Vertical Farming

Growing food in vertically stacked layers is known as "vertical farming". The technique may employ hydroponic, aeroponic, aquaponics, or other soil growing techniques. In tough circumstances, such as those where arable land is few or unavailable, vertical farms try to generate food. The technique uses skyscraper-like designs and precision agriculture techniques to assist mountainside settlements, deserts, and cities grow various varieties of fruits and vegetables. It's a clever way to have fresh veggies and herbs even in places where there isn't much open land.

Greenhouse Farming System

Greenhouse farming, also known as greenhouse cultivation or horticulture under glass, is a method of growing plants in a controlled environment within a structure made of transparent materials such as glass or plastic. This structure, called a greenhouse, allows sunlight to enter while trapping heat inside, creating a warm and sheltered environment for plants. Greenhouse farming enables year-round cultivation, protection from harsh weather conditions, and control over factors like temperature, humidity, and light. It's a way to create an optimized space for plants to grow and thrive, regardless of the external climate.

Hydroponic Farming System

Hydroponic farming is a way of growing plants without using soil. Instead, plants grow in water that has all the nutrients they need. This water is mixed with special nutrients to help the plants grow strong and healthy. They don't need the soil because they get everything that needed in the water. People use hydroponic systems to grow plants indoors, in greenhouses, or even in places where the soil isn't good for growing.

This farming system requires specific equipment such as air pump and air stones for consistent oxygen supply, nutrient pump for continuous nutrient distribution, and reservoir and containers that will hold the nutrients and the crops.

Aeroponic Farming System

Aeroponic farming is a special way of growing plants where their roots hang in the air and are misted with water containing nutrients. Instead of using soil or water, this mist gives plants everything they need to grow. It's like a plant spa treatment – they get a shower of nutrients that helps them grow really well. This method is great for saving water and making plants grow faster.

This farming system requires specific equipment such as mist nozzle that sprays a fine mist of water and nutrient solution directly onto the plant roots with the help of nutrient pump.

Aquaponic Farming System

Aquaponics is a clever way of growing both fish and plants together in a special system. It's like creating a little ecosystem where fish provide nutrients to the plants, and in turn, the plants clean the water for the fish. The fish waste serves as food for the plants, and the plants filter the water for the fish. It's a win-win situation where both the fish and the plants help each other grow and stay healthy.

Just like the hydroponic farming system, both requires the same specific equipment, however, th e source of nutrients in aquaponic farming system relies on fish.

Tower Farming System

A tower farm, also known as vertical farming or vertical agriculture, is a method of cultivating plants in a vertical arrangement, often in stacked layers or towers. This approach utilizes limited space to grow a variety of crops indoors or in controlled environments. Tower farms use technology like specialized lighting, climate control, and efficient water and nutrient systems to support plant growth. The goal is to maximize production in a smaller footprint, making it suitable for urban areas and places with limited land availability. This clever setup allows for growing a lot of plants in a small space, like a tower of greenery. It's like a mini garden skyscraper!

Note that vertical farming is not a complete replacement for traditional farming. Though it offers numerous benefits, including efficient space utilization, reduced resource consumption, and year-round cultivation that can address urban and resource scarcity challenges, it's not a complete replacement due to factors like cost, energy consumption, crop suitability, and the importance of maintaining diverse agricultural practices. A combination of both approaches can contribute to a sustainable and resilient food production system.

For more info: https://www.fao.org/land-water/overview/covid19/homegardens/en/