Project Design Phase-I
Proposed Solution Template

Date	24 September 2022
Team ID	PNT2022TMID33093
Project Name	Project - IoT based smart crop protection system for agriculture
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	• Agriculture is the main backbone of India's economic growth. To boost the productivity and minimize the barriers in agriculture field, there is need to use innovative technology and techniques called Internet of things. Due to enormous growth in technologies, farming has become more popular and significant. Different tools and techniques are available for development of farming. Internet of Things (IoT) can play big role in increasing productivity, obtaining huge global market and to obtain idea about recent trends of high yielding and high income. • Even if the farmers increased productivity of crops, crops may be destroyed due to animals, floods and other natural disasters. Hence our project deals with a smart crop protection system to safeguard the crops and to increase the productivity. • The crops are damaged mainly due to entry of intruders and animals. It cause huge loss for the farmers financially and

		• economically. Without timely supply of water, the crops withers away .To overcome these problem, we develop this project.
2.	Idea / Solution description	• Surveillance plays a major role in many fields like farmlands. It helps us to monitor a certain area and prevent theft and also provides proof of evidence. In the case of farmlands or agricultural lands surveillance is very important to prevent unauthorized people from gaining access to the area as well as to protect the area from animals. Various methods aim only at surveillance which is mainly for human intruders, but we tend to forget that the main enemies of such farmers are the animals which destroy the crops. This

		leads to poor yield of crops and significant financial loss to the owners of the farmland. This problem is so pronounced that sometimes the farmers decide to leave the areas barren due to such frequent animal attacks. This system helps us to keep away such wild animals from the farmlands as well as provides surveillance functionality. • RFID is used to allow the authorized persons only inside the field. Servo motor is used to open the farm gate. • Moisture sensor is used to check the moisture content present in the soil. • The annual income of farmers is largely dependent upon the yield of crops that they produce, which is continuously decreasing due to a number of factors and one such factor that we are focusing on is the damage caused by birds. By taking into consideration the statistical survey of farmers on the percentage damage of crops due to birds, we would like to propose the model and prototype of an automated bird detection and repeller system using IoT devices. This model consists of two main functionality one is the motion detection using PIR(Passive Infrared) based motion detectors and the other part that is repeller that will generate sounds of the predator which will drift the birds away from the field, using an MP3 module and megaphone.
3.	Novelty / Uniqueness	• To prevent the human intruders into our field the agricultural land is protected by fencing and a door with smart lock system based on RFID. • To prevent too much of birds from spoiling the ripened fruits, birds are expelled from the field by playing the buzzer. • If the soil in our field is dry then automatic irrigation is done with the help of moisture sensor and DC motor. • Owner of the agricultural land will receive all alert messages.

4.	Social Impact / Customer Satisfaction	• Better Quality: With an effective IoT solution it is possible to have increased control over production process as well as maintain high standards of growth capacity and crop quality via automation. This way, farmers can expect higher revenues eventually. • Data collection: The data which is collected by the smart sensors would be able to track things, like crop's growth progress, soil quality, weather conditions etc. Farmers can use this data for tracking state of operation and other

		factors like equipment efficiency and staff performance. • Be in Control: Integrating IoT technology allows to maintain control over internal processes and this way production risks can be decreased. Being able to predict the output of your production will be helpful in planning for enhanced product distribution. Like, when the farmers are aware how much crop they would be harvesting, they can ensure that their product doesn't go unsold. • Reliability: In the field of agriculture, IoT devices are deployed in an open environment due to which harsh environmental conditions may cause communication failure and the humiliation of deployed sensors. Therefore, it is important to ensure the physical safety of deployed IoT devices/sensors to protect them from severe climate conditions. • Security: In the agriculture field, IoT devices are at risk due to physical interference such as attack by animals and predators or modification in physical address. Moreover, due to low energy consumption and limited memory, it is hard to implement sophisticated and complex algorithms. The precision farming services such as IoT-enabled location information and location-based services are exposed to hackers that may use this information for device capturing. Attackers attack the IoT device and take out cryptographic implementation.

5.	Business Model (Revenue Model)	• The benefits of optimizing irrigation scheduling with soil moisture sensors includes increasing crop yields, saving water, protecting local water resources from runoff, saving on energy costs, saving on fertilizer costs and increasing the farmer profitability. Less Consumption of Water and Energy: Sensors across the fields help the farmers determine the appropriate resources required. • Reduced Operation Costs: The utility of IoT in agriculture generates more profits since it leads to less manual intervention due to automated processes. • Better Food Quality: Farmers can create the conditions necessary to improve the quality of the crops. • Low Usage of Chemicals: IoT-based systems help farmers switch to cost-effective and ecofriendly farming methods through muchreduced consumption of harmful pesticides and fertilizers.
		➢ This way it brings massive efficiencies of scale, cuts costs, and helps in saving scarce resources, like water. Farmers and growers are able to reduce the waste and increase the productivity that ranges from quantity of fertilizer utilized to number of journeys made by farm vehicles. ➢ Replacing auto switches on pump-sets with IOT based mobile motor controllers can drastically reduce wastage of highly subsidized electricity and water. Farmers can make better on-farm decisions, such as the optimal time to plant, irrigate, feed, protect, or harvest their crops. ➢ Farmers can make better on-farm decisions, such as the optimal time to plant, irrigate, feed, protect, or harvest their crops.

6.	Scalability of the Solution	• This solution is scalable enough to fit the IOT Based Smart crop protection system for agriculture by using the sensors. The cost and use of this project is affordable hence it is very useful for farmers. An efficient marketing system is one capable of moving goods from producer to customer at the lowest cost consistent with the provision of the services that customers demand. Once the costs involved in marketing have been identified then means can be devised to make the system more efficient. Agriculture sensors such as air temperature and humidity, soil moisture, soil pH, light intensity, and carbon dioxide are often used to collect data in all aspects of crop growth such as nursery, growth, and harvest. The air temperature and humidity sensor can monitor the air temperature and humidity changes in the agricultural planting • environment. The soil moisture sensor is one of the most important agricultural sensors. Soil moisture determines the water supply status of crops. Too high or too low soil moisture will affect the normal growth of crops above the ground.