Empirical Analysis of Aquaponics Farming Markets in Pune Region

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Abstract

The Demand for Organic Food Supply has grown exponentially in the recent years and Pune City in Particular has seen a High Demand for Aquaponics Products as it one of the most preferred location for Corporate destination and also the Aquaponics System is widely considered to be a Superior Agricultural Practice due to its economical, Scientific and Technological Advancement where Crops are grown Soil-less and without the use of Artificial Fertilizers. In Aquaponics, the crops and marine lives are mostly grown in a Controlled Environment where the cost of Energy, negative impact on Environment and the usage of Water can be minimized and efficiently used from the growing till the harvest period. Factors like Water Quality (PH and Acidity Level) should be regularly checked and maintain accordingly (6.8-7.2). This Research will further highlight the importance and development of the Aquaponics System for Small – Medium Farmers and also how it has Potential to satisfy and over produce for export purposes, increase the Employment opportunity in Rural Areas and also satisfying the demand for Organic Food Products in the Urban and Metro Cities like Pune.

Key Takeaways from this Research Paper are:

- Understanding the Need and Demand for Organic Products in Pune City
- Utilization of Resources to Maximize Production and Profit
- Health Benefits

Keywords: Aquaponics Products & Aquaponics System, Superior Farming Technology, Tilapia, Carp, Pangasius, Prawn, Lettuce, Chinese cabbage, Mint, Spinach, Pandemic, Organic, High Demand and Health Benefits.

Introduction

With the increasing Indian Population and its way to be the Most Populated Country by 2023 according to the United Nations Survey 2022. India has witnessed a rapid growth in Poverty, Unemployment and shortage of Food Supplies with its Increasing population for the last Decade and also the limited water availability, environmental pollution due the excessive use of artificial fertilizers. The Aquaponics Farming System is not a new farming technique in India and can be traced back to the Aztec Indiana who grew plants on the Surface of the rafts above the lake but with the Advancement of Modern Technology and Innovation, this brings us to the new era where this same technique has been revived to revolutionize the Farming System in India. This System of Faming saves 80-95% of the water which are recycled and filtered back to the tanks and also there is little to no cost of fertilizers and 50% reduction in the cost of fish feeds. It also has the potential to reduce the Educated Unemployment Rate of the Country which will automatically lead to the decrease in poverty and with its high

production rate in small patches of farming land, it will surely contribute in the Food Supplies for the country.

Urban – With the Urbanization and centralization, the Aquaponics Market in India has a very huge potential in then urban areas of the country because of it flexible plant layout. Aquaponics is a very good farming innovation for the urban areas because this farming doesn't require a huge area of land or space and can be grown on Terrace and small area of land which can provide for a significant market. Urban Areas being highly congested with population and the demand for organic products has risen exponentially so this farming practice can help fulfil the demand for the Organic Products.

Rural – As most of the population of our country still lives in the rural areas and practices the traditional method of farming, the introduction of Aquaponics Farming can help them in sustaining their livelihood by exporting the organic products to their nearby Market and slowly but eventually expand and develop their rural area to a Commercial Organic Market for the Country. Today with the help of the Government of India, the Farmers can apply and avail Schemes to set up these plants and also interest free loans and tax exemption for Start-ups.

Hydroponics System of Farming, Hydroponics is a type of horticulture and a subset of hydroculture that involves using water-based mineral fertiliser solutions in aqueous solvents to grow plants, mainly crops, without soil. Plants on land or in water may grow with their roots exposed to the nutrient liquid, or they may be physically supported by an inert material like perlite, gravel, or other substrates. Despite inert media, roots can alter rhizosphere pH, and root exudates can influence rhizosphere biology and physiological balance of the nutrient solution through secondary metabolites.

Fish waste, duck manure, purchased chemical fertilisers, and artificial nutrient solutions are some of the sources of nutrients used in hydroponic systems.

Tomatoes, peppers, cucumbers, strawberries, lettuces, and cannabis are among the plants usually produced hydroponically in a greenhouse on inert material.

Expected CAGR of 13.53% FY22-29.

Aquaculture System of Farming, Aquaculture most commonly known as aquafarming is technique of controlled fish and aquatic organism farming. This farming can be practiced in freshwater, brackish water and saltwater populations under controlled or semi-natural conditions, and can be contrasted with commercial fishing, which is the harvesting of wild fish. This can also be conducted in completely artificial facilities built on land (onshore aquaculture), as in the case of fish tank, ponds, aquaponics or raceways, where the living conditions rely on human control such as water quality (oxygen), feed, temperature. The Global Aquaculture market was estimated to be Rs 27,400 Cr in the year 2019 and is estimated to grow up-to Rs 37,800 Cr by 2027 with a registered CAGR of 5.8%.Also the Indian Aquaculture Market reached a volume of 1140 Cr Tons in 2021 and is also estimated to reach 1840 Cr Tons by 2027 and has a CAGR of 8.20%.

With the combination of both Hydroponics and Aquaculture System, the Aquaponics System has started to overcome and capture the Local market in Pune by replacing the chemically grown plants and the marine animals with the organic and healthy vegetables and fishes. Also due to the increasing migration rate of educated population from other states of the Country

in the City. Pune is one of the Major City that had adopted the Aquaponics System and is successfully implemented it and is supplying the Population with high quality and healthy products.

Literature Review

Aquaponics is an innovation of farming fish and plants with the combination of Aquaculture and Hydroponics to maximize the Production without using any fertilizer. In this System, the waste from the Fish gets converted to nitrates with the help of nitrifying bacteria which is then used by the plants. According to Ashwin Anand and Dr. N.V. Sreedharan (2021) on their research paper 'Coronavirus Pandemic's Impact on Aquaponics Farmers: With Reference To Palakkad District' has identified how the Aquaponics Sector and the human life was adversely affected. Aquaponics Systems: Future Food Production System by T. Suguna (2021) in her research paper, she has mentioned the future potential of Aquaponics Farming System with the Increasing demand in the global Animal Protein and According to her, Aquaponics System will play a major role in fulfilling the Demand. Simon Goddek, Alyssa Joyce, Benz Kotzen, Gavin M. Burnell (2020) in this research paper 'Aquaponics Food Production Systems Combined Aquaculture and Hydroponic Production Technologies for the Future', they have identified and formulated the technique of cutting the cost of Fish Feed with the combination of Aquaculture and Hydroponics in the Aquaponics System. Margaret Fisher's 'Aquaponics: Raising Fish & Growing an Abundance of Tasty, Organic Vegetables-Without the Confusion & Cycling Problems' (2020) talks about the most environmentally sustainable farming method which is the Aquaponics Farming. Jesse Stone's 'Aquaponics: Beginner's Guide to Harvest Fresh Vegetables and Fish at Home' guides on how to get up a small backyard Aquaponics System for the kitchen. Abhijit Mitra 'Role of aquaponics in the sustenance of coastal India – Aquaponics is a solution for modern agriculture in ecologically sensitive Indian mangrove Sundarbans' (2017) discusses about the exploitation of aquaculture in mangrove areas and how the constantly growing per capita income in India has led to the increase in the demand for fish and to solve the problem of over fishing in the Coastal areas of India with the introduction of the modern agriculture practice called the Aquaponics Farming System. Simon Goddek in 2015 conducted research on the "feasibility of aquaponics system." The paper claims that aquaponics is a major force behind the expansion of integrated food production systems, particularly in arid areas with scarce water supplies. In the research paper 'Aquaponics: Innovative farming' by Sharad R. Surnar, O. P. Sharma, V.P. Saini (2015) focuses on the increasing economically and sustainability of indoor and outdoor fish farming with the Increasing popularity of the Aquaponics Farming System. Rashmi Menon, Sahana G.V., Shruthi V. and Suganya R. 'Small Scale Aquaponics System' (2013) talks about the modern food and water crises and how the portable Aquaponics System which uses less water and space and is also purely organic will be one of the major Solution for the food and water crises globally

The Aquaponics Market in India is still considered to be in the nascent stage in regards to the technology used which simply means it has a lot of Potential in the future and also recently, it has reportedly witnessing a rapid growth pre as well as post Pandemic and is expected to grow upwards as Our Agricultural Sector is expected to grow at a rate of 3.5% In FY22.

Objectives - To understand the growing Aquaponics Farming System in Pune.

RESEARCH METHODOLOGY

This Survey was conducted in areas of Pune with active Aquaponics System where a total of 150 respondent's data were analysed. Cluster and Random Sampling were the methodology used along with four other techniques like Field Survey, Computed Assisted telephone Interview (CATI), Links with sources from the cities and secondary research for references. This helped to determine the number of Active and Potential Prospects for the Aquaponics System in Pune and also the age and education level of the farmers. The results were exported and summarized using SPSS. A descriptive analysis is to test the hypothesis set forth. Means, Median, standard, Wilcoxon signed-rank test is used to testing check the difference in various constraints. All were tested at p=0.05 level of significance.

Types of Aquaponics System practiced in Pune

a) **Deep Water Culture (DWC)** (also known as the Floating raft method) is a method where the plants floats on top of the water (Fig. 3) Given that this design is the most stable of the three system types, it is frequently used in commercial manufacturing. Extreme changes in temperature and nutrient levels are far less common since there is so much more water in the system. It works better in warmer climates because, although being able to withstand daily temperature fluctuations, heating water in colder climes is expensive. Additionally, compared to media beds, larger root zone plants can be used, and plant removal is considerably simpler

b) Nutrient Film Technique - NFT systems are well-liked in the business sector because to their labour cost effectiveness and space efficiency. Crops are simple to access and harvest because they can also be planted vertically on a shelf. This technique is most frequently used in hydroponic cultivation and is most effective for leafy greens. Large fruiting plants should not be used with this design since their root masses could choke the channel and their weight might not be supported. In an NFT system, the plant roots are exposed to more air and less water, which can make the plants more susceptible to sudden changes in temperature.

c) Media Beds (also known as Gravel system method) this method may be successfully employed without a background in engineering, aquaponics, or plant science, it is best suited for novices and backyard growers. It is affordable, easy to assemble, and effective on a small scale. You may grow huge root mass plants like fruits, blooming plants, veggies, and root vegetables since the media supports the plants like dirt would. Media bed designs are difficult to expand into commercial use since the media is not space efficient and requires significantly higher labour inputs.

Types of Fish Feed available in Aquaponics System in Pune

a) **Plant Waste –** The waste from the plants roots i.e. the old leaves and roots of the plants are being consumed by the fishes hence resulting to the use of minimum commercial feeds for the Fishes. It contributes about 5%-10% of the total feed for the Fishes. This is not so commonly practiced because the fishes might over eat the roots, making the plants grow slower.

b) **Azolla Microphylla** – Azolla or Duckweed is a highly productively plants that grows double its biomass within 1.9 days depending on the quality of the water. It is also

used in the feed of many domesticated cattle's and also used as fish feed. It contributes almost 40-50% of the feed used in the Aquaponics System and it contains about 25%-30% protein. Due to its high growth rate, Farmers today farms Azolla which helps in cutting the cost and contributes 40%-50% of the feeds

c) **Commercial Feed –** The Commercial Fish feed come in two types, the floating and sinking pellets. These pellets are packed with balanced nutritious for the fishes. It comes in multiple sizes depending on the Size of the fish. Though today, the farmers prefers to grow on a more traditional bases minimizing the cost and quality of the Fish as well.

Figure 1. Variety of Vegetables Grown in Aquaponics System and Found in Pune

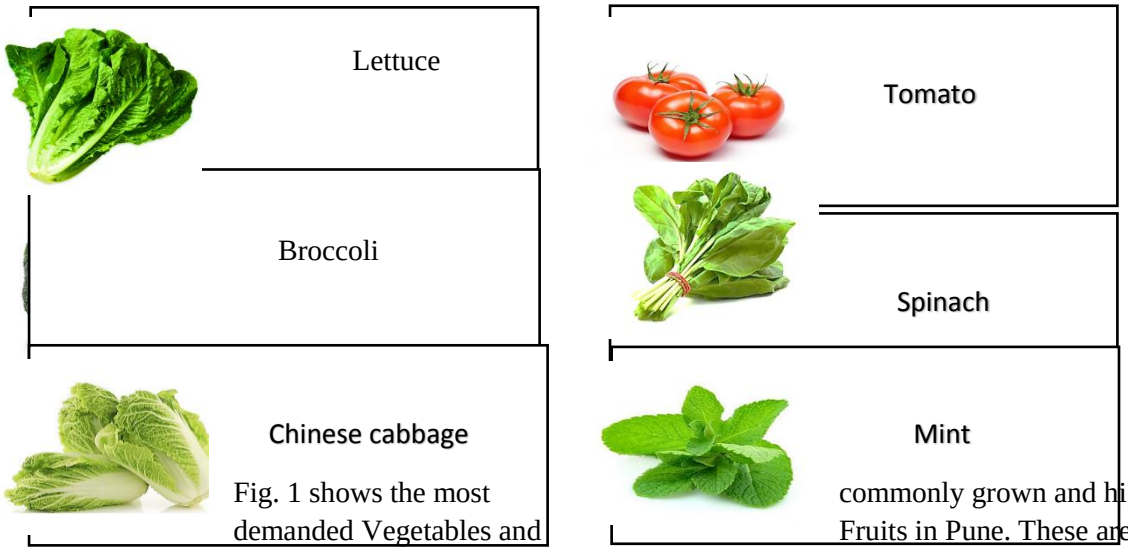


Fig. 1 shows the most commonly grown and highly demanded Vegetables and Fruits in Pune. These are grown without the use of any artificial fertilizer and without the need of soil, using Deep Water Culture (DWC), Media Filled Beds and Constant Flow growing type.

Figure 2. Variety of Fishes Grown in Aquaponics System and Found in Pune

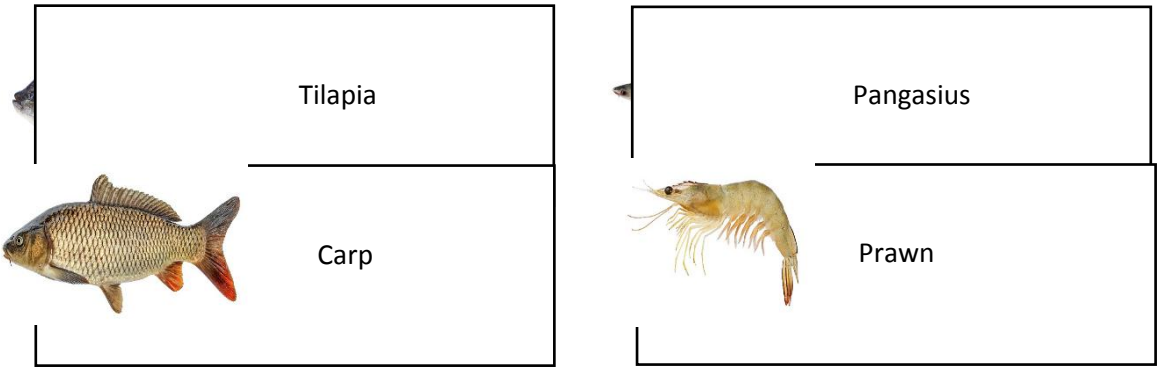
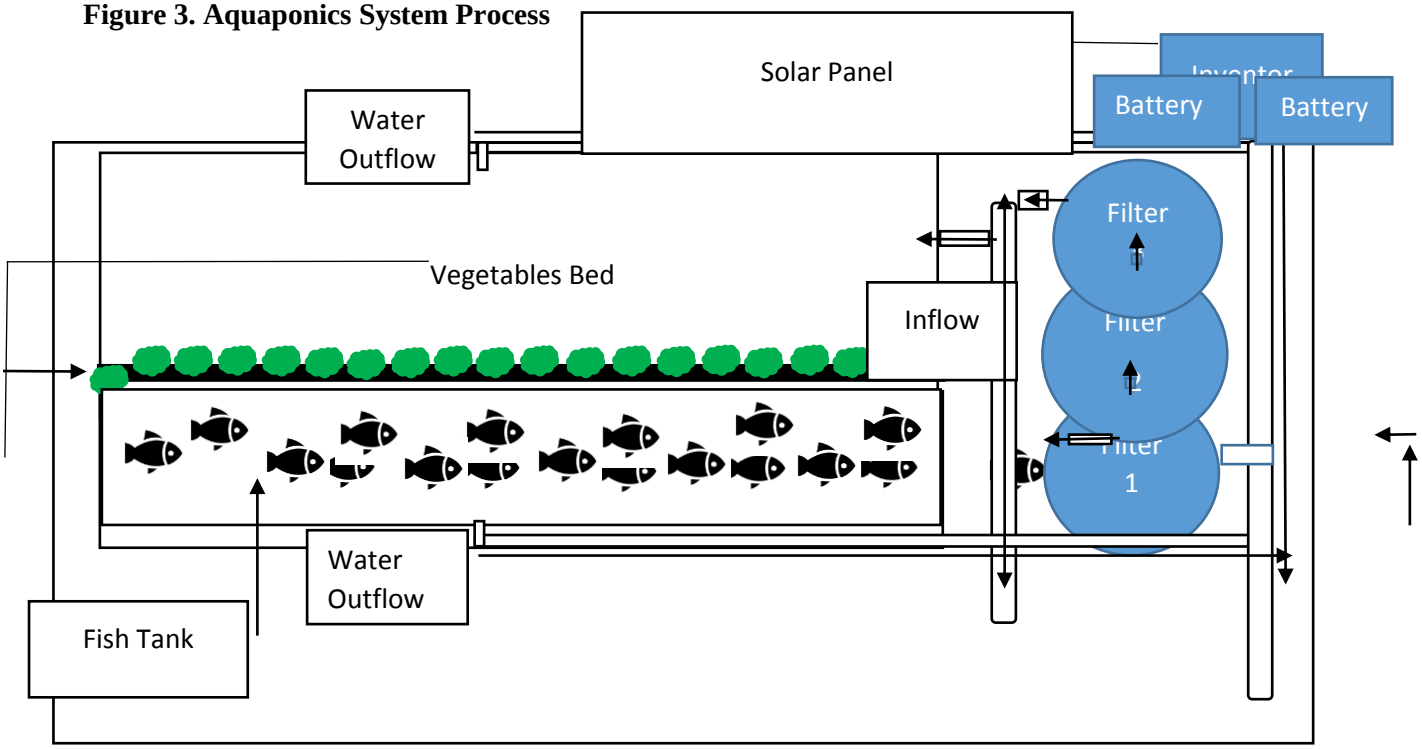


Fig.2 shows the most commonly Grown Fishes in the Aquaponics System and also being highly consumed in Pune. These fishes are grown in a very high density and the waste from the fishes are used by the plants as natural fertilizer. Also the fishes are monitored regularly from the water temperature, Acidity and the pH Level for the fishes to grow in a Healthy environment which will eventually produce high quality Meat.

Here in Aquaponics System, the waste from the Fishes are converted from Ammonia to Nitrate using a Bacteria and also the waste from the plants are being consumed by the fishes resulting in the lowering the cost of Fertilizer and feeds for the Fishes.

Figure 3. Aquaponics System Process



this System. This System can be practiced in the Terrace of Your Building, Backyard and for commercial production, it can be set up in area as small as 100x100 ft. i.e. 10,000sq.ft with maximum production for maximum profit.

The Fish tank can range from 15,000 liters – 50,000+ with of 1,000 kg – 3,000+ kg Harvest Capacity and the vegetable bed will depend on the type of vegetable grown.

The Depth of the Tank also depends on the requirement of the farmer and the type of fish grown.

Fish Stocking Density

In a fish tank, stocking density is expressed in units of fish to the water quantity.

Figure.4

Fish	Fish Density	Water in Liters	Harvest in Kg/gram
Tilapia	1,000	8 Ltr per Fish = 8,000 Ltr.	300 grams per fish= 300 kg
Pangasius	1,000	15 Ltr per Fish = 15,000 Ltr.	800 grams per fish = 800 kg
Carp	1,000	12 Ltr per Fish = 12,000 Ltr.	500 grams per fish = 500 kg
Prawn	1,000	5 Ltr per Fish = 5,000 Ltr.	200 grams per fish = 200 kg

Fishes like Tilapia and Pangasius are usually grown in very high density and surprisingly has high yielding rate and can be breed very easily. Carps fishes which are non-aggressive can be inbreed with the plants.

Figure 5.

Fish Type	Optimal Temperature	pH	Harvest Period in Months	Feed Consumed to reach the required Weight in Grams	Avg. Weight
Tilapia	23°C-30°C	6-9	Between 4-6	250 grams	350-500 grams
Carp	20°C-25°C	7.5-8	Between 6-8	700 grams	500-1,000 grams
Catfish	23°C-27°C	5-7	Between 6-8	500 – 800 grams	500 – 1,000 grams
Prawn	25°C-30°C	7-8.5	Between 2-4	200 grams	80 – 150 grams
Shrimp	22°C-26°C	7.5-9	Between 1 -2	----------	10-30 grams

The above Fig. 4 shows the required quantity of feed to grow the Fish to the required size under the most suitable water condition like the Temperature and the pH Level.

- **Tilapia** – It is one of the most farmed and the most sought after in the World. It grows up to 7-8 Inch long and can weight up to 500 grams
- **Carp** - Depending on where you're from, it is either considered a delicacy or a useless bottom feeder but in India, it is considered a Delicacy and can grow up to 2.5 ft long and weight up to 15kgs.
- **Catfish –** There are about 3,000 species of Catfish and Pangasius being one of the most sought after in Pune can grow up to 500 – 1,000 grams in a period of 6-8 months.
- **Prawn –** Prawn is a type of Crustaceans mostly found in the fresh water and which also has a high market value.
- **Shrimp –** Shrimps are swimming crustaceans found both in Salt Water and Fresh Water.

  Not only are they easy to care for, they are also super-quick growing and have a decent
  Market value.

Figure 6.

Vegetable Type	Plant Spacing	pH Level	Temperature	Harvest Period	Avg. Weight
Lettuce	10 Inch	5.8-6.2	21°C-25°C	15 days -25 Days	200-300 grams
Broccoli	15 Inch	6-7	25°C-30°C	45-80 Days	350-500 grams
Spinach	7 Inch	6-7	22°C-25°C	25-40 Days	50-100 grams
Chinese cabbage	15 Inch	6.2-6.8	22°C-24°C	40-70 Days	500-1,000 grams
Mint	10 Inch	5.5-6.5	20°C-25°C	30-50 Days	50-100 grams
Tomato	15 Inch	5.5-6.5	25°C-30°C	50-80 Days	5,000-8,000 grams

The above Fig.5 shows the optimal temperature, pH Level, sibling spacing and their harvesting period in an Aquaponics System.

- **Lettuce**- It is one of the most commonly grown green leafy that grows so fast in aquaponics and it can be harvested in as short as two weeks or when you notice the heads and leaves are large enough for consumption.
- **Broccoli** – Due to its huge array of health benefits, it is a high value veg, making it a great choice to grow in an Aquaponics System.
- **Spinach** – It is one of the most commonly consumed leafy vegetable in the world and it can be grown all through yearlong and also it requires very minimum maintenance.
- **Chinese cabbage** – Compared to its other relatives, the Chinese cabbage has higher market value, making it a suitable vegetable to grow in an Aquaponics System. It is also amongst the easiest plants to grow in an Aquaponics System.
- **Mint –** It is one of the most popular herbs grown in an Aquaponics System due to its flavour and medicinal usage. It grows relatively faster and healthier in an Aquaponics System due to its controlled clean water and hygienic conditions.
- **Tomato** - Tomatoes are one of the popular and best plants to grow in an aquaponics system. It grows faster in this system than in soil and also there is less chances for the tomatoes to get infected by insects because they are staked to keep the tomato plants upright to allow more utilization of the growing space.

Success Case Study

Pune Daily Wager raised 1,900 kg of fishes and grew aquaponics vegetables in the First Quarter despite the Pandemic.

Ms. Akshayaa a daily wager from Pune during the pandemic availed the Pradhan Mantri Matsya Sampada Yojana which is a government scheme from the Central Government to raise fish as a means to earn income for her family during the Lockdown.

The 29 Year old says, she was desperate for job as her daily income from her the construction sites was disturbed due to the pandemic and she had no other means of income to support her family of three. She utilized all the means of technology available at her disposal and she turned to Social Media particularly YouTube where she came across the Aquaponics System of Farming and conducted research by observing from multiple YouTube videos to understand more about this farming practices. Aquaponics Farming was more relevant to her as her family did not have much land area for the traditional farming and also the Capital received from the Scheme was also not enough for a large scale farming. With the little space she had, she started her Aquaponics Farm on her terrace and the little extra space of over 1500 Sq.ft, also to minimize the cost of constructing tanks, she build a temporary tanks made of iron rode and tarpaulin which could be easily moved and - relatively cost efficient than a concrete tank. She also started harvesting the rain water for the fish tank and used Thermocol Sheet as grow bed for the plants.

Breakdown of Expenses

Materials	Quantity	Cost ₹
Iron Rode	**50 kgs**	**₹5,000**
Tarpaulin	**20x30 ft. sheet x 2 for**	**₹2,500**

	20,000 Ltr. Fish Tank	
Fish Seed	**Tilapia (1,500 x ₹3)** **Pangasius (1,000x ₹8)**	**₹4,500** **₹8,000**
Plants Seedling	**Lettuce**	**₹1,000**
Aerator	**2500x2**	**₹5,000**
Fish Feed	**1100 x 5 Bags**	**₹5,500**
Power Back Up	**Invertor & 2 Battery**	**₹30,000**
Monthly Expenses	**Electric and Misc. Exp**	**₹3,500**
		₹65,000

₹50,000 monetary benefit from Pradhan Mantri Matsya Sampada Yojana and ₹15,000 from her personal savings. In the next 6 month, Akshayaa was able to harvest Tilapia (3,000 x 300 grams) =900kgs and Pangasius (2,000x 500 grams) = 1,000 Kgs which were sold for ₹110 per kilo (₹2, 00,000) to the wholesalers. Also the vegetables grown on this system were able to generate a revenue of over ₹25,000 in the period of 6 months.

Total revenue in 6 months ₹2, 25,000 - ₹65,000+₹10,000 (Operating Expenses) Initial Investment = Net Profit = ₹1, 50,000.

Ms. Akshayaa is expected to expand her Aquaponics Farm and practice farming Fulltime in the near Future.

HYPOTHESIS

1. Ho: There is no significant difference in education level in Aquaponics farming in Pune.

   H1: There is significant difference in education level in Aquaponics Farming in Pune.
2. Ho: There is no significant difference in the technology used in the Aquaponics Farming System.

   H1: There is significant difference in the technology used in the Aquaponics farming System
3. Ho: There is no significant difference in the Capital Invested in the Aquaponics farming System.

   H1: There is significant difference in the Capital Invested in the Aquaponics farming System.
4. Ho: There is no significant difference in the Maintainace for the Aquaponics Farming System

   H1: There is significant difference in the Maintainace for the Aquaponics Farming System.
5. Ho**:** There is no significant difference in the Future Potential for the Aquaponics Farming System.

   H1: There is significant difference in the Future Potential for the Aquaponics Farming System.

RESULTS AND DISCUSSIONS

Analysis the individual perspective of Aquaponics Farming System with reference to Pune.

Table No. 1: Statistics on the Growing Aquaponics Farming System in Pune.

Descriptive Statistics

	N	Minimum	Mean	Std. Deviation	Variance
OnlyHighlyeducatedindividualsstartsAquaponicsFarming	50	1.0000	3.080000	1.1399964	1.300
ElectricityisrequiredinthisSystem	50	1.0000	3.300000	.9529760	.908
SolarEnergyismostcommonlyusedtorunthissystem	50	1.0000	3.300000	1.1293849	1.276
AquaponicsFarmisaProfitableBusiness	50	2.0000	3.960000	.8071113	.651
Itrequiresahugeinvestment	50	1.0000	3.180000	1.1726474	1.375
AquaponicsSystemisthemostSuperiorsystemofFarming	50	1.0000	3.320000	1.0583005	1.120
ThereisalowerriskofFailure	50	1.0000	3.220000	1.0745668	1.155
Aquaponicssystemproducesfreshandorganic Food	50	2.0000	4.000000	.7824608	.612
Itiseasyandsimpletomaintain	50	1.0000	3.200000	1.1248583	1.265
Itgrowshighvaluevegetablesandfastgrowingfishesonly	50	1.0000	3.460000	1.0343094	1.070
AquaponicsSystemproductscanbeHarvestedmultipletimes	50	1.0000	3.700000	.9313146	.867
ThereisahighdemandforAquaponicsProducts	50	1.0000	3.620000	.9665846	.934
ThereisahighpotentialforAquaponicsMarketin India	50	2.0000	3.720000	.8580947	.736
Aquaponicscanbepracticeinanyterrainandweathercondi	50	1.0000	3.510204	.9815474	.963
ItcanbepracticeonTerrace	50	1.0000	3.260000	.9648940	.931

DeepWaterCultureisthemostcommonaquaponicssystem	50	1.0000	3.480000	.8861750	.785
WouldDefinitelyrecommendthisSystemoffarming	50	3.0000	4.340000	.6580739	.433
Valid N (listwise)	50				

Source: Primary Data

Table No. 2

Crosstab

			EducationalLevel			Total
			Post Graduate	Graduate	10+2	
AgeGroup	Between 25-30	Count	6	7	2	15
		Expected Count	7.2	5.7	2.1	15.0
	Between 30-40	Count	11	6	1	18
		Expected Count	8.6	6.8	2.5	18.0
	Between 40-50	Count	4	2	2	8
		Expected Count	3.8	3.0	1.1	8.0
	Above 50	Count	3	4	2	9
		Expected Count	4.3	3.4	1.3	9.0
Total		Count	24	19	7	50
		Expected Count	24.0	19.0	7.0	50.0

Table No.3

Correlations

		SolarEnergyismostcommonlyusedtorunthissystem	AquaponicsSystemisthemostSuperiorsystemofFarming
SolarEnergyismostcommonlyusedtorunthissystem	Pearson Correlation	1	.345*
	Sig. (2-tailed)		.014
	N	50	50
AquaponicsSystemisthemostSuperiorsystemofF	Pearson Correlation	.345*	1

arming	Sig. (2-tailed)	.014	
	N	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

Education

Ho: There is no significant difference in education level in Aquaponics farming in Pune.

H1: There is significant difference in education level in Aquaponics Farming in Pune.

Since p>0.05 (from Table 1) we accept the Alternate hypothesis and therefore there is no significant difference in the education level for farming in the Aquaponics System.

Technology

Ho: There is no significant difference in the technology used in the Aquaponics Farming System.

H1: There is significant difference in the technology used in the Aquaponics farming System

Since p<0.05 (from Table 3) we reject the null hypothesis and therefore there is a significant difference in the technology used in this type of Farming.

Capital Investment

Ho: There is no significant difference in the Capital Invested in the Aquaponics farming System.

H1: There is significant difference in the Capital Invested in the Aquaponics farming System.

Since p>0.05 (from Table 1) we accept the Alternate Hypothesis and therefore there is no significant difference in the Capital invested in the Aquaponics System.

Maintainace

Ho: There is no significant difference in the Maintainace for the Aquaponics Farming System

H1: There is significant difference in the Maintainace for the Aquaponics Farming System.

Since p>0.05 (from Table 1) we accept the Alternate hypothesis and therefore there is no significant difference in the Maintainace for farming in the Aquaponics System.

Potential Market

Ho: There is no significant difference in the Future Potential for the Aquaponics Farming System.

H1: There is significant difference in the Future Potential for the Aquaponics Farming System.

Since p>0.05 (from Table 1) we accept the Alternate hypothesis and therefore there is no significant difference in the future Potential for farming in the Aquaponics System.

Hypotheses – The Hypotheses applicable for this Market research is Alternate Hypotheses (H1) because there is a relationship between the variables and the outcome of the Research.

SCOPE OF THE STUDY - The research is limited to the people already practicing the Aquaponics farming within Pune District of Maharashtra. The impact of Technology and influenced from the Western Culture to the Indian Aquaponics Market and Pune Market in particular. This research is limited to Pune District with reference from Industrial experts by Site visit and Computed Assisted telephone Interview (CATI) and secondary research for more references.

Conclusion

The Aquaponics System is an integration of both Aquaculture and Hydroponics and this system has proven to be more productive in comparison to the traditional and other Agri Practices in terms of the production, maintenance and the operational cost. In this system, there is 0% to minimum wastage as everything from the waste of the fish to the plants are being absorbed by each other and hence there is minimum usage of fish feeds and no usage of artificial fertilizers.

According to the report, there was a significant increase in the adaptability of the Aquaponics Farming as a result of direct and indirect factors influencing the Covid19 pandemic in Pune. Owing to a spike in people's health issues, the demand for aquaponics items such as fish and organic vegetables have also risen. In the near future, the aquaponics industry has a lot of promise in developing countries like India and Pune, Maharashtra in Particular due to the abundance of resources and educational capital of the State.

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