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**A Synopsis On**

**“GROW IT YOURSELF”**

**Submitted By**

**Miss. Gayatri M. Jangam USN:-2VS16EC011**

**Miss. Asiya A. Desai USN:-2VS17EC400**

**Miss. Priyanka S. Tibile USN:-2VS17EC404**

**Miss. Trupti C. Patil USN:-2VS17EC408**

**Under the guidance of**

**Prof. Vidyavati N. Deshpande**

**Grow It Yourself - An automated , Smart , Self-contained Growing System That Cultivates Plants From Seed To Maturity.**

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# ABSTRACT

# Ardunio is gaining popularity day by day. Right from Industrial Automation to Software to manufacturing, Ardunio is making its way. However the agricultural practices used even today are far way from the deployment for the benefit. People still follow the obsolete agricultural practices.The crop plantation requires lot of hard work for a farmer while factors such as soil fertility,water& many such environmental conditions & additional to them the crop diseases will affect the larger percent of agricultural produce for most of the farmers. While some nutrient values may vary which creates a major impact on crops. To find a proper solutions to these particular problems this project is created. This project proposes the concept of use of 3D-printing ,air control systems & fog-maker(atomizer) for agricultural operations including growing crop using an innovative new irrigation called areoponics “fog-ponics”. The proposed project consists of an automated ,smart , self-contained growing system that cultivates plants , monitors & controls the environment for plant in completely autonomous fashion from seed to mature crop. Thus proposed project is expected to bring ardunio to agriculture , thereby solving advanced agricultural problems which can be solved easily by human intervention.

# Keywords: Aeroponics, Ardunio, 3D-printing, Atomizer, Human Intervention etc.

**INTRODUCTION**

One of the important sectors of Indian Economy is Agriculture. Employment to almost 50% of the countries workforce is provided by Indian agriculture sector. India is known to be the world's largest producer of pulses, rice, wheat, spices and spice products. Farmer's economic growth depends on the quality of the products that they produce, which relies on the plant's growth and the yield they get. Therefore, in field of agriculture, growing plants & cultivating crops without losing its nutrients plays an instrumental role. Hence, it is required to develop computational methods which will make the process of growing crops automatic using aeroponics.

India is the land of villages. This being said the major occupation of majority of villages in India is agriculture. Near about 70% people are dependent upon agriculture. Agriculture has been the backbone of the Indian economy and it will continue to remain so for a long time. It has to support almost 17 per cent of world population from 2.3 per cent of world geographical area and 4.2 per cent of world’s water resources. The economic reforms, initiated in the country during the early 1990s, have put the economy on a higher growth trajectory. Annual growth rate in GDP has accelerated from below 6 percent during the initial years of reforms to more than 8 percent in recent years. This happened mainly due to rapid growth in non-agriculture sector. The workforce engaged in agriculture between 1980-81 and 2006-07 witnessed a very small decline; from 60.5 percent to 52 percent.

Research in agricultural systems has been growing in the last years, thanks to potential applications and industry efforts in robot development .Their role was investigated for many agricultural tasks, mainly focused in increasing automation of conventional agricultural machines and covering processes such as ground preparation, seeding, fertilization, and harvesting.

Systematic, repetitive, and time-dependent tasks seem to represent the best fields of application for robots, especially in an arable farming context with temporary crops. Beside agronomic practices, robotic plant protection has also been investigated, but may represent the most complex challenge for researchers Sustainability.

Areoponis in agriculture is a field of wide research and not implemented on practical scale as agriculture still follows obsolete methods. This not only brings down the agricultural produce but also provides a lot of physical as well as mental pressure on farmers. Now-a-days we experience a lot of environmental changes which affect human beings as well as the agriculture fields.the crops turn brown,loss of essential nutrients & hence get damaged.This will drastically bring down the agricultural output as well as farmer needs to spend more and more amount without actually knowing the cure for the problems.

**METHODOLOGY**

We are planning to achieve the desired results by implementing the following technology:

**Grow LED light** - the Chlorophyll in plants primarily responds to only two wavelengths, represented by 450nm & 650nm. The LED system which we are planning to use will have a combination of red and blue LED lights to provide the perfect blend to help in both vegetative and flowering growth.

**Ultrasonic Atomizer (fog maker) -**To use a new method of irrigation, called aeroponics (FogPonics) that waters the plants through fertilizer-infused mist.

**Automatic Nutrient Dosing**- This system will automatically dose the nutrients for plants exactly when they need it.

**Water Sensing System**- We want to equip our system with pH and TDS (Total Dissolved Solids) sensors to help maintain a balanced pH value in the water reservoir that will suit best for plants as well as knowing and alerting when to dose the nutrients.

**Water Exchange System** - the system should be equipped with a hookup for automatic water changes.We are planning to make this process easy, and controlled just by the click of a button.

**Air Control System** - It allows having a precise control over temperature and humidity inside the system, down to a single degree. The technology behind involves the use of a Temperature/Humidity sensor like DHT22 or DHT11 to receive the data, and a fan with a coil to regulate it accordingly.

We did a lot of research and analysed carefully the strengths and weaknesses of the available projects, and considering the market response,came up with a new advanced open source system, which will reduced the disadvantages and will implement only the best features.

**HARDWARES & SOFTWARES USED**

**HARDWARE’S USED**

1. pH sensor
2. Ardunio Mega 2560
3. UV Sensor
4. Temperature sensor
5. Light intensity sensor
6. UV and normal leds
7. Relay
8. Ultrasonic sensor
9. 2.4 inch touch display
10. DHT11 Humidity sensor
11. Power supply

**SOFTWARE’S used**

1. Ardunio IDE
2. Serial monitor

**ADVANTAGES**

1. No Soil
2. Easy to automatize
3. Controlled environment
4. Shorter grow cycles
5. Vertical farming possible
6. Less water
7. Indoor
8. Air quality enhancement

**DISADVANTAGES**

1. Power Dependency in Aeroponics System
2. Initial setup for Aeroponics System
3. Technical Knowledge Is Required

**APPLICATIONS:**

* Retail /hotel/fast food Chains
* NASA
* Private Investors
* Public Sector Companies
* Railway Catering companies(**IRCTC**)
* Processed Food Industry
* Corporate Hospitals
* FFV Exporters
* Large land owners
* NGO’s
* Foreign Retail Companies

**CONCLUSION:**

* The Commercial Aeroponics industry is a successful industry and is rapidly expanding.
* The market is larger than opined as produce is sold on quality rather than production method.
* Aeroponics cannot displace bulk commodity items.
* The industry is expected to grow exponentially as conditions of soil growing is becoming difficult.
* Government intervention and university interest can propel the use of this technology

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