**Artificial Farming – The new revolution**

**Identification and Justification of Problem (100 words)**

In the last decade, we are overworking our resources at a pace higher than ever, making sustainability call of the hour. Overpopulation is to be accused of all this as we have to overexploit our resources to make ends meet. And this theme of overexploitation has affected us a lot. Rather than focusing on the judicious use of resources, we began using resources to their fullest. Now the state is so bad that we don't have ample land to overcome the inadequacy of food.

**Village/ Study Area/ Location**

Deenbandhu Chhotu Ram University of Science and Technology (DCRUST)

**Description of Problem (100 words)**

Overexploitation of resources leads to scarcity, which has commenced. The land is the first to feel the wrath. The lack of fertile land depicts it very well. All this results in scenarios like starvation, famine, etc. **Global Hunger Index** represents all this as statistics. As per 2020's GHI, nearly 690 million people are undernourished all over the world. Most of all, South Asia has the highest hunger and undernutrition level in the world. Taking it a level higher, India is under the Serious category, all thanks to overpopulation. For the principle of food for all, we must find a solution.

**Description of Innovative Solution (250 words)**

Using technology, we can overcome all odds. Now the enigma of how we can do that arises. **Hydroponics** rises as the solution. Hydroponics (derived from two **Greek** words, neologism and geoponics) is the technique of growing plants without the use of soil while using water as an alternative. Thanks to technology, we can take it up a notch and approach the concept of artificial farming. It appears small but will be a game-changer soon. To attain this, we must know the basics of plant growth, its demands, etc. Analyzing that, we got to know the best artificial amenities to be as alike as nature. The crucial aspect of this technique is the optimization of agriculture using electronics. For that, we will be using sensors and microcontrollers to our advantage. Using sensors, we are going to collect all the data. And microcontroller will be regulating other stuff based on this data. The whole system can have the ability to operate on its own, making it more effective and limited resource-dependent. Stacking of the setup will utilize the space to its max. Hence, boosting the overall efficacy of farming.

As we are using water, we have to supply nutrients with water in the form of a solution so that roots could absorb nutrients easily.

Now comes the question of sunlight, how will the process of photosynthesis occur without sunlight. So to answer this question, we need to understand the use of light in the process of photosynthesis.

In photosynthesis, sunlight acts only as a source of photons that provide enough energy to break the molecules of water and CO2. Now to tackle the problem of natural light, we have to find a source that does the same thing, and here come RGB lights to our aid. These can act as a source of photons in this technique. Now comes the viewpoint of maintaining these conditions as per the natural environment. For that, we can use various sensors that will read the moisture content of water and photon frequency of RGB lights. Various sensors like DHT 11 (Temperature sensor), pH Sensor, Light Dependent Resistor, and Float Sensor. Based on the assimilated data, systems like fans, GSM module, grow lights, water pumps will be governed.

**Description of Technology (200 words)**

To accomplish this all, we will be using the Internet of Things (IoT). The Internet of Things describes the network of physical objects embedded with sensors, software, and other technologies to connect and exchange data with other devices and systems over the Internet. The active role of this technique is the acquisition of data. Automated farming can make exceptional use of the consolidated data. Taking an informed decision, minimizing jeopardy, and reduced effort are some of the assets of incorporating IoT in agriculture to mention. The Internet gives the benefit of connecting with stuff without being there. Eventually, influencing the agricultural setup in terms of efficacy. IoT, being a viable technique, has the position of evolving. Multinational companies like Microsoft are eyeing IoT as the future. And are working to make it more worthwhile. Azure IoT Hub shows the efforts companies are putting in it.

**Target beneficiary group/ Anticipated size of the market for the proposed solution (100 words)**

Target beneficiaries include Restaurant owners, Residential Welfare Society, Small-scale Farmers. For Small-scale farmers, it can be an opportunity to shine. With nearly the same resources, produce can increase by up to 50%. Restaurant owners can grow leafy vegetables there, reducing cost while improving food quality. Residential Welfares can approach the concept of smart cities using it.

Consider a market of about 2 lakh consumers. Assuming only 1% of the total market is going to purchase the product, we got about 2,000 consumers. And out of these 2,000, only about 500 will comprise actual market share.

**Expected outcomes/ outputs (100 words)**

Short term expectations are; enhancing the efficacy while reducing the resources and the time investment; making climatic conditions trivial.

Midterm goals will be self-sustainability and independence in dietary needs while raising the quality of food. Smart cities will no longer be a word but a reality.

A decline in Global Hunger Score will be a well-deserved long term accomplishment. It will be helpful not only in India but over the Globe. Ultimately, attaining the prosperity of the human race.

**Brief description of the implementation of delivery and business model (100 words)**

Starting with the supply of raw material, a direct deal with lead suppliers will help in assuring the quality of the product. A special team will be looking-over production and problem-solving, introducing new iterations at regular intervals. The entire model will work on value for money, having a price range of Rs. 8000-15000. Having a multi-sided customer makes the evolution of products easier. Social media is a perfect platform for advertising, improving accessibility. Customer relationships will be the essence of the entire model. Providing both on-site as well as call support will be the foremost priority.

**Description of support/ ecosystem provided by/ available at the institute to facilitate the startup idea (max 150 words) (to be filled by mentor)**

**The novelty of the idea provided (100 words)**

Thanks to growing electronics, we have a lot of options to choose from, providing the user with the ability to customize. Customizability raises the overall utility while making it cost-effective.

**Krishi Vigyan Kendra (1974)**eliminates the need for prior knowledge, providing everyone the equal opportunity to be a part of the coming revolution.

Easy installation and mostly reusable components increase the working life while making it eco-friendly.

The whole setup can work in both semi-automated as well as automated manner.