

# Nutrofarm-A Hydroponic Farming System



03-322202-004

**Muhammad Junaid**

03-322202-008

**Rana Muhammad Hamid Mushtaq**

03-322202-009

**Umair Khalid**

A project submitted in fulfilment of the  
requirements for the award of the degree of  
Master of Business Administration

Department of Management Sciences  
Bahria University, Lahore Campus

Aug 2022

© Bahria University, 2022

## APPROVAL FOR EXAMINATION

Student Name:

M. JUNAID, RANA M. HAMID, Umair Khaid

Registration No.:

Student Name:

Registration No.:

Programme of Study:

Master of Business Administration

Project Title:

NUTROFARM HYDROPONICS

It is to certify that the above students project has been completed to my satisfaction and, to my belief, its standard is appropriate for submission for examination. I have also conducted a plagiarism test of this report using HEC prescribed software and found similarity index 16% that is within the permissible limit set by the HEC for the MBA Project. I have also found the project in a format recognized by the BU.

Principal Supervisor's Signature:

M. Mansim Kasid

Date:




26-7-22

Name:

M. Mansim Kasid

## DECLARATION

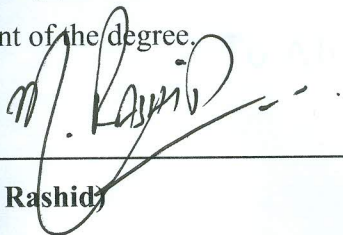
We hereby declare that this project report is based on our original work except for citations and quotations which have been duly acknowledged. We also declare that it has not been previously and concurrently submitted for any other degree or award at Bahria University or other institutions.

Enrolment	Name	Signature
03-322202-004	Muhammad Junaid	
03-322202-008	Rana Muhammad Hamid Mushtaq	
03-322202-009	Umair Khalid	

Date : Aug 05, 2022

## CERTIFICATE

It is certified that the contents and form of project entitled “**Nutrofarm-A Hydroponic Farming System**” submitted by **Muhammad Junaid (03-322202-004)**, **Rana Muhammad Hamid Mushtaq (03-322202-008)**, **Umair Khalid (03-322202-009)**, been found satisfactory for the requirement of the degree.



Advisor: \_\_\_\_\_

(Mr. Mohsin Rashid)

Co-Advisor: \_\_\_\_\_

(Dr. Saif ul Haq)

## ACKNOWLEDGEMENTS

We would like to express our special thanks of gratitude to project supervisor Mr. Mohsin who gave us the golden opportunity to do this wonderful project on the topic “Nutrofarm- A Hydroponic Farming System” which also helped us in doing a lot of research work and we have explored many things related to this topic which we are highly thankful to them.

With deep gratitude and humbleness, we really appreciate the encouragement and guidance received from my organizational side.

Secondly, we would also like to extend our heartfelt affection to all colleagues and who helped and supported us a lot in finalizing this project within the limited time frame.

Muhammad Junaid

Rana Muhammad Hamid Mushtaq

Umair Khalid

# Table of Contents

APPROVAL FOR EXAMINATION .....	ii
DECLARATION.....	iii
CERTIFICATE.....	iv
DEDICATION.....	v
ACKNOWLEDGEMENTS .....	vi
Executive Summary .....	2
<i>Chapter 1</i> .....	3
<b>1. INTRODUCTION.....</b>	<b>3</b>
<b>1.1 Background .....</b>	<b>3</b>
<b>1.2 Problem statement .....</b>	<b>5</b>
<b>1.3 Aims &amp; objectives .....</b>	<b>5</b>
<b>1.4 Logo and Slogan.....</b>	<b>7</b>
<b>1.5 Vision Statement .....</b>	<b>7</b>
<b>1.6 Mission Statement.....</b>	<b>7</b>
<b>1.7 Scope of Project.....</b>	<b>8</b>
<i>Chapter 2</i> .....	10
<b>2. LITERATURE REVIEW .....</b>	<b>10</b>
<b>2.1 Key Concepts.....</b>	<b>10</b>
<b>2.2 Basic Hydroponic Techniques .....</b>	<b>11</b>
1) Nutrient Film Technique (NFT).....	11
2) Deep Water Culture (DWC).....	11
3) Aeroponics .....	11
4) Wicking .....	11

5) Ebb and Flow .....	11
6) Drip Water system.....	11
<b>2.3 Comparison of Land, Water, and Energy Requirements of Lettuce Grown Using Hydroponic vs. Conventional Agricultural Methods .....</b>	<b>13</b>
<b>2.4 Future of Soilless Farming Trends.....</b>	<b>14</b>
<b>2.5 Limitations of Hydroponics .....</b>	<b>15</b>
<b>Chapter 3 .....</b>	<b>14</b>
<b>3. OPERATIONAL, MARKETING STRATEGY AND FINANCIAL ANALYSIS.....</b>	<b>14</b>
<b>3.1.1 OPERATION PLAN .....</b>	<b>14</b>
<b>3.1.1 Introduction.....</b>	<b>14</b>
<b>3.1.2 Supply Chain Process (Value Stream Mapping).....</b>	<b>15</b>
<b>3.1.3 Supply Chain Strategy.....</b>	<b>16</b>
<b>3.1.4 SCOR Model.....</b>	<b>17</b>
<b>3.1.5 Production Capacity .....</b>	<b>20</b>
<b>3.1.6 Location Facility.....</b>	<b>20</b>
<b>3.1.9 General Operation Hours.....</b>	<b>21</b>
<b>3.1.10 Industrial Analysis.....</b>	<b>22</b>
<b>3.2 MARKETING STRATEGY .....</b>	<b>23</b>
<b>3.2.1 Target Market .....</b>	<b>24</b>
<b>3.2.2 Product Strategy .....</b>	<b>25</b>
<b>3.2.3 Pricing Strategy.....</b>	<b>25</b>
<b>3.2.4 Distribution Strategy .....</b>	<b>26</b>
<b>3.2.5 Advertisement and promotion.....</b>	<b>26</b>
<b>3.2.6 Sales Strategy .....</b>	<b>27</b>
<b>3.3 MARKETING ANALYSIS.....</b>	<b>27</b>

3.3.1 SWOT Analysis .....	27
3.3.2 PESTLE ANALYSIS .....	29
Pros and Cons of PESTLE Analysis .....	29
3.4 FINANCIAL PLAN .....	35
3.4.1 Start-up- Summary .....	35
3.4.2 Start-up Funding.....	36
3.4.3 Capital Requirement .....	37
3.4.4 Product Cost and Selling.....	37
3.4.5 Sales Forecast .....	39
3.4.6 Break Even Analysis.....	39
<i>Chapter 4</i> .....	41
4. Conclusion and Future Scope of Technology .....	41
4.1 Conclusion .....	41
4.1 Future Scope.....	42
References.....	43

## List of Figures

FIGURE 1: SHOWS PRODUCTS OFFERINGS FROM HYDROPONICS SYSTEMS.....	4
FIGURE 2: SHOWS LOGO OF NUTROFARM HYDROPONIC SYSTEM.....	7
FIGURE 3: SHOWS DIFFERENT TYPES OF HYDROPONIC SYSTEMS.....	12
FIGURE 4.1: WORLD COMPOUND ANNUAL GROWTH RATE.....	14
FIGURE 4.2: GLOBAL MARKET SHARE.....	14
FIGURE 5: AGRICULTURAL LAND USE.....	15
FIGURE 6: REPRESENTS CUSTOMIZED INSTALLED HYDROPONIC SYSTEMS.....	16
FIGURE 7: REPRESENTS SC OPERATIONS REFERENCE (SCOR) MODEL LEVEL 1.....	17
FIGURE 8: SHOWS BUSINESS BROCHURE FOR SALES & MARKETING.....	23
FIGURE 9: SHOWS A GRAPHICAL REPRESENTATION OF INDOOR HYDROPONIC SETU.....	25
FIGURE 10: SHOWS SOCIAL MEDIA PROMOTIONAL PIC OF NUTROFARM HYDROPONICS.....	26

## LIST OF SYMBOLS / ABBREVIATIONS

NFT	Nutrient Film Technique
DWC	Deep Water Culture
HAPI	Hydroponic Automation Platform Initiative
As	Aeroponics
N	Nitrogen
K	Potassium
EC	Electrical Conductivity
pH	Potential of Hydrogen

## **Executive Summary**

The report is based on the business start-up named as “Nutrofarm Hydroponics” which aims to provide the customized Hydroponic Farming setup to its potential customers. Once equipment and setup installed, it will provide fresh, natural and nutritious foods depending upon the type of system installed and materials used. Through Hydroponics different kinds of plants can be grown by using mineral nutrient solutions, in water without using oil which helps in enhancing productivity multiple times as compared to conventional agriculture method. During Covid-19 era, logistics problems emerge which causes limited supply of fresh organic foods from farms. Additionally, surge in prices due to rising inflation causes food security issues. Extreme climate condition, vegetable productivity stagnation led many people to go for home-grown fresh vegetables and foods without relying on market.

Considering the prevailing condition and bridging the demand supply gap, Nutrofarm Hydroponics comes forward with unique solution by providing hydroponic farming setup for customers instead of selling fresh foods. We will be offering B2C business services, through customer can purchase and get installed hydroponic setup in any location of house.

The project report includes detailed literature reviews, marketing strategies, operational planning and financial business plan etc. We at Dress up Women & Play safe believe that the future holds substantial promises for us. We do believe that we have far more strengths than weaknesses. We have taken our time to analyse the situation and the industry, we believe that we have the vast opportunities for growth and profitability by simply following our creative business plan. We believe that the only serious threats we will be facing are the prolonged and worsening economic downturn or more competitors to enter the existing marketplace because of lack of entry barrier.

# *Chapter 1*

## **1. INTRODUCTION**

### **1.1 Background**

Hydroponic farming is a method of growing plants using mineral nutrient solutions, in water, without soil. In this technique, compositions of nutrient solutions which are added in water is regulated. Also, the rate of supplying the nutrients to the plants can be self-adjusted / controlled.

Apart from traditional farming practices, in which soaked soil contains nutrients and plant takes nutrients from it. Hydroponic farming method is a popular indoor farming techniques which is being practiced widely around the world. (Agrifarming, 2021). It is a method of growing plants and vegetables by using water based mineral nutrient solution. It is a soil-less farming method in which soil is replaced with an inert medium i.e., rock wool, clay pellets so that plants roots may have direct contact with water based nutrient solution through these medium. It is also known as aquaculture or tank farming, began as a way of studying scientifically the mechanisms of plant nutrition. (Arshad Mehmmod Malik, 2018)

Hydroponic farming is being considered a revolution in farming industry as it has capacity to produce surplus food with faster growth rate. The technique is pure eco-friendly and has no health threats as it doesn't involve in extensive use of pesticides and insecticides. Hydroponic farming setup conditions can be controlled with the help of greenhouse effect. For indoor gardening, artificial light is important replacement of natural sunlight. Different light source has different effects on plant growth rate. Additionally, monitoring the pH level of nutrient solution is also mandatory due to acidity or alkalinity of the environment. (Jones, 2014)

Due to urban colonization and growing demand of fresh organic & sustainable fruit & vegetables among urban populations, hydroponic farming is being preferable by many people in their houses. Most of the people are showing keen interest in setting small to

medium size hydroponic setup in their houses to meet the household demand. As a matter of fact, it is observed that most hydroponics setup will focus exclusively on growing organic fruits and vegetables to help meet the demand of groceries stores and fresh food markets. As per SMEDA, the Hydroponic Crop Farming industry is in the growth stage of its life cycle because of its increasing number of participants, high industry value added (IVA) and rapid growth of customer acceptance.

Following are the list of plants that can be easily grow through hydroponic farm setup and can be consumed as per household requirement.

1. Leafy Vegetables (Spinach, lettuce, cabbage, chard, mint etc.)
2. Vining plants (tomatoes, cucumber, peas)
3. Root crops (carrots, radish etc.)
4. Fruits (Strawberries, raspberries, blueberries, small papaya,
5. Herbs (Basil, parsley, chives etc) (SMEDA, 2019)



*Figure 1: Shows Products offerings from Hydroponics Systems*

Therefore, keeping in view, a simplified hydroponic system can be installed in balconies, kitchen gardens, rooftops and lawns to cater the household demand.

## **1.2 Problem statement**

In today's polluted environment, we are facing huge demand of fresh foods and vegetables, which are full of nutrients particularly home grown. Also, water consumption is very high in traditional farming. Which also involves a chemical fertilizers and growth stimulants that flow into the water bodies nearby. To produce high quality, nutritional, and flavourful vegetables for consumption in both household and local markets and create opportunities for leadership and highly productive teamwork for local women who work from home. They can grow the best plants possible for their own daily use. It causes supply chain disruption both locally internationally, which results in shortage in availability of fresh grown foods and vegetables as well as increase prices of these goods. Therefore, there has been increase in charm for hydroponic farming among people. Because it not only fulfils the nutrient rich food needs but also gives the aesthetic look to selected places. Keeping the above scenario, Nutrofarm farm aims to render its services in customized hydroponic farming setup for its potential customers according to their space & requirement.

## **1.3 Aims & objectives**

Hydroponic systems have been increasingly popular among amateur gardeners and fully operational farms in recent years. As cities continue to grow and people become more aware of where their food is coming from, people are demanding properly raised, organic crops at a steadily increasing rate. To help fight this, hydroponic systems have been developed so that the urban farmer can exist in harmony with the traditional farmer. However, the traditional farmer is also adapting to this change and can now reap the many benefits of using hydroponic greenhouse systems versus traditional soil-based farming.

Unfortunately, in general, hydroponics systems are capital intensive, can be hard for novices, and require a lot of attention. These disadvantages can scare away potential farmers, especially in an age where the majority of consumers would like to buy rather than take on a do-it-yourself project. This project will attempt to address the difficulties of hydroponics while also providing consumers with a product that allows them to reap the full rewards of their investment. The major purpose is to provide the urban and metropolitan population with an unparalleled opportunity to grow their own organic food in the comfort of their own homes.

The Project is aimed at:

- To construct a versatile, compact hydroponics system that may be used in a variety of conditions.
- Develop a system that can be used by both entry-level and expert users.
- Provide real-time system monitoring in order to aid the user throughout the growth cycle of their desired produce via a mobile application.
- Creating a user-friendly experience in both the mobile application as well as the physical interaction with the system.
- Individuals to continue to develop an interest in hydroponics as a way to grow their own food, regardless of where they live.

## 1.4 Logo and Slogan

**Slogan:** Growing green in a better way



*Figure 2: Shows Logo of Nutrofarm Hydroponic system*

## 1.5 Vision Statement

“Be the top-seller in hydroponic farming market by designing and creating products using modern technology to make eco-friendly society.”

Green technology is the future of society. Investing in green businesses is only a solution way forward for environment sustainability. Also, the good management is the key to success and good management starts with setting business objectives. Furthermore, the keys to success will be providing products and services which will fulfill customers demand and exceeding their expectations.

## 1.6 Mission Statement

“To provide customized and quality product to all our valuable customers and cater their personal needs to grow fresh & hygienic foods in their courtyards.”

Nutrofarm Hydroponics values the customer’s requirement and offer the precise and robust technology to craft efficient & cost-effective solutions for the urban households.

In producing large quantity of home-grown food having least environmental impact on society.

## **1.7 Scope of Project**

Hydroponic farming has a broad scope in Pakistan. The business has vast potential to grow and have shorter payback period. Nutrofarm Hydroponics will provide its service in building and installation of both indoor and outdoor hydroponic farming system according to the requirement of customer.

This business model doesn't involve any costly investment and it is excellent way to give back to the community. The business will enable people to have customized system in houses so that they can high-quality, nutritious, and tasty green products. Initial setup cost for hydroponic system ranges between 25K- 60k depending upon the customer requirement and space available for installation. The farm setup requires labour work, equipment's, utilities, seeds and delivery facility to final customer.

For this business model, the target market will be individual households located in city suburbs and outskirts which can utilize the free space for hydroponic farming. So Revenue will be generated by selling the customized system to customers. We'll be producing healthier and tastier leafy green and other vegetables and some fruits including potatoes, mint, cabbage, lettuce, tomatoes, onions, green beans, spinach, fenugreek plant, lemons, green chili, bell peppers, strawberries, blueberries, and cherries. The business will yield profit as the demand for hydroponic farming is increasing day by day. The business is not only eco-friendly but also a beneficial for healthy community. Societies nowadays appreciate the opportunity to utilize home grown foods rather relying on markets. So local community will definitely adopt hydroponic farming for being self-sufficient in green fruits, vegetables and other forms of greenery which makes surrounding environment more aesthetic. Presently, business has vast potential to grow due its popularity and increasing demand of their products.

Effective marketing strategy with promotional activities will prove to be a big success for a business.

Also, there is need for extensive market research for different types of hydroponic systems ranging from drip system, ebb and flow, wicking, nutrient film technique, deep water culture etc. depending upon customer requirement. So, it is better to analyse the demand of particular systems & their associated products before actual manufacturing.

## Chapter 2

### 2. LITERATURE REVIEW

#### 2.1 Key Concepts

The term hydroponics is derived from word “hydro” means water and “ponus” means labour. It is a technique of growing plants without soil by using mineral nutrient solutions. So in hydroponics, plants are usually grown in soil-less condition having their roots immersed in liquid solution essentials minerals & nutrients and also in inert medium such as perlite, vermiculite, sand gravel or mineral wool. (Beibel, 1960). Whereas Aeroponics is another technique, more or less similar to hydroponics with only difference that under aeroponics plants are grown with fine drops (a mist or aerosol) of nutrient solution.

Foods can be grown in soil-less culture in different ways which depends upon number of factors given as below.

- Available space and resources
- Required Productivity
- Availability of growing medium
- Quality of product required -features and organic content

(Mamta D. Sardare, 2013)

Hydroponics removes the barriers between the plant and its nutrients. This provides the roots with direct access to water, oxygen, and nutrients that it needs to grow and survive. Because there's no soil, there is also no need for harmful pesticides or chemicals. There's also a lower risk of plant disease or exposure to external elements.

Hydroponics farming or gardening can be used for both households as well as commercial gardening. Although in cities, vertical farms are increasing rapidly as unused buildings in crowded cities are used as vertical farms. There are several techniques of hydroponics farming.

## 2.2 Basic Hydroponic Techniques

Some basic techniques or methods which are being used currently worldwide are given as below

- 1) Nutrient Film Technique (NFT)
- 2) Deep Water Culture (DWC)
- 3) Aeroponics
- 4) Wicking
- 5) Ebb and Flow
- 6) Drip Water system

Wicking is the most basic type of hydroponic process. The nutrients and water are transported to the plants' roots using a wick, like a rope or a piece of felt. The plants are suspended in some sort of growing medium, like coconut coir or perlite. Below the growing tank is a reservoir of water and nutrient solution. One end of the wick is in the solution and the other end of the wick is in the growing media. This allows the wick to transport the water and nutrients at the same rate that the plants' roots require the nutrients. Whenever the roots are ready to absorb, they'll take in the nutrients from the wick. Wick systems are "passive hydroponics" because they don't require air or water pumps. This makes them low-cost and easy to maintain, especially for beginner growers.

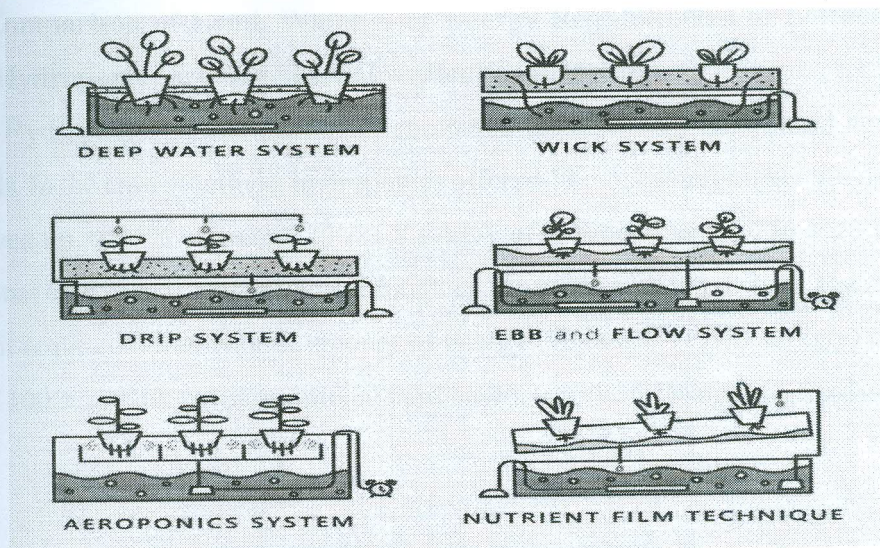
A deep-water culture consists of a reservoir filled with water and nutrient solution. The plants are suspended over the reservoir using a net pot and growing media. The roots themselves are submerged in the reservoir, so they have a constant supply of water and nutrients.

Whereas nutrient film technique (NFT) supplies the plants' roots with a thin film of nutrients. The water and nutrient solution is held in a large reservoir, which has an air pump and air stone to stay oxygenated (like a DWC system). However, unlike the submerged roots of a DWC, NFT-system plants are grown in a nearby channel (in net pots).

Ebb and flow system, also called “flood and drain,” floods your plants with nutrients on a cycle. It it’s not as flexible for plants’ needs. Some growers like this system, though, because it doesn’t continuously expose the plant roots to the nutrient solution.

Aeroponics is the method of growing plants having anchored in holes in Styrofoam panels. Their roots are suspended in air beneath the panel. They are usually practiced in safe structure and really viable for leafy vegetables i.e. spinach and lettuce. It is the most high-tech and usually more expensive, but they’re also one of the most effective systems. In an aeroponic system, the plants and roots are suspended in air. The reservoir (with oxygenating air pump) has misters, which spray a fine spray over the plant roots. Some growers will use a nonstop, fine mist while others will mist on a cycle. The cycle of misting is shorter than the flood and drain model with only a few minutes between each cycle. This allows the roots to continuously have nutrients without oversaturation or submersion. It also naturally allows the roots greater exposure to oxygen, which is critical for growth and development.

Drip system are similar to NFT systems, where the plants are held in a separate channel. The plants are suspended in net pots over a thin layer of water and nutrient solution. A pump continuously moves the water throughout the channel to improve oxygenation and nutrient uptake. Leftover solution flows back into the reservoir to be reused. (Anonymous, 2019)



*Figure 3: Shows Different Types of Hydroponic Systems*

### **2.3 List of important nutrients**

In hydroponics, careful monitoring of the system is necessary because of limited nutrient-buffering capacity of the system. It is necessary to check the nutrients supply through its delivery system and plant absorption response. Some of the common nutrients with their effective characteristics are given as.

- Potassium Nitrate [N, K]
- Calcium Nitrate [N, Ca]
- Potassium Phosphate [B]
- Magnesium Sulphate [S, Mg]
- Iron Chelate [Fe, Cit]
- Boric Acid [B]

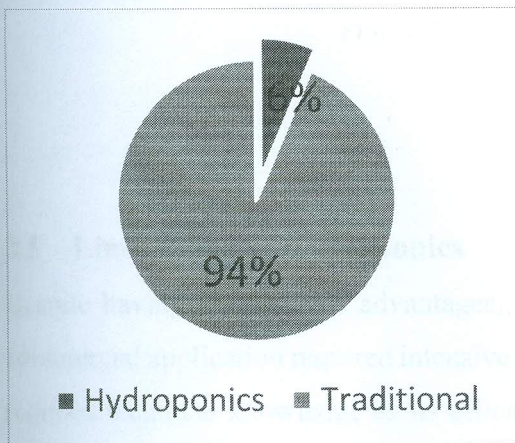
The frequency and volume of the nutrient solution applied depends on the type of substrate used, the crop (species and stage of development), the size of the container, pipes, the crop and irrigation systems used and the prevailing climatic conditions. (Mamta D. Sardare, 2013)

### **2.3 Comparison of Land, Water, and Energy Requirements of Lettuce Grown Using Hydroponic vs. Conventional Agricultural Methods**

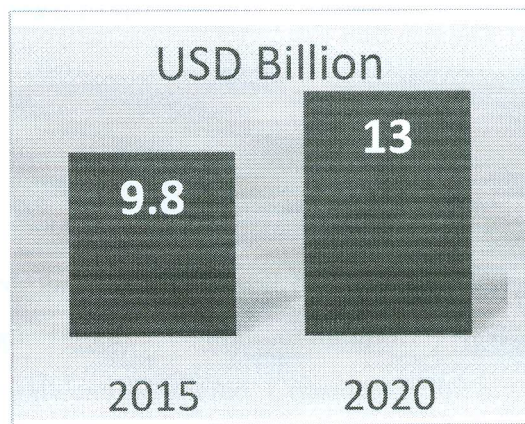
Hydroponics is more efficient compared to traditional land based agricultural methods. In the case of lettuce, hydroponics offered  $11 \pm 1.7$  times higher yields per area and saved up to 95% of water ( $20 \pm 3.8$  L/kg/y of hydroponics vs.  $250 \pm 25$  L/kg/y of traditional land based)– mainly lost through evaporation, if not absorbed. The down side is that it required a tremendous amount of energy ( $90,000 \pm 11,000$  kJ/kg/y) compared to the  $1100 \pm 75$  kJ/kg/y of traditional land based. (Mamta D. Sardare, 2013)

## 2.4 Future of Soilless Farming Trends

Soilless farming techniques are majorly used in developed countries, yet its share has continued to increase in the past few years. By the year 2020, hydroponics is predicted to account for about 6% of the Compound Annual Growth Rate (i.e. the total food production) of the entire world. While its Global market share is expected to increase to about 13 billion US.

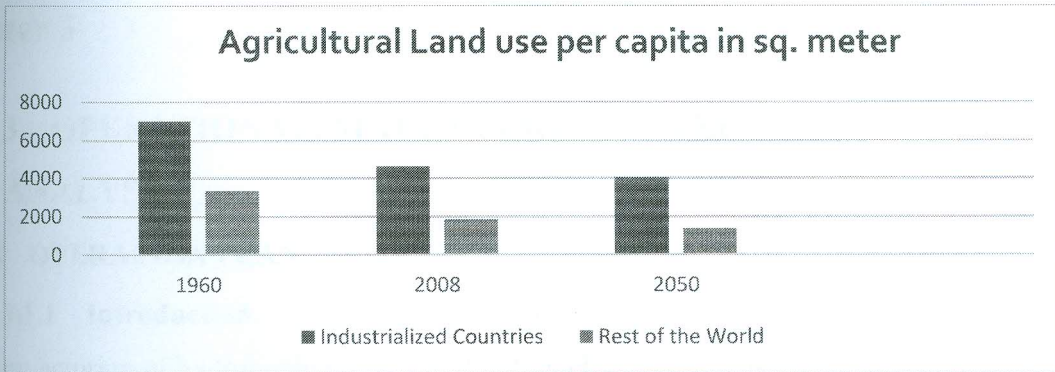


**FIGURE 4.1 WORLD COMPOUND ANNUAL GROWTH RATE SHARE**



**FIGURE 4.2 GLOBAL MARKET SHARE**

Shrinking of agricultural land is already an increasing problem of the world -as shown below. This shortage is either due to de-fertilization of soil, as a result of heavy agricultural use in the past, or urbanization. This shortage means the world will need to find a suitable alternative for crop productions. The economical alternative in urbanized areas for agriculture, are hydroponics and aquaponics, whose share in CAGR, if increased, can easily account for the food shortage. (Hydroponics Market Insights, 2017-2025, 2019)



**FIGURE 5: AGRICULTURAL LAND USE**

## 2.5 Limitations of Hydroponics

Despite having multifarious advantages, hydroponic farming still has limitation. The commercial application required intensive capital amount, continuous monitoring. It still requires technical knowledge as its efficacy rate can be altered. Considering the high initial cost, it is limited to high value crops. Intensive care is required for plant health control. Constant energy supply is required to run the system efficiently.

## Chapter 3

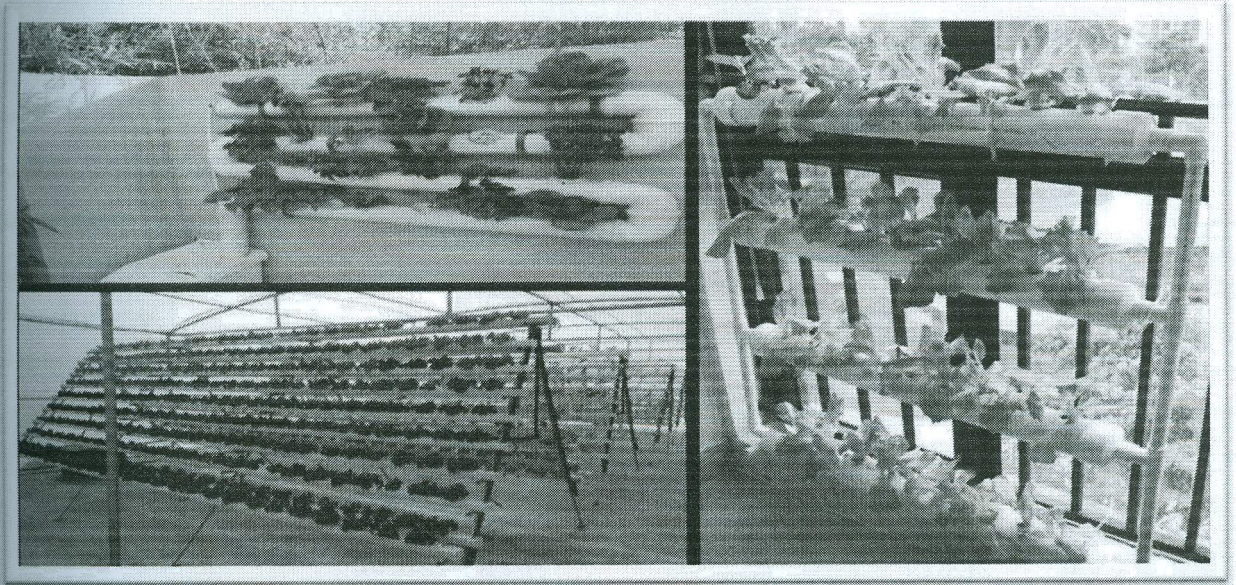
### 3. OPERATIONAL, MARKETING STRATEGY AND FINANCIAL ANALYSIS

#### 3.1.1 OPERATION PLAN

##### 3.1.1 Introduction

The manufacturing of hydroponic process will not much labour intensive nor capital intensive. In fact, individual parts will be assembled together to design a final product. The product will differ from client to client based on their product type requirement. Initially, Nutrofarm hydroponics will deliver hydroponics systems based on NFT (Nutrient Film Technique). It is the simplest hydroponic set-up, as it is common among commercial growers and can also be adapted for smaller-scale systems as well. Plants or vegetables will be grown in channels or troughs to grow hydroponically. The channels are used in this system to grow plants, the nutrient solution keeps flowing in these gully channels. Therefore, a constant stream of water will be available to the roots. Hydroponic systems deliver nutrient water to plants either actively or passively. Active systems use pumps to circulate the water, while passive ones simply keep the plants floating above the water. Water is constantly flow through narrow channels. Plastic pots will be used for the support structure of plant roots. A simple net pots having holes or side slits will be used and adjust in the PVC pipes by using drilled holes in order to allow the root system to reach the nutrient solution below. Pots should only be partially submerged to allow the developing plant roots to get necessary oxygen and water. Pumps will push nutrient water from a reservoir filled with it into the channels. Because the channels sit at an angle, gravity draws the water down the channel and through a drain. From the drain, the water ends up back in the reservoir, ready to be used again.

This plan assumes that the machinery is utilized at 85% capacity and the labour is trained. The business production strategy will be based on BTO (build-to-order) strategy. All operations are to be executed at day shift. The representatives present at the site will be in charge of the quality and consistency of assembly process.



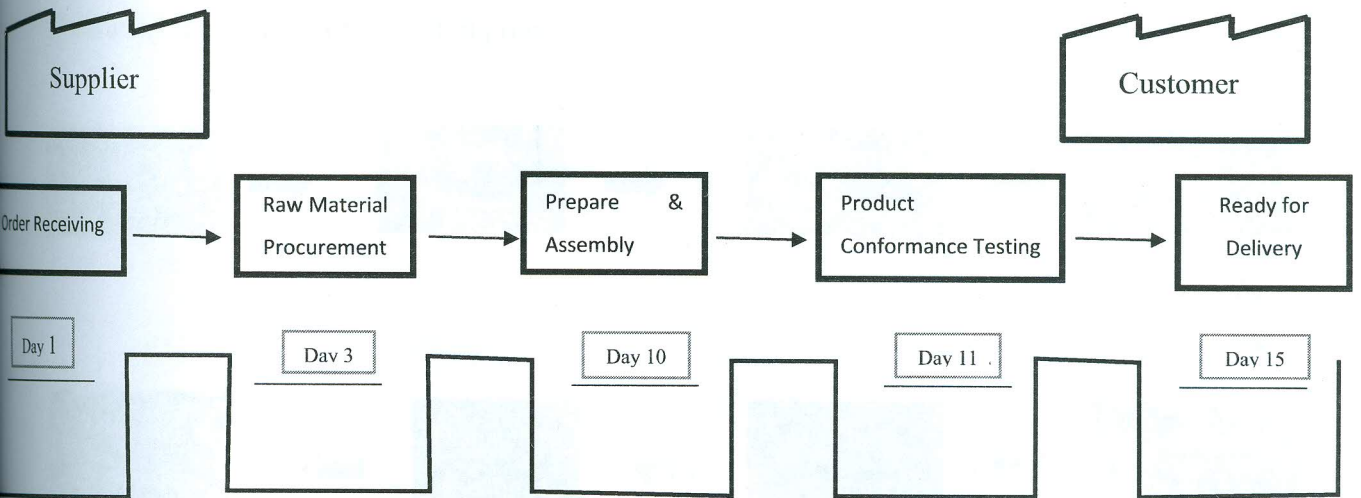
*Figure 6: represents customized Installed hydroponic systems*

### **3.1.2 Supply Chain Process (Value Stream Mapping)**

The entire value supply chain process at Nutrofarm Hydroponics aims to deliver the product to customer in accordance to delivery lead time. The order lead time is almost 2 weeks. Our try our best to put value added services in our products to each customer. Following are the steps involved in supply chain operations.

- Step 1 – Order receives from customer with detailed requirements.
- Step 2 – Procuring material from sources for the manufacturing setup
- Step 3 – Manufacturing /assembly is carried out
- Step 4 – Product quality tested and ensured
- Step 5 – After completion, Hydroponics setup are dispatched to customer

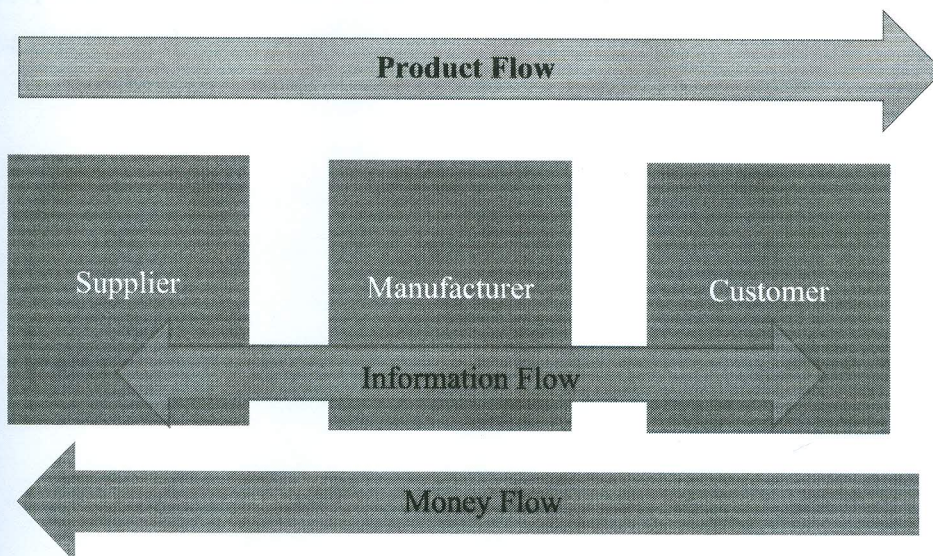
The value stream mapping for production setup will be as following



### 3.1.3 Supply Chain Strategy

The Supply Chain at Nutrofarm is to configure, organize and integrating all activities within supply chain operations by satisfying the customer demand through delivering the right product, in the right quantity at the right time, and being highly recognized by all stakeholders and complying with government regulations.

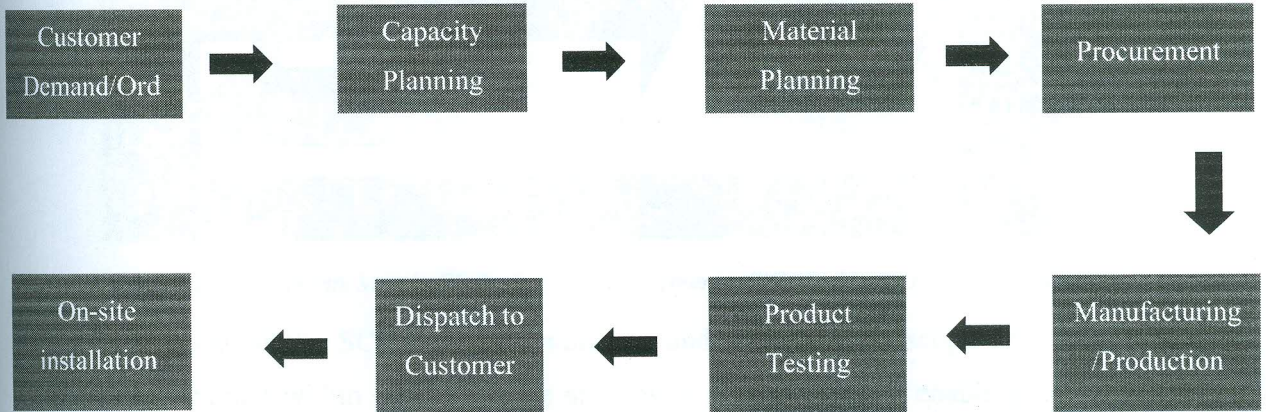
#### 3.1.3.1 Supply Chain integration



### 3.1.3.2 Supply Chain Processes

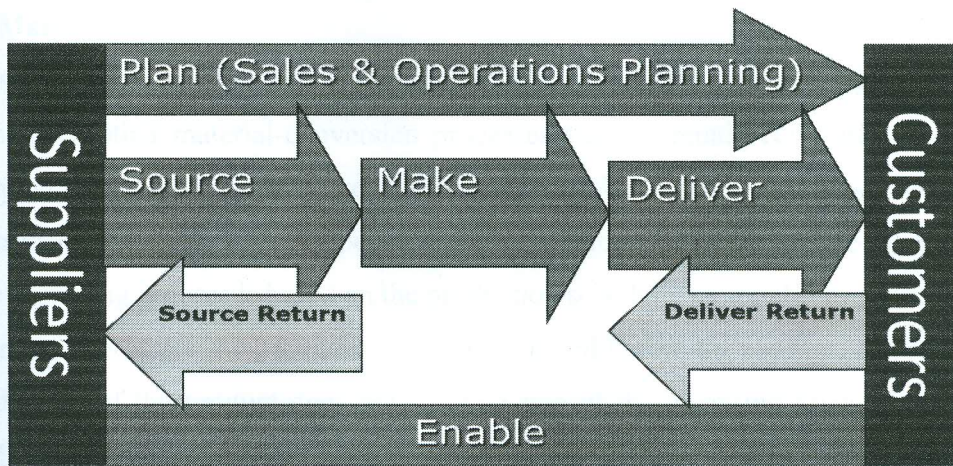
The company's supply chains operations follow lean methodology and works on pull strategy.

Following are the flow of operation/process involved.



### 3.1.4 SCOR Model

The Supply Chain Operations Reference (SCOR) model is a tool to develop capabilities in a start-up scenario or diagnose issues in an established supply chain. The SCOR-model has been developed to describe the business activities associated with all phases of satisfying a customer's demand. SCOR methodology assumes that all supply chain processes can be subdivided into one of five general subtypes: **Plan, Source, Make, Deliver, and Return**. Complex supply chains are made up of multiple combinations of these basic processes. The historical data of the supply chain to see how it performs and develops, it defines five generic performance attributes and three levels of measures that the analysts can use.



*Figure 7: represents Supply Chain Operations Reference (SCOR) Model Level 1 Processes*

The starting point of the SCOR process model is understanding the scope of Supply Chain Operations contained within the five value streams and a category of enabling activities that support the management of the supply chain.

- **Plan**

It includes planning of all the necessary resources, and supply of materials, to operate the supply chain. Upon receiving order from external customer, all relevant information is collected from all sources, communicating the delivery timeline, balancing the demand with supply schedule. Raw material is purchased according to the given demand. Bulk Orders are also being catered on advance basis. For this, aggregate material planning is scheduled and bulk inventory will be purchased.

- **Source**

These processes support the activities of ordering, delivery, receipt and transfer of raw material items, sub-assemblies, finished products, or services. At Nutrofarm, procurement is divided into two sections. Direct material and indirect material procurement. Direct material includes all basic necessary materials to manufacture Assembly units. Whereas, indirect procurement deals with other utilities, spare parts etc. Sourcing also includes supplier identification, qualification and contract negotiation processes. Nutrofarm aims to develop supplier relations management with their potential suppliers. Vendors are categorised on the basis of their product quality, service level, technological skills, financial capacity and related experience.

- **Make**

These processes support the transformation of materials into semi-finished or finished goods. It includes other material-conversion processes such as repair, refurbishment, recycling or scraping. All of the production kept at Nutrofarm hydroponics is Build-to-order, which is 96% of its production. Whereas 4% personalized institutional orders are made-to-stock. The entire manufacturing process is based on the production schedule, material procurement in arranging the raw material for the production department well before the appropriate period so that the production of the product does not delay. Some of the operating procedures includes pipe cutting, end cup pasting, pipe hole drilling, welding filling, pinching etc.

- **Deliver**

These processes cover the activities supporting the creation, commitment, maintenance and fulfilment of customer orders. This includes receiving, validating and creating customer orders; scheduling sales order deliveries; picking, packing, shipping and ultimately delivery / invoicing of the order to the customer. Nutrofarm hydroponics ensures the supplying goods to consumers at the right time in the right place and in the right amount for delivering excellence. Distribution can be achieved through various methods.

- **Return**

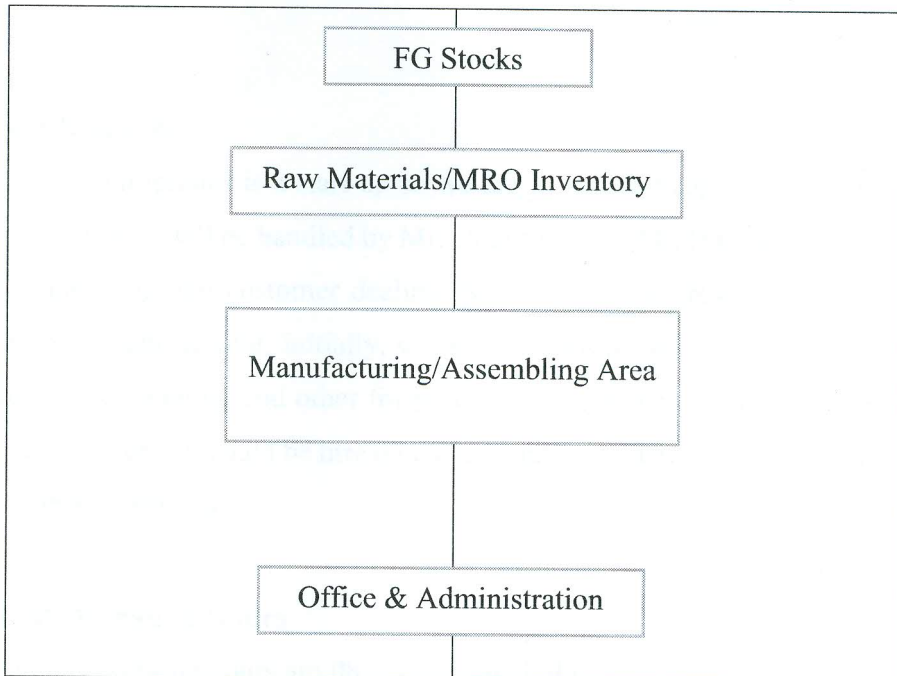
These processes support the activities associated with the reverse flow of goods. This includes identification of items that need to be returned and deciding on the proper method of disposition, scheduling the return, shipping and receiving the return. Two types of return are possible. Raw material returns to supplier after testing non-conformance. Product return from customer is very rare because of its functional nature. Nutrofarm makes sure the product quality matches the customer requirement. In case of return, company has a policy of 15 days after the delivery date.

**3.1.5 Production Capacity**

By utilizing the space of 2,722 Sq. ft of manufacturing assembly, current production capacity of Nutrofarm will be 1 order/week. Thus, considering all constraints, a total of 4 to 5 system per month can be delivered to the customer.

**3.1.6 Location Facility**

The production facility is located at Model town, Lahore. Both the office and manufacturing facility will operate at mentioned location. The location is chosen because of its proximity to city centre. The area is divided into different portions with respect to the production and office matters. The layout of location facility is given as below



### **3.1.7 Inventory Management**

Inventory usually consists parts of raw materials, WIP, finished goods and MRO (maintenance, repair and operations) parts. Some of the important raw material required for manufacturing operations are PVC pipes, Plastic tubes, water pump, clay pebbles, small Pots, Trellis and stands, fertilizers, plant seeds, buckets and PH testing kits.

Since it's a start-up based, the production strategy is based on BTO in which products are built according to the requirements of individual customers at competitive prices within a short time period. Nutrofarm will strictly followed lean principles in optimizing the operations and eliminating the waste. Lead time normally for product delivery is around two weeks (14 days) but it is highly subjected to customer customization and delivery place.

### **3.1.8 Human Resource**

Since Nutrofarm Hydroponics is a start-up so we are just three people in the management team. All operational activities will be handled by Mr. Umair Khalid. Mr. Hamid Mushtaq is responsible for sales and marketing and customer dealing. Mr. Junaid will provide technical assistance in product development and testing. Initially, we have employed two persons at production facility location (1 for office handling and other for production assistance). All other labour team which includes welder, painter etc would be hire on contractual basis. The labour staff will be hired more in case of business expansion.

### **3.1.9 General Operation Hours**

Our production unit working hours are 08 am to 5pm (1 shift/day) form Monday to Saturday. Sales and marketing team remain vigilant and active all time for acquiring new orders and customer satisfaction. The daily performance with respect to production target is noted down and inventory is maintained for required purposes.

### **3.1.10 Industrial Analysis**

Hydroponics market in Pakistan is currently at growth stage. Demand for fresh and home-grown food rose substantially during Covid-19 era which led to increase in demand for fresh foods. Agriculture productivity stagnation has become a serious issue for past few years. Rising inflation further escalated the situation. Agriculture land is shrinking day by day while population is increasing at constant rate. Therefore, there has been always a demand for fresh and organic food among public. With the increase in urbanization and purchase power of households, food demand for country is increasing sharply. Currently there is a huge Scope for hydroponic farming in Pakistan, so much that supply comes nowhere near to market demand.

There are some local businesses practicing commercial hydroponic farming and providing technical assistance. Some of them are selling foods and vegetables online through online services. Nutrofarm Hydroponics is in itself a unique platform which provides customized hydroponic farming setups to its customers according to their space, budget and consumption requirement. Our team purely focuses on customer demand level, providing unique ideas for kitchen gardening, technical assistance and ensuring after sales service. Following are our competitors, striving for a market share of green farming are listed as

- Pakistan Hydroponics
- BT Hydroponics
- Green Fields Organic
- Banu Mukhtar Farms
- Grow pure Pvt Ltd

#### **Competitor Analysis:**

- Providing fresh vegetables & fruits through mass hydroponic setup
- Supplying hydroponic equipment's
- Offering farming consultancy to customers.

**Competitive Edge:**

- Providing unique service by delivering small-scale hydroponics setups at customer house or workplace.
- Excellent reputation for high product quality and custom workmanship.
- Excellent customer service
- Product customization with value added services and technical assistance.

**3.2 MARKETING STRATEGY**

Nutrofarm hydroponics aims to provide customized service of hydroponic farming setup based on customer/client requirements. For instance, frame design, colouring, size, utilities with the value-added services what they demand for it. We will be targeting all residential areas and commercial buildings which include domestic households, educational institutes and offices.

We will position our product as complimentary service yet organic and eco-friendly in nature which would be helpful in our brand building effort.

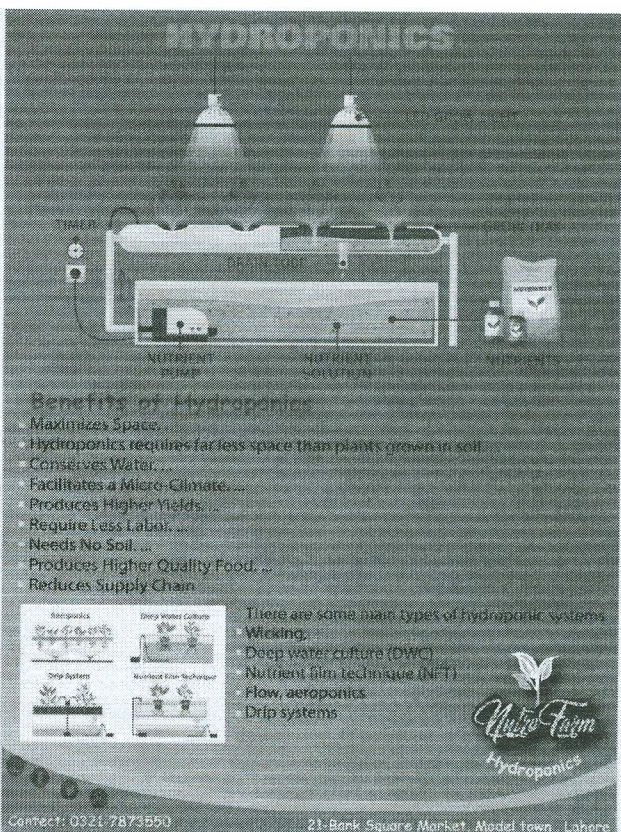
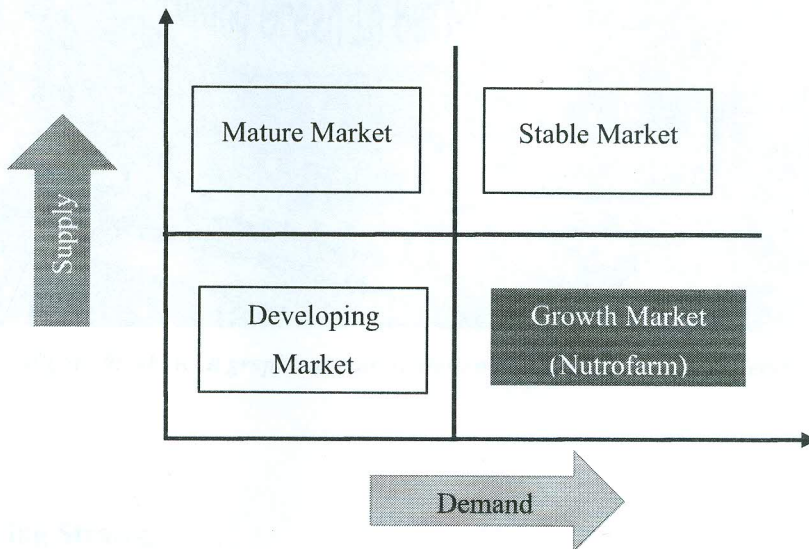


Figure 8: shows Business Brochure for Sales & Marketing

### 3.2.1 Target Market

- Location: Punjab & its suburbs
- Target industry: Hydroponics (Nutriculture)
- Target Consumer: Urban Residents
- Demand for our product: Looking at the current situation, the demand for our product & services will eventually increase as it's a nutritional, cost-saving and eco-friendly for the environment.

#### Market Quadrant:



Since hydroponic is emerging technique which has vast potential and benefit and acceptable by eco-friendly society. The market quadrant for Nutrofarm hydroponics lies in third quadrant since demand is stronger and growing, but supply is limited. The business focuses on the market penetration, product development, its diversification while increasing the production capacity to meet rising demand.

### 3.2.2 Product Strategy

- **Product:** Our product will include a complete set hydroponic system which would be assembled at client desired place
- **Features:** Product can be customized for the clients depending upon their needs and requirements. It would be eco-friendly as it would produce green yet nutritious food.
- **Benefits:** The end product of this installed system would be beneficial for health. Customer will be able to promote its health benefits. Additionally, it will also give an aesthetic look to your house (rooftop, garden, balcony, courtyard etc.).
- **Differentiating factor:** The key differentiating factor would be the promotion of green products through hydroponic farming system. Despite its food benefits, its use for multifunctional home décor also provides eye-catching look for people having bleed green lifestyle.

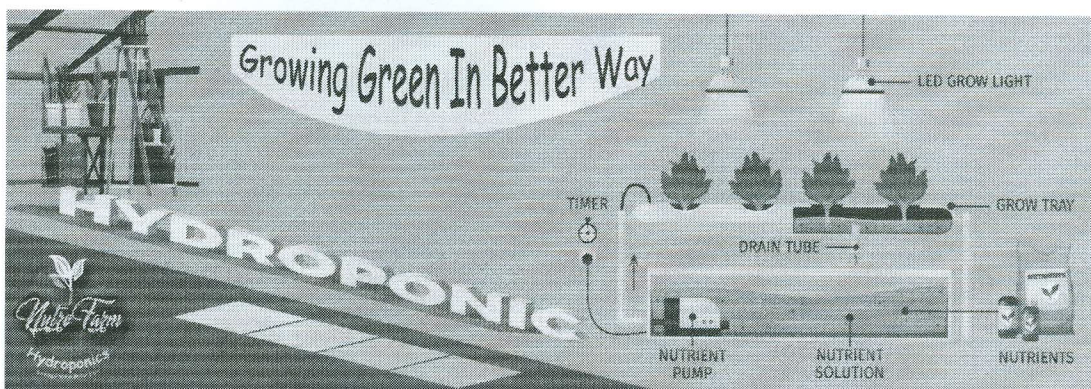


Figure 9: shows a graphical representation of Indoor Hydroponic Setup

### 3.2.3 Pricing Strategy

We will adopt the target costing method for this start-up to make sure the all expenses covered within a proposed selling price to customer. Since market for hydroponics is growing consistently with a unique offering. Nutrofarm Hydroponics aims to render its product based on sustainable, superior quality, excellent customer services. Price will vary according to each customized system

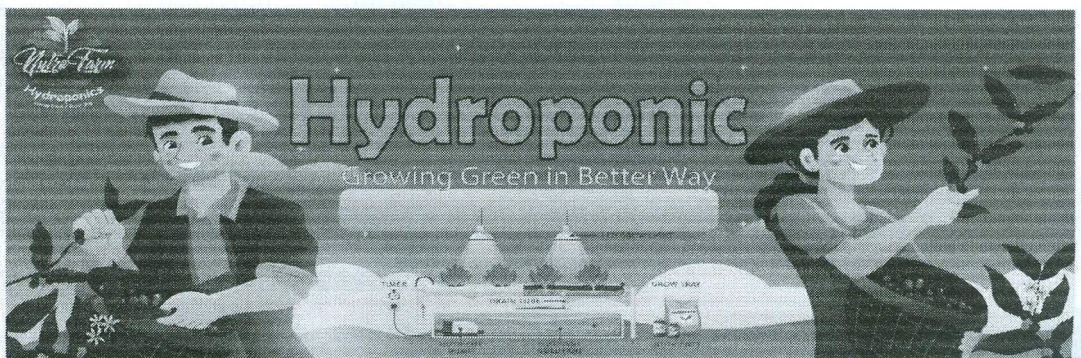
demanding by customer, but we will make sure to keep prices below market rate for the main time and will increase as our brand identity increases.

### 3.2.4 Distribution Strategy

Upon receiving order from customer, our concerning team member will contact to customer and provide delivery at doorstep. Customer feedback and after sales services will be offered to customer depending upon price quotation & negotiation. Furthermore, in order to capture wide public attention, installed hydroponics systems will be displayed in retail outlets of home décor, interior and gift shops.

### 3.2.5 Advertisement and promotion

- **Advertising** – Initially, we will be using print media like brochures, flyers, posters, Web page and emails. Social media platforms such as FB, YouTube, Insta will be used for promotional activities
- **Personal selling** – Sales team will be engaged in promoting the product and the value we give and getting the orders.
- **Public relations** – we intend to post write-up of the company, the ideology and advantages to clients and society.
- **Direct Marketing**- This will include interactive consumer website, catalog distribution and retail outlet, promotional letters.



*Figure 10: shows social media promotional Pic of Nutrofarm Hydroponics*

### **3.2.6 Sales Strategy**

We would use the following marketing and sale strategies.

- We intent to implement a local campaign with our targeted market via the use of flyers, brochures, advertisements, and word of mouth advertising.
- We plan to develop an online presence by developing a website and placing the Company's name and contact information with online directories.
- We will also advertise our business in relevant financial and business-related magazines, newspapers, TV stations, and radio station.
- We will display our catalogues at business fairs, expos, seminars, and décor outlets.
- Create different packages for different kinds of clients in order to work with their budgets and still deliver good returns on investment.

## **3.3 MARKETING ANALYSIS**

Many industries contracted because of the COVID-19 pandemic, while hydroponic farming is growing in terms of demand. This type of farming practice was expanding across the urban areas even before the pandemic. It is now witnessing a huge growth rate because vertical farms control everything, from seeds to stores. As demand of food is rising globally. High growth rate of population, urbanization and increased purchasing power are contributing positively in increasing demand of food in the country. Per capita consumption of food is high in urban areas as compared to rural area. This also required more demand for food. World population is also increasing which need increased supply of food as a global responsibility.

### **3.3.1 SWOT Analysis**

SWOT analysis was introduced by Albert Humphrey at the Standard Research Institute in 1960. Its basic determination was to bring accountability and objectivity to the process of planning. Albert Humphrey encouraged the execution of SWOT analysis on particular principles, such as products, process, customers, distribution, finance, and administration. It allows the firm to assess its competitive position and then utilize their strengths to take advantages of opportunities, mitigate

threats and correct weakness. Currently, SWOT analysis is very powerful tool and it is using for skimming the internal strengths and weakness and also its external opportunities and threats.

There are some advantages and disadvantages of SWOT Analysis as listed below.

**Pros:**

- Its application provides the vision of every functional area of firm.
- A comprehensible approach
- Provide firm's broad perspective and solution to problems.
- Helpful for executives to make decisions.

**Cons:**

- A generalized and intuitive based data.
- Sometimes it gets opposite to the purpose for which it is designed
- Used by managers only for their assessments.
- It doesn't lead to formulate or optimize strategic options.

**1. Strength**

Our strength as a hydroponics farm company is the fact that we are the only company that provides domestic hydroponic vegetable garden. We are the only suppliers and hydroponics setup installer at household level within the Lahore. We have some of the latest hydroponics farming machines; tools and equipment that will help us cultivate kitchen related vegetable with ease. Aside from our equipment, we can confidently say that we have some the most experienced hands and technique in the hydroponics farming line of business.

**2. Weakness**

Our weakness could be that we are a new hydroponics farming business in the Lahore, it might take some time for our organization to break into the market and gain acceptance especially from domestic household users because of less awareness that's why we have to educate the people about the organic farming in beginning which may also help us in achieving business goals.

That is perhaps our major weakness.

### **3. Opportunities**

The opportunities that are available to us is that we are making the beginning of a unique system in which people are more passionate about growing organic plants at home. People with hobbies like gardening will also be creating opportunities to us.

### **4. Threats**

Just like any other business, one of the major threats that we are likely going to face is economic downturn. It is a fact that economic downturn affects purchasing / spending power. Another threat that may likely confront us is the arrival of a new hydroponics farm in same location where our target market exist and who may want to adopt same Business model like us.

#### **3.3.2 PESTLE ANALYSIS**

A strategic framework for evaluating the business external environment by splitting the opportunities and threats into Political, Economic, Social, Technological factors, Environmental & Legal. It is an effective tool for strategic planning. allow managers to recognize those variables which are related to macroeconomic level, and those variables helped them for the industry expansion. Later on, this model worked for forecasting and also made the correct choices in current time in for future.

#### **Pros and Cons of PESTLE Analysis**

Pros:

- A method of defining key variables of external business environment.
- Approachable and easy to understand.
- It allows the firm to have broader marketplace view with future business expansion.
- Firms can foresee the problems in business environment.

Cons:

- Data can be misrepresented of factors not addressed properly.

- Analysis needs rationalization frequently.
- Information can be based on assumptions.
- PEST is time consuming and required research skills to gather accurate information.

With PESTLE analysis, we are going to analyze the external conditions of our country where our company is going to operate. As the PESTLE analysis will help us to make decisions for our brand functioning. Below is the detailed PESTLE analysis of Nutrofarm Hydroponics which is covering almost all the majors' factors regarding Political, Economic, Social, Technological, Legal and Environment.

<b>POLITICAL FACTOR</b>	As Nutrofarm hydroponics deals commercially so it is exposed to multiple political risks and factors. The political factors play an important role in determining the company's long-term profitability and market share. Some of the factors related to our nature of business are discussed below:
Political Instability	Political Instability such as mass protest, civil unrest, strikes and road blocks surely affects our business. The entire supply line disrupts, resulting in business loss and customer dissatisfaction.
Taxes	Apart from indirect taxes, Govt implies new kinds of taxes, incentives such as income, withholding, property etc. We have to pay different percentage of tax on our products. A high level of taxation would demotivate company like from maximizing the profit.
Labor Right	Protecting Labour right is fundamental obligation on businesses.  We at our manufacturing unit make sure to provide the labors with all the essentials they need to perform their task in a safe and secure environment.
<b>ECONOMIC FACTOR</b>	The Macro environment factors such as – inflation rate, savings rate, interest rate, foreign exchange rate and economic cycle

	determine the aggregate demand and aggregate investment in an economy.
<ul style="list-style-type: none"> <li>▪ Current Economic Condition</li> </ul>	Presently, countries have worst economic crises. Business suffers a lot due to high cost of operations. Higher the economic uncertainty, lower will be the economic activity.
<ul style="list-style-type: none"> <li>▪ Interest Rate</li> </ul>	Higher interest rate has stagnant the economic growth. Nutrofarm hydroponics finds difficulty in securing investment loans with this high % of interest factor.
<ul style="list-style-type: none"> <li>▪ Inflation rate</li> </ul>	Because of inflicting higher inflation rates, people prefer to avoid new purchase and experience. So we need to adjust our product prices to customer range.
<ul style="list-style-type: none"> <li>▪ Production Cost</li> </ul>	Due to currency devaluation, business get incurred with higher operating costs such as fuel expenses, electricity, etc. Both direct & indirect material gets expensive which causes our high production costs
<b>SOCIAL FACTORS</b>	Social factors that impact are a direct reflection of the society that operates in, and encompasses culture, belief, attitudes and values that the majority of the population may hold as a community.
<ul style="list-style-type: none"> <li>• Education</li> </ul>	With the growing literacy rates and contemporary education, young generations are more aware about importance of fresh organic foods. This will help us in marketing our product to young generations.

<ul style="list-style-type: none"> <li>• Family structure &amp; heredity</li> </ul>	A lot of people prefer a vegetarian diet and desire to eat home grown foods to cut costs and daily food expenses.
<ul style="list-style-type: none"> <li>• Health &amp; Safety concern</li> </ul>	With increase in knowledge and common awareness, people are keener to consume healthy foods and drinks which is safe for the environment.
<ul style="list-style-type: none"> <li>• Cultural norms &amp; trends</li> </ul>	Culturally, people in Pakistan prefers to eat fresh green foods such as Salad, onion, cucumber, carrot etc with their meals. This consumption reflects a societal trend because of cultural norms.
<b>TECHNOLOGICAL FACTORS</b>	Rapidly changing technology can make either make business flourishes or erase my existing competition. Technological factors play important roles in business sustainability.
<ul style="list-style-type: none"> <li>• New tech development</li> </ul>	We intend to use renewable energy use i.e. Solar power for manufacturing operations. Also, to secure workplace and monitoring tasks, CCTV cameras are installed which covers each portion.
<ul style="list-style-type: none"> <li>• Innovation and R&amp;D</li> </ul>	Nutrofarm Hydroponics aim to deliver innovative product to its customer bu having R& D and adopting latest technology and trends.
<ul style="list-style-type: none"> <li>• Social media</li> </ul>	Use of internet and presence on social media platforms helps us in approaching out targeted market. Social media users can easily obtain much information about our working, past accomplishments etc.

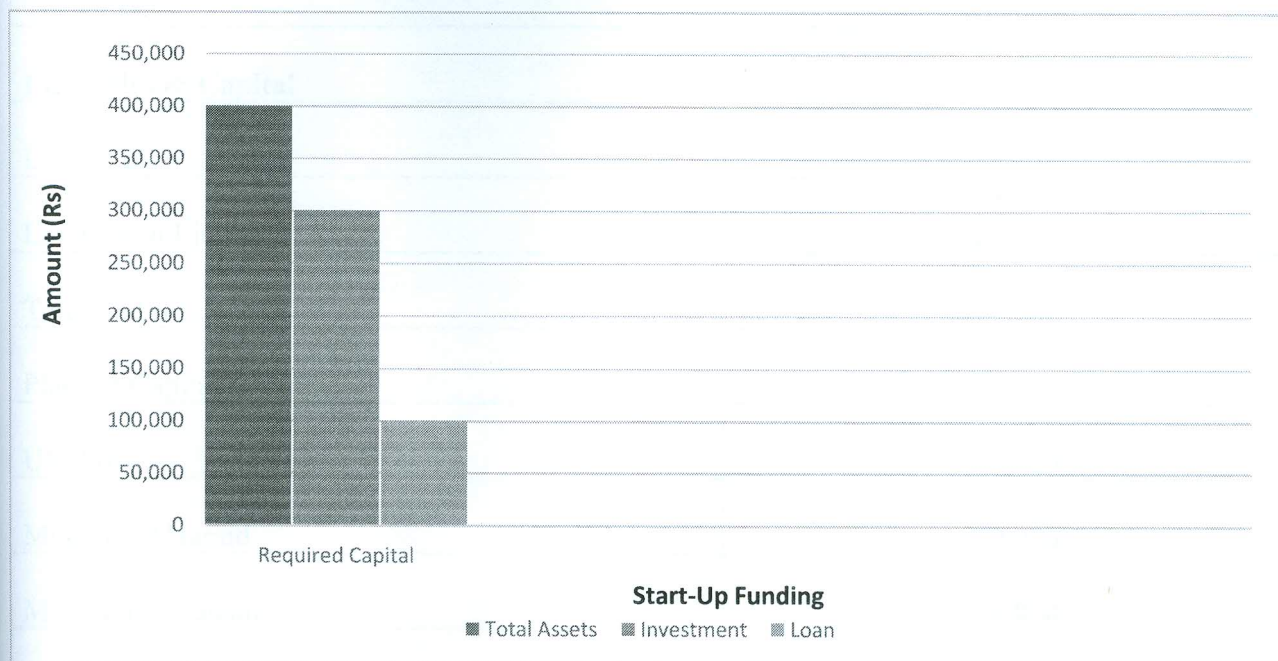
<b>ENVIRONMENTAL FACTORS</b>	<p>Today's customer is more knowledgeable, powerful and eco-friendly. Consumers prefer to consume and advertise those who have environmental compliance and follow related CSR activities.</p>
<ul style="list-style-type: none"> <li>• Recycling</li> </ul>	<p>At Nutrofarm Hydroponics, recycled materials are being used to ensure sustainable use in its operations.</p>
<ul style="list-style-type: none"> <li>• Health, Safety and Environment (HSE)</li> </ul>	<p>Strict implementation on HSE policies. Minimizing the waste reduction</p>
<ul style="list-style-type: none"> <li>• Compliance</li> </ul>	<p>Adopting certified process and products in operations to ensure environmental compliance.</p>
<b>LEGAL FACTORS</b>	<p>In the legal aspect, Nutrofarm Hydroponics is considering the following aspects to follow soon.</p>
<p>Business registration</p>	<p>It includes registration of business, opening business account, and obtain permit.</p>
<p>Employment Laws</p>	<p>All hired employees will be registered and eligible for provident funds.</p>
<p>Anti-discrimination law</p>	<p>Company intends to follow the anti-discrimination law by becoming an equal opportunity employer.</p>

### 3.4 FINANCIAL PLAN

#### 3.4.1 Start-up- Summary

Each of the three co-owners will invest an equal amount. The remainder of the required financing will come from the family loan from each co-owner family. The following chart and tables show projected initial start-up costs for Nutrofarm Hydroponics business. Since the business is at start-up level, total investment is of **400,000 PKR** and 75% of major investment comes from three business partners and **100,000** loan will be secured from family members.

<i>Name of Business Partner</i>	<i>Capital Sharing Amount (Rs)</i>	<i>Capital Contribution Ratio</i>	<i>Partner Responsibilities</i>
<i>Umair Khalid</i>	100,000/-	25%	Supply Chain & Operations
<i>Rana Hamid Mushtaq</i>	100,000/-	25%	Sales & Marketing
<i>Muhmmad Junaid</i>	100,000/-	25%	Designing & Technical
<i>Total</i>	<b>300,000/-</b>		



### 3.4.2 Start-up Funding

<b>Start-up Investment breakup</b>	
Start-up Expenses to Fund	
Start-up Assets to Fund	400,000
<b>Total Funding Required</b>	<b>400,000</b>
<b>Assets</b>	<b>400,000</b>
Non-cash Assets from Start-up	320,000
Cash Requirement from Start-up	80,000
Cash Balance on Starting Date	80,000
<b>Total Assets</b>	<b>400,000</b>
<b>Liabilities &amp; Capital</b>	
<b>Liabilities</b>	
Long-Term Liabilities	100,000
<b>Total Liabilities</b>	<b>100,000</b>
<b>Planned Capital Investment</b>	
UMAIR	100,000
Muhmmad Hamid	100,000
Muhammad Junaid	100,000
<b>Total Capital</b>	<b>300,000</b>
<b>Total Capital &amp; Liabilities</b>	<b>400,000</b>
<b>Total Required Funding</b>	<b>400,000</b>

### 3.4.3 Capital Requirement

Sr #	Name of Equipment	Total Amount
1	Cutting Grinder	20000
2	Grinding Tool Set Kit	1200
3	Drilling Machine	6000
4	Drilling Tool Kit	1500
5	Pipe Joint Heater	3000
6	Pipe Cuttter	700
7	General Tooling Kit (Plier, Screwdriver, Handsaw, Nose Plier, rammer, File etc.	50,000
8	Hardware Accessories	5000
9	Furniture (chairs and tables)	40,000
10	Office Accessories	28,000
11	Computer	50,000
12	Other General items	14,600
13	Fixture & fittings for the storage area	100,000
13	<b>Total Amount</b>	<b>320,000</b>

### 3.4.4 Product Cost and Selling

Currently, a company is selling the 3 types of prototypes in the market. Nutrofarm hydroponics currently charges 30% profit margin on its products. A special 10% discount will be granted by ordering through retail shop exhibition.

SR	Product	Size	Production Cost	Profit margin%	Selling Price
1	NFT Hydroponic Farming System	4X4 Sq Ft	16,000	30%	20,800
2	NFT Hydroponic Farming System	6X6 Sq Ft	36,000	30%	46,800
3	NFT Hydroponic Farming System	8X8 Sq Ft	56,000	30%	72,800

<b>Fixed Costs (Monthly)</b>	<b>Amount (Rs)</b>
Salaries	50,000
RENT	35000
Electricity	20,000
Phone & Internet	4500
Kitchen	8000
Sales & Marketing	15,000
Miscellaneous	5000
<b>Total</b>	<b>137,500</b>

<b><u>Variable Cost for (4X4 Sq Ft) System</u></b>	
<b>Direct material</b>	
<b>Parts</b>	<b>Amount</b>
Pipe 4" (17 feet)	1,845
End Cups 4" Dia	1,920
Elbow	350
T=Socket	120
Pipe Length	1,350
Pipe Closet	40
Hydroponic Net Cups	675
Pipe Drilling Equipment	320
Water Pump	600
Pipe Inlet	70
Pipe Nozel	20
Slotion popular	240
Gripper	120

Paint Bottles	690
Miscellaneous	840
	<b>9,200</b>
<b>Direct Labor &amp; FOH</b>	
Manpower Cost	<b>1,800</b>
Transportation	5,000
	6,800
<b>Total Variable Cost</b>	<b>16,000</b>

### 3.4.5 Sales Forecast

Year	2022	2023	2023	2024	2025
Hydroponics System Sales	150,000	2,700,000	475,000	650,000	880,000

### 3.4.6 Break Even Analysis

The cost-volume-profit analysis, also commonly known as breakeven analysis, looks to determine the breakeven point for different sales volumes and cost structures, which can be useful for managers making short-term business decisions. CVP analysis makes several assumptions, including that the sales price, fixed and variable costs per unit are constant. Running a CVP analysis involves using several equations for price, cost, and other variables.

The CVP formula can also calculate the breakeven point. The breakeven point is the number of units that need to be sold or the amount of sales revenue that has to be generated in order to cover the costs required to make the product.

<b>Break Even Analysis</b>				
<b>SR</b>	<b>Product</b>	<b>Sale price</b>	<b>Unit VC</b>	<b>Unit Contribution Margin</b>
1	4X4 Sq Ft) NFT Hydroponic System	20,800.00	16,000.00	4,800
2				
3	Unit Contribution Margin	4,800.00		
4	Fixed Cost	137,500.00		
5	Break-Even in units	<b>29</b>		
6	Break-Even in Amount (PKR)	<b>603,200</b>		

From the given analysis, we can assume that we can achieve break even in 4<sup>th</sup> year.

## **Chapter 4**

### **4. Conclusion and Future Scope of Technology**

#### **4.1 Conclusion**

Hydroponic business holds tremendous opportunity for youngsters to initiate their start-ups and demand for the farming setup and its products keep surging. Being naive, we faced some issues in developing a initial prototype for the hydroponic model as different types and techniques are available for product customization. These setbacks acted as stepping stones for us and facing the failures and rejections has led us to enlighten new horizons. Furthermore, Nowadays Pakistan is facing a serious issue regarding agricultural productivity loss, its stagnation in the fields of fruits and vegetables. This loss of productivity led to food shortage and causes price hikes of fruits & vegetables. The industry is expected to grow exponentially also in future, as conditions of soil growing is becoming difficult. Specially, in Pakistan, where urban concrete conglomerate is growing each day, there is no option but adopting soil-less culture to help improve the yield and quality of the produce so that we can ensure food security of our country. Nutrofarm Hydroponics farming provides handful opportunity and unique solutions for the low-income households, green food lovers and those who prefers kitchen gardening.

Despite of large capital requirements for this business, we started with small amount of capital in order to explore the market dynamics and customer needs. Apart from financial investment, the business demand skilled labour, technical knowledge, monitoring & control and other said resources. Otherwise, it can cause product malfunctioning and productivity loss. We are striving hard to overcome difficulties and learning from mistakes.

Nutrofarm Hydroponics intents for business expansion after achieving break-even. We successfully ran pilot project and looking for more projects. We have participated in local exhibition and have prototype display. The agenda is to spread the more awareness and the aesthetics among people which may consider it fruitful and appreciate it.

## 4.1 Future Scope

Hydroponic is emerging and fast growing field in agriculture sector across the world. It will dominate the conventional food production technology. With increasing population, depleting land resources, countries with arid land are applying hydroponic farming setup on mass scale. Countries like Japan and Israel has successfully implemented the technique and growing those foods which impossible to grow with existing land environment. Hydroponic farming method keeps productivity yield 1,000 times than conventional method, if operated in controlled environment. It is extremely useful for dry and arid countries in Africa and Asia when land and water resources are minimal. Even some countries are practicing hydroponic farming in sea containers and exporting the product across other countries. In this way, global food supply chain is integrated to avoid food shortages.

Hydroponic farming is a technology of future. As Nasa do extensive research plans and testing different types of hydroponic setups for higher product yields in their space exploration projects. Hydroponic farming would be helpful in colonization of Mars. It has two-folds benefits; large variety of food and supporting a bio-regenerative life support system. (Mamta D. Sardare, 2013)

## References

- AgriFarming. (2021, 4 30). *Hydroponic Farming FAQ Information fro begineers*. Retrieved from AgriFarming.in: <https://www.agrifarming.in/hydroponic-farming-faq-information>
- Anonymous. (2019, July 24). *Hydroponic Systems & What's Right For You*. Retrieved from Hydropros.
- Arshad Mehmmod Malik, K. M. (2018). Impact of Hydroponics Technology in Pakistan's Fruits and Vegetable. *Journal of Social Sciences*, 190.
- Beibel, J. (1960). *Hydroponics -The Science of Growing Crops without Soil*. Florida: Florida Department of Agriculture.
- Hydroponics Market Insights, 2017-2025*. (2019, June). Retrieved from Transparency Market Research : <https://www.transparencymarketresearch.com/hydroponics-market.html>
- Jones, J. B. (2014). Hydroponic terminology. In J. B. Jones, *businessComplete Guide for Growing PlantsHydroponically* (p. 4). Anderson, South Carolina: CRC Press.
- Mamta D. Sardare, S. V. (2013). A REVIEW ON PLANT WITHOUT SOIL - HYDROPONICS . *International Journal of Research in Engineering and Technology* , 2.
- SMEDA. (2019, Aug). *Hydroponic Farming*. Retrieved from Small and Medium Enterprises Development Authority (SMEDA): [https://smeda.org/phocadownload/OTC\\_Documents/Agro\\_Food/Hydroponic%20Farmin g%20System.pdf](https://smeda.org/phocadownload/OTC_Documents/Agro_Food/Hydroponic%20Farmin g%20System.pdf)

junaid

ORIGINALITY REPORT

16%  
SIMILARITY INDEX

29%  
INTERNET SOURCES

3%  
PUBLICATIONS

19%  
STUDENT PAPERS

PRIMARY SOURCES

1	hydropros.com Internet Source	6%
2	www.profitableventure.com Internet Source	4%
3	mejast.com Internet Source	3%
4	www.eecs.ucf.edu Internet Source	3%
5	www.slideshare.net Internet Source	2%
6	Submitted to Higher Education Commission Pakistan Student Paper	1%
7	puregreensaz.com Internet Source	1%
8	www.investopedia.com Internet Source	1%
9	ndl.ethernet.edu.et Internet Source	1%