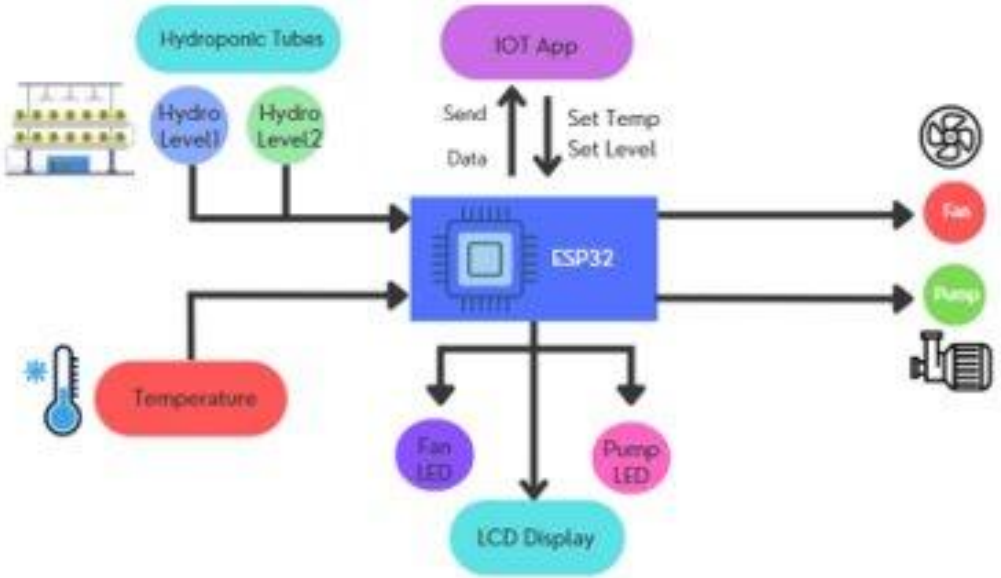
Defining the problem

Agriculture is a significant economic sector in the United Arab Emirates, but it has a number of obstacles, such as limited water supplies, crop losses brought on by the weather, and a reliance on imported items for food security. As a result, creative and long-lasting solutions are required to handle these problems.



SWOT ANALYSIS

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
•Internet of Things (IoT) •Sensors •Easy to control •Sustainable design	•Based on circuit	• Make the idea into business	• Electricity

Budget

	Name	Justification	Price (USD)	quantity
1	ESP32	ESP32 provide multiple analog pins to get sensor data and it is faster than Arduino	10.99	1
2	Capacitive water level sensor	Measure the water level more accurately	12.52	2
3	Relay modules	Used to power pump and fan	11.46	1
4	Dht11	Measure temperature	6.78	1
5	Water pump 12v	To supply water to plant	8.89	1
6	OLED i2c	Used to show the data live on the display	26.47	1
7	Jumpers MF	Pack	5	Pack
8	Power supply 12v	Power the fan and Pump if required	7.74	1

Hydroponics- Iot Based

Um Al Mo’mneen Girls school- C3

Principal name – Mariam Mohamed Hassan Alhosani
Supervisor name – Safa Touati , Shafaque Ahmareen

Students name- Alreem Alabdouli, Zainab Albloushi, Fajar Khaled, Sara Alzaabi, Malak Humaid

Aims

01. provide a reliable source of fresh, locally grown produce

02. conserve water

03. making it a sustainable solution for agriculture in the UAE

04. reduce the dependence on imported goods for food security

05. minimize the impact of weather-related crop losses

Why hydroponics?

What is hydroponics?

Hydroponics is the technique of growing plants using a water-based nutrient solution rather than soil

How is it different?

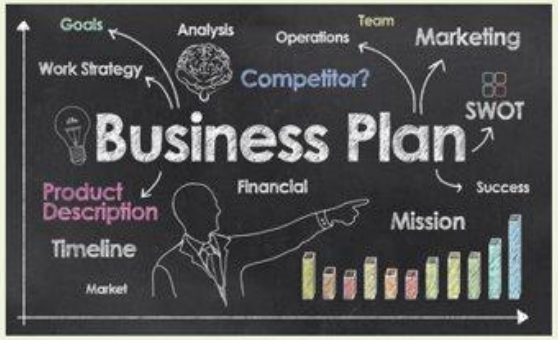
It is the cultivation of plants without using soil. Hydroponic plants are planted in inert growing media and supplied with nutrient-rich solutions, oxygen, and water. This system fosters rapid growth, stronger yields, and superior quality

Why is it good?

Hydroponic plants produce a greater yield of fruits and vegetables because in a hydroponic system plants are more densely spaced together compared to the size of land that would be needed to grow the same number of plants.

Scope of improvement

- Make it as a business so its easy to access for everyone.
- Convert it into embedded system for it to be easy to use by everyone.



Factors for using hydroponics

The need for sustainable, efficient agriculture practices

The project uses hydroponic technology to grow crops more effectively and sustainably while using less water and reducing the effects of weather-related crop losses.

The increasing demand for fresh produce

By incorporating IoT technology, the growing environment can be monitored and managed in real-time, assuring the best possible setting for crop growth and reducing the risk of crop failure.

The importance of food security

The project can help reduce dependence on imported items and promoting self-sufficiency in the food supply by providing a consistent source of fresh, locally grown produce.

The desire to embrace technology and innovation in the agriculture sector.

By combining it with traditional farming methods, the project promotes the development of a more sustainable, effective, and efficient method of crop production that can be used as an example for other areas.

Project benefits

1. **Water conservation:** Compared to traditional methods, hydroponic technology greatly reduces the quantity of water used in agriculture, making it the perfect answer for areas with few water supplies, like the UAE.
2. **Greater Productivity and Yields:** By combining IoT technology into hydroponic systems, the growing environment can be monitored and managed in real-time, resulting in better crop development and greater yields.
3. **Food Security:** The project can help to lessen dependency on imported items and encourage self-sufficiency in the food supply chain by offering a consistent source of fresh, locally grown produce.
4. **Sustainability:** Because hydroponic technology uses less water and lessens the effects of crop losses caused by weather, it is a more sustainable alternative for agriculture.
5. **Technological Innovation**: The project supports efforts being made by the UAE to embrace innovation and technology across all industries, including agriculture. The initiative can be used as a model for other areas because it makes use of cutting-edge technology.
6. **Job Creation:** The initiative may result in the creation of new jobs in industries including engineering, technology, and agriculture, boosting the local economy.
7. **Environmental Benefits:** Hydroponic systems can lessen the need for pesticides and other chemicals, resulting in an agriculture solution that is more environmentally friendly.

How is it useful for UAE?

Due to the lack of the quality soil and water in the UAE, our project will be very helpful in this field. Because our solution does not require that much soil or water.

Literature Review

Although the average human drinks about 2 liters of water per day, it takes more than 3,200 liters of water to create enough food for one person each day. Agriculture uses more than 70% of the freshwater that is produced. The figure shows an estimation of population growth through 2050. By 2050, agricultural output must provide more than 70% of the total to meet rising food demand, primarily for foods