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## THE ROLE OF AQUAPONICS IN INDIAN CONTEXT

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**A**quaponics is an innovative crop production technique where two to three crops can be produced by minimizing the land and water resources. It's a promising sector for continuous production of food with the help of combination of RAS and hydroponics farming. India is called a central station of global agriculture. 70 percent population of India are found in rural areas and somehow their livelihood depends on producing crops. In India the most common barrier for crop production is lack of knowledge to access the advanced technology, unskilled manpower, and limited land area with climate condition. To observe the present condition of India after the Covid situation, aquaponics can be the major solution of nontoxic organic crop production. Generally aquaponics system supports to grow fishes with different types of leafy and fruity vegetables. In recent trends, three kinds of aquaponics models are popular in worldwide for their compatibility and production margins.

In Indian climate condition and on the basis of cultivation investment, crop production in aquaponics medium will be beneficial than soil medium. Manually floating raft aquaponics system and nutrient film technique aquaponics system are familiar in India other than media based aquaponics system. Any types of aquaponics system contain fish tank, clarifier tank, and bio filter tank with plant production unit. Fish waste act as an organic fertilizer for production of plant and plant function as a natural bio filter for the medium which extract nitrate from the system and keep fish healthy and stress free. Aquaponics can play the outstanding role in the maximum production of the crops from single unit and could upgrade Indian agri based economy by several ways:

**Effective natural resource utilization:** Most of the farmer of India are marginal and small farmers and they habitual in land based traditional agro farming. Traditional agro farming needs vast amounts of water and fertile lands for getting maximum production from

production unit. Some parts of India, arid or barren land resources and freshwater scarcity for irrigation is a prime problem. In aquaponics system, water is recycled regularly and fulfill the demand of water to each and every crop components and a single unit infertile land can be manufacture highest yield. To achieve expectable production from the agro based investment, aquaponics would be the great choice.

**Nutrient Managements:** Aquaponics system follow the close loop system where fish and plant both are grow through maintaining the symbiotic relationship. The integrated nutrients deduct the necessity of chemical fertilizer and produce the organic crops in cost effective and hassle free way.

**Multiple crop production:** Aquaponics help to turn out a broad range of crops which vary from leafy to fruity vegetables. The divergence of food variety not only secure the food scarcity problems also enhance the quality of life by economical sustainability.

**Local crop production:** Most of the land of the India experience a prominent physical variations. Aquaponics permit for year round farming in any local areas of Indi. This system can supply enormous production of local food which minimize the transportation cost of import and steady the local food security.

**Economic opportunities:** Aquaponics can participate to lower the poverty level by economic development through agrobased production. Farmers to common people can earn handsome money by adopt or engage with this system.

**Sustainable food production unit:** This system is an exceptional role model of sustainable production of food. The waste matter of this system utilize in a scientific way which stunted the environmental impact effortlessly.

**Reduction the manpower:** Indian agriculture mainly depends on manpower for each and every stage of cultivation namely seeding, trilling, fertilization, harvesting and marketing also. Aquaponics systems can manage the whole systems only fewer labour cost.

**Climate Resilience:** In India, climate is a major issue for acquiring maximum product from the soil based agri field. Due to unpredictable weather patterns, aquaponics may be the solution for controlled the environment as demand basis and this unique systems can manage the weather related matters for cultivation easily.

**Educational and research value:** Mainly aquaponics system is a highly developed technology system and this system is a greenhouse of education on hydroponics, fisheries, microbiology, hydrology, physics and civil engineering also. For this specific reason this system could be provide a best opportunities for research and innovation with educational tool to teach students.

Still and all in Indian context, crop production by adopt aquaponics system faces several challenges including:

**Primary investment:** Installation of aquaponics system demand an upbringing investment at primary stage for infrastructure, major equipment's and training. Most of the farmers of India are small and marginal farmers and they are not familiar with investment in technology based agriculture. So, organizing the training session for the farmers by taking on aquaponics under the govt. scheme and provide loan to initiate the system functionally, would be the solution to spread the popularity of the system.

**Markets affirmation:** The collected crop from aquaponics system are healthier than traditional agro product. But the aquaponics crops dealing severe confronts in terms of consumer perception, market acceptability and pricing also. Advertising with campaigning and public awareness on organic food consumption through aquaponics system may be help to upgrade the acceptability of aquaponics product.

**Energy Dependence:** Aquaponics is an energy embraced agro technology. To regulate the system manually, continuous energy for recycling the water, lighting the plant, oxygenation are necessary. In rural or remote areas where power supply is unreliable, it could be create a barrier for expectable product.

**Regulation and policies:** In favor of aquaponics system, relevant policies need to be developed to carry out and promote this sustainable farming technique comfortably.

## Conclusion

In whole world wide aquaponics supposed to be a blessings of agritechnology which can produce the crops against the inadequacy of water for irrigation, infertility of land and application of pesticides with synthetic drugs. In India, aquaponics has the potential for renowned as a sustainable farming system for incessant production of food and can also play a key role in increasing GDP of India in agriculture.

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