VERTICAL FARMING TO MEET FOOD AND NUTRITIONAL SECURITY

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INTRODUCTION:

Over the years mankind has been able to convert nearly 57% of productive land for cultivation of various crops for food, often on expense of forest and grasslands (43%). The rapid urbanization on the other hand is putting pressure on available land resources that is witnessing gradual decline in the cultivated land worldwide.

Due to limited access to land for farming, there is a need to explore potential alternatives to pave the way for adding to food requirements especially for the continuously expanding urban population. Recently, the application of vertical farming into cities has emerged as an option to land based farming for cultivation of vegetables and ornamental plants in high rise buildings the world over. It appears that the concept of the vertical farm in the urban areas could solve a lot of issues related to safe and nutritious food production and environmental degradation. Vertical gardens are being taken up enthusiastically in Indian metros too by growing plants in various soilless medium. Optimally, vertical farming is required to be a cost effective, sustainable and efficient system to be adopted on a large scale in peri-urban areas.

Vertical farming generally refers to the growing of crops mostly vegetables, ornamentals, and herbs on stacks of indoor shelves using artificial light and nutrient solutions, without much sunshine and soil. Vertical farming has potential to sustain ever increasing world population especially in the urban areas with nutritional supplement thus providing food security. Vertical production of mushrooms, hydroponic green fodder, some vegetables and fruits and even poultry birds are either already in vogue or at advanced stage.

IMPORTANT FEATURES OF VERTICAL FARMING

Vertical farms enable the producer to:

- ✓ Grow food 24 hours a day, 365 days a year.
- ✓ Protect crops from unpredictable and harmful weather
- ✓ Re-use of water collected from the indoor environment
- ✓ Provide jobs for residents/communities
- ✓ Minimize use of pesticides/fertilizers/ herbicides
- ✓ Drastic reduction and dependence on fossil fuels
- ✓ Prevent crop loss from storage/shipping/ long transportation
- ✓ Stop agricultural runoff, water saving up to 90%
- ✓ Pride of producing food – an euphoric feelings
- ✓ Education and training to school children in food production

COMMONLY GROWN CROPS IN VERTICAL FARMING

Although possible to grow any plant completely indoor, economics limits to few crops in vertical farming that have small growing habit (for maximizing the number of plants that can be grown in a limited space), are prolific producers (e.g. indeterminate tomatoes), or can be grown and sold rapidly (such as micro greens). Compatible crops for vertical agriculture today include lettuce, broccoli, spinach, chard, chive, palak (beet leaf), mustard greens, amaranthus, parsley, coriander, mint, kale, basil and other herbs (rosemary, fennel, thyme, oregano and others), strawberries, mushrooms, micro greens and sprouts, summer squash, peppers, eggplants, tomatoes, cucumbers, muskmelon, algae, crop nurseries, ornamental foliage and flower plants.

VERTICAL FARMING A POSSIBLE REPLACEMENT TO CONVENTIONAL FARMING IN FUTURE

The length of distance that food travels in cities from source of production will increase many folds in future, if cities continue to depend for food on rural farming (most of the food in cities is imported from far off places). In this scenario, future cities would have to produce their own food. However, conventional land farming would not be possible in cities and peri-urban areas with prohibitive land prices. The vertical or roof top farming (also called zero-acreage farming) would be the only possible future approach and solution for providing food/nutrition to cities.

CONCLUSION

Crops in traditional farming systems are vulnerable when it comes to global warming, natural calamities, and weather changes.

There is also immense pressure on natural resources to feed the ever-growing population considering shrinking cultivable land, freshwater, and lower yields.

Though vertical farming systems do not support all sorts of crop production considering return on investment, it appears to be one of the most preferred alternatives for sustainable crop production.