specialized advice; (2) A low cost and hassle-free certificate

cycle and specialized help for record keeping; (3) An enabling environment for small ranchers' gathering confirmation, internal control framework, and so forth, wherever necessary; and (4) Dissemination of market data.

Sincere efforts should be done by the augmentation work force to encourage ranchers to adopt more advanced creation innovation to reduce the yield gap in order to enhance organic farming in Haryana. The local ranch science centre, like KrishiVigyan Kendra, should be aware of the concerns of the ranchers and offer criticism and restrictions in their favour. Excrement, bio-compost, and other data sources should be made available through social groups and other circulating communities at the local level, and it should be guaranteed that ranchers will receive valuable contributions in order to raise their level of productivity. Every municipality needs to have government representatives and other organisations set up to produce organic goods from ranchers. Additionally, the public authority must disclose the various help expenses for organic goods.

## **7. Conclusion**

The perspectives of organic farming are significantly different. In any event, a has advantages due to its capacity to protect human wellness naturally and its eco-friendly character. Furthermore, a great deal of research has shown that organic farming is beneficial and viable. Because organic farming requires a lot of labour, which is expensive in developed countries, the cost of producing organic food is greater in these countries. The Indian government has made efforts to support organic farming on a broad basis. In fact, a number of groups have been created to promote the products of organic farming. We can infer that even a little knowledge and familiarity with VF can significantly increase food viability and security. New developments like aeroponic systems, security measures, and bug-free plant development have altered the nursery industry and prepared the way for new types of farming, such roof farming. Innovative lighting management techniques and regular developments in lofts and commercial buildings helped businesses save energy and reduce the spread of ozone-depleting substances.

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