



**EN - 1190 ENGINEERING DESIGN PROJECT  
Group Power On**



**Project Proposal**

# **NUTRITECH POT**

**Growing made simple**

**Group Members:**

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## Problem Description

Many people struggle with keeping their plants alive due to inconsistent watering and inadequate sunlight. For busy individuals or those without a green thumb, this can be a frustrating and costly problem.

Our project aims to address this issue by creating a smart plant pot that automatically waters plants when the soil moisture level is low to ensure optimal growing conditions.

By providing a solution to this common problem, we hope to make plant care more accessible and enjoyable for everyone.

## Motivation

The motivation for selecting the smart plant pot project was driven by the growing trend of agriculture-based products in the world. With an increasing focus on sustainability and healthy living, more people are turning to plant care as a way to connect with nature and improve their indoor air quality.

By creating a smart plant pot that automates watering, we aim to make plant care more accessible and enjoyable for everyone.

Furthermore, with the rising interest in smart home technology, we believe that our product has the potential to tap into a large and growing market.

# Product Idea Validation



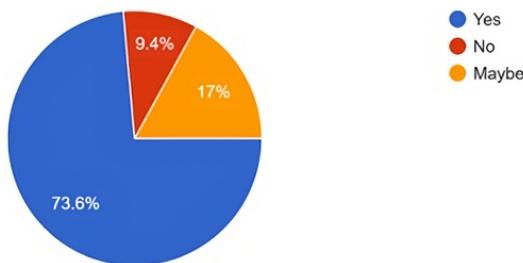
We conducted a survey among a randomly selected group of people of about 50 to validate the product idea for our smart plant pot. The survey revealed that a majority of participants struggled with plant care due to inconsistent watering and providing fertilization.

Most of the people have stated that they like gardening but they don't have enough time to look after plants. And people also mentioned that they forgot to water their plants very often.

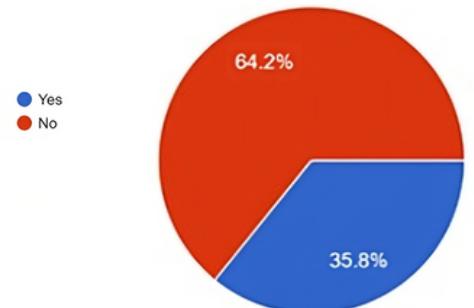
Over 70% of respondents expressed interest in using a smart plant pot that automatically waters their plants. Additionally, participants identified features such as automatic watering and real-time monitoring as desirable in a smart plant pot.

Based on the survey results, we believe that our smart plant pot has a promising market potential and addresses a common pain point among plant enthusiasts.

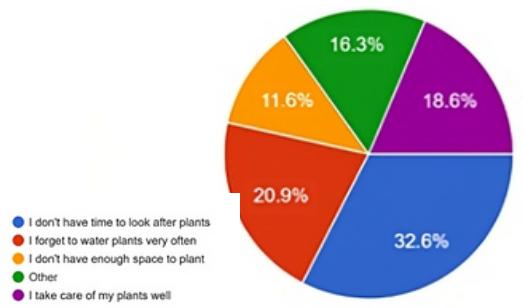
Would you be interested in using a smart plant pot that waters your plants for you?  
53 responses



Do you have plants that you take care of?  
53 responses



If not, why?  
43 responses



How often do you forget to water your plants?  
53 responses

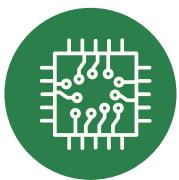
# Technical Feasibility



The purpose of our product, the NutriTech pot, is to make gardening easier and more convenient for individuals who are interested in sustainable living but may not have access to outdoor gardening spaces or have busy lifestyles.

The pot is equipped with a soil moisture sensor and a water pump that automatically waters the plant when the soil moisture level is low. It also includes a water level detector that measures the water level in the tank and alerts the user when to add water.

The Technical Specifications that are needed to be satisfied are mentioned below



## Hardware

The product is designed to automatically water plants when the water level is low for plant growth.

To achieve this, we will be using hardware components such as the atmega328p microcontroller, capacitive soil moisture sensor, DC water pump, and a water level detector. All of these necessary components are readily available.



## Software

Software requirements to program the microcontroller is Arduino IDE and for the development of the app we use Android Studio. For the PCB design, we use the Altium Designer and for the enclosure design, we use the Solidworks software. All the resources can be met and they are available at the moment.



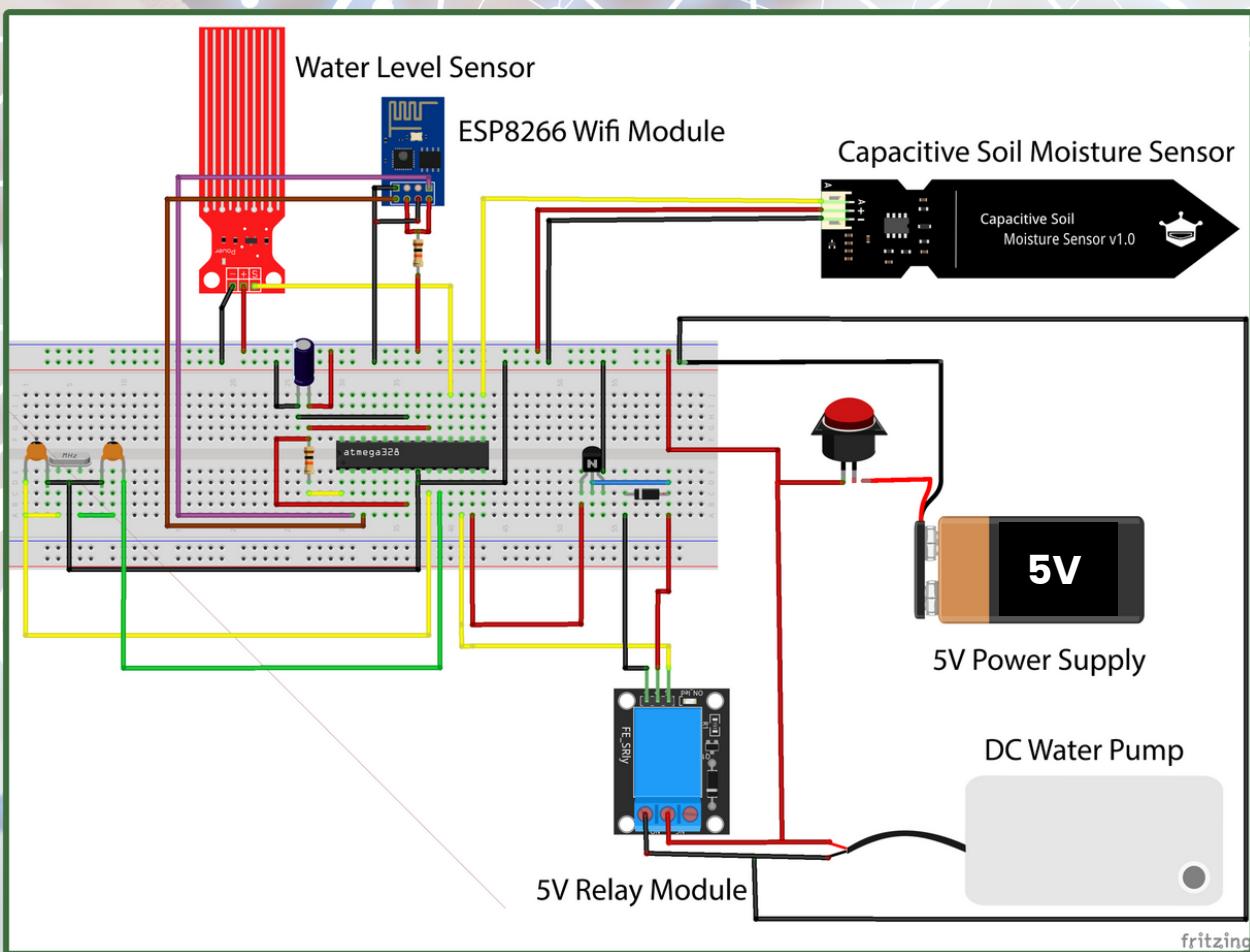
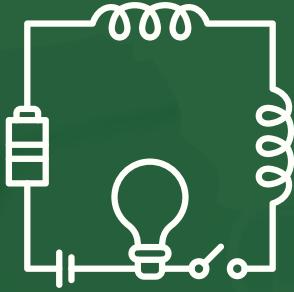
## Circuit and Enclosure Design

We are planning to do the PCB printing and 3D printing by hiring professionals. The necessary resources are available at the moment. Our product does not require heavy machinery work. Solder and soldering stations are available.

## Future Improvements -

We are planning to introduce a rechargeable battery in the future

# Product Architecture



## Main Circuit

We use 8266 microcontroller as the central unit. All modules, including Water level detector, Soil moisture sensor, and DC water pump, are connected to it. It gets inputs from sensors and controls the water pump accordingly. Also it alerts the user of low sunlight.



## Nutritech App

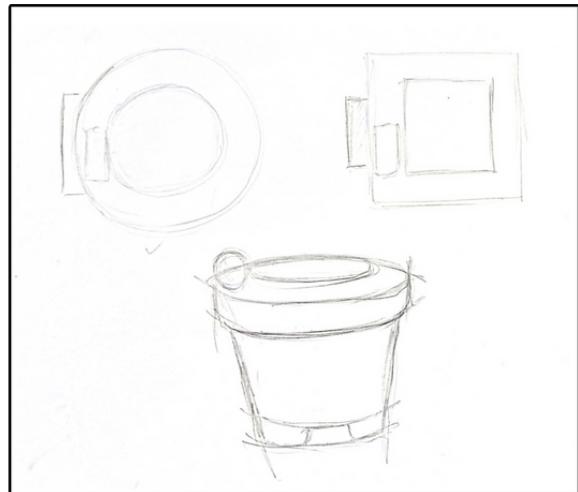
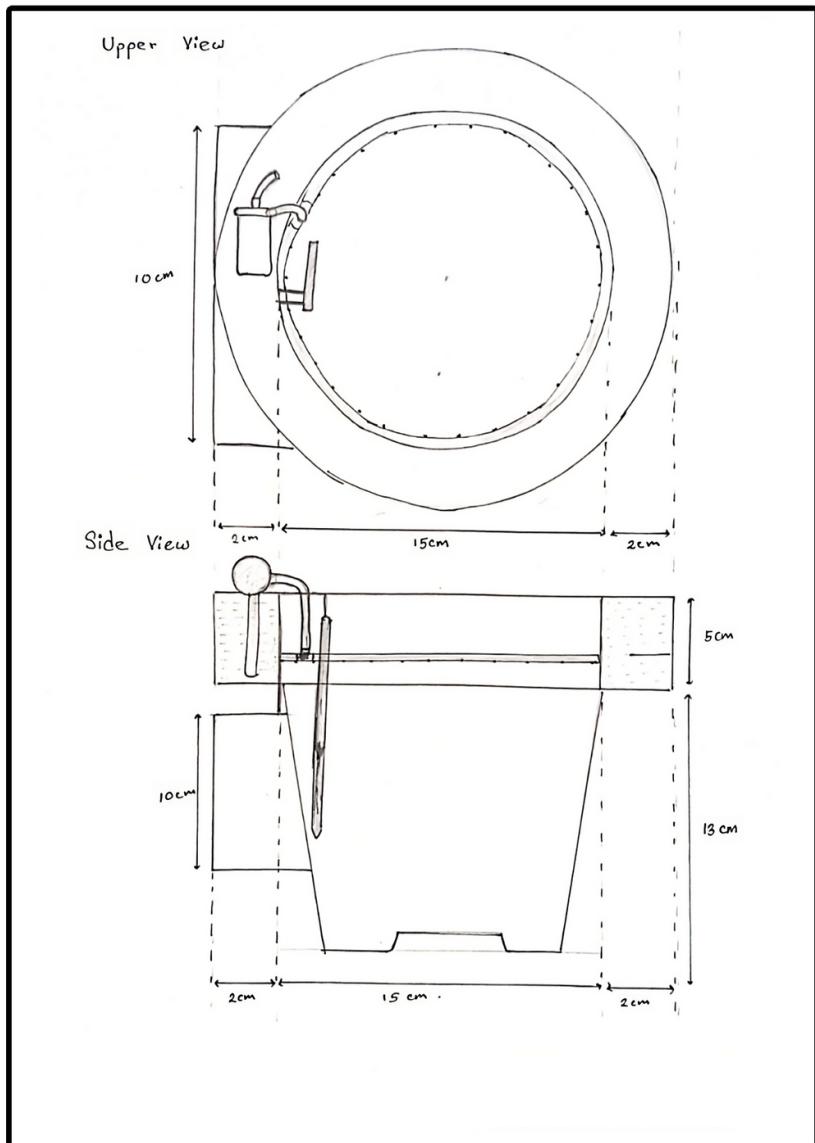
The NutriTech application is being developed to efficiently track the water level in the tank, alerting the user promptly when a refill is needed. In addition, it constantly monitors the soil moisture level and presents the data in an easily understandable format to the user.

# Initial and Final Sketches



Our product enclosure is designed to resemble a typical plant pot, with the PCBs and battery mounted unit located on the curved surface of the pot. The soil moisture sensor is supplied separately, and can be conveniently plugged into the unit after the plant has been planted. The circular water tank is situated at the top of the pot. The water level detector will be mounted inside the water tank

**Material - PLA filament**  
**Color - Matte Black**



**Initial Sketch**

**Final Sketch**

# Marketing



## COMPETITIVE FORCES:

The market is new and growing, with evolving competition. Product quality, pricing, support, and marketing affect competitive forces. Intensified competition and tech advancements require staying ahead..

## TARGET MARKETS:

Our project targets people who care about gardening and sustainability, especially those living in urban areas with limited outdoor space or who are too busy to take care of plants manually. We plan to market the product to them by emphasizing its convenience and benefits.

## WARRANTY TERMS:

We are planning to offer a 6 months warranty period with 10 months service period for the smart watering and fertilizing pot, covering any defects in materials or workmanship. The warranty period is clearly communicated to customers, and any necessary steps for claiming warranty should be made easily accessible.

## MARKETING STRATEGIES:



Social Media  
Marketing



Influencer  
Marketing



Email  
Marketing



Content  
Marketing

# Sales



## Marketplaces

### Online Marketplaces

Daraz  
Ikman.lk  
Ebay

### E Commerce Website

Setting up an e-commerce website

### Retail Stores

Collaborating with retail stores

## After Sales Service

A customer support hotline, which is easily accessible and responsive to ensure customer satisfaction.

## Maintenance and Repair

We provide clear instructions for cleaning and upkeep to ensure the product lasts for a long time. Additionally, we offer repair services for any damages or malfunctions that occur during the warranty and service period.

## Reuse/Recycle and Disposal

We encourage customers to reuse and recycle the product when it is no longer needed. The product is designed to be easily disassembled and recyclable at the end of its life cycle. We are also planning to offer recycling programs or incentives for customers who choose to recycle the product.

# Product Budget



Component	Qty	Unit Price (LKR)	Price (LKR)
atmega328p Micro Controller	1	1400.00	1400.00
Capacitive Soil Moisture sensor(MD0247)	1	400.00	400.00
ESP 8266 Wifi Module	1	480.00	480.00
DC water pump(RB0031)	1	380.00	380.00
9V Battery	1	200.00	200.00
Water Level Detector(MD0207)	1	220.00	220.00
16MHz Crystal Oscillator	1	40.00	40.00
Resistors (1 kOhm - 1, 10 kOhm - 1)	2	3.00	6.00
BC 547 npn Transistor	1	5.00	5.00
IN 4007 Diode	1	5.00	5.00
Push Button Switch	1	30.00	30.00
5V Relay Module	1	100.00	100.00
Capacitors (10 micro F - 1, 22 pF - 2)	3	5.00	15.00
<b>Total</b>			<b>3281.00</b>

Total production cost - Rs 3000 (For multiple Product manufacturing)

PCB Printing and 3D Printing - Rs 200 (per one unit)

Market Price - Rs 3600

Manufacturing Quantities - 50

## Task Allocation

**Kodikara K.S.S.** - Altium and PCB Design

**Kodithuwakku J.N.** - Microcontroller Programming and Testing

**Sehara G.M.M.** - Solidworks and Enclosure Design