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Editorial Note

Urban Farming: A Necessity or a Hobby for Few

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Agriculture/Farming has historically proved to be a major factor which guided the evolution of human civilization. Right after the beginning of agriculture revolution 12,000 years ago which came after the human cognitive revolution, the settlement patterns and food habits of humans changed drastically. People started living in large numbers practicing agriculture and thus the first villages came into being. The oldest civilizations like that of Indus valley are known to be agriculture based harnessing the fertile lands near the banks of river Indus.

Agriculture continues to influence human behavior in the modern world of 21st century but not in the same manner as it did in older times. The advent of technology and emergence of higher standards of living have resulted in large scale migratory behavior among humans. Everyday more and more people are migrating to urban areas in search of better livelihood. This is in turn affecting the agricultural practices especially in the developing countries. Agriculture still continues to be a laborious and underpaying means of livelihood in developing countries largely due to lower degree of mechanization and limited reach of advanced agricultural techniques. The upcoming generations in the rural areas no longer want to engage in farming. This coupled with an ever decreasing arable land have started to pose serious issues. Developing countries like India has seen a decline in the contribution of agriculture to the country's economy despite half of country's population being engaged in the agricultural practices. There are also various food security concerns being raised in parts of the world.

The past one year of Covid 19 pandemic further exposed glaring problems in the current agricultural setup. The lockdowns imposed as a result led to breaks in supply chains of crops from rural to urban areas. Farmers couldn't get their produce to the right markets due to the restrictions in various places. Also a fear ensued among the people living in cities regarding shortage of supplies which led to hoarding. Although there wasn't many instances of shortage of food crops and other supplies in the cities, the large dependency of urban areas on rural areas for agricultural supplies was exposed. In case of a prolonged logistics breakdown similar to the pandemic induced lockdown, can seriously affect the food security of urban areas. From where will the food come to feed millions living in cities if villages are not able to supply?

This necessitates the urban areas not to be entirely dependent on rural areas. Large scale Urban farming could be a potential solution. In cities we don't have the luxury of large patches of arable land which shifts our focus to non-traditional farming practices like aeroponics, hydroponics, aquaponics, vertical and terrace farming. But such practices are not yet widely adopted. Such practices are largely limited to people who follow farming as a hobby in cities like kitchen gardens and terrace gardens. But what is needed is a system to scale such practices to commercial scale. This might not seem a viable option at first due to lack of agricultural land and required expertise in cities.

This is where we can leverage a combination of vertical farming and smart IOT enabled farming. Having multiple vertical stacks to grow crops, starting from certain vegetables initially can do wonders. The stacks can increase available space for growing crops by multiple times. But still we might not have the required skilled workforce to run such setups on a commercial scale. IOT and sensor technologies can really prove to be helpful here. A variety of sensors and actuators can be deployed in such vertical farming setups to monitor and automatically calibrate various parameters essential for crop growth like soil moisture, temperature, soil pH, light intensity, etc. Thus, even a person with no actual prior experience in farming can easily grow crops using such setup. The biggest

advantage such system offers is that it can be integrated with any sort of farming practice both conventional and non-conventional (like aeroponics). The sensors can also collect the essential parameter data which can be further processed to predict crop growth patterns. Interestingly we can also solve the problem of large scale migration of village people to cities using such system. Generally, such people are employed as laborers in cities with poor working conditions. But such section of people may inherently have agricultural knowledge due to their rural roots. They can form the ideal workforce to maintain such urban farming setups.

Thus, smart urban vertical farming setups seem to be solving all our problems. But there can be a number of challenges related to their scalability and efficient implementation making them commercially sustainable. It is evident from recent experiences that agriculture and food production as a whole may require certain drastic changes due to new challenges our world is facing. Urban smart farming could be such a step which may not seem essential as of now but might become an absolute necessity in near future.