Brainstorming and ideation: IoT in Agriculture

Problem Statement - 1	
Focused Area	**Digital Farming**
Problem statement including use of ICT	Develop affordable app-based solution for Soil health monitoring and suggest which crop to be sown based on it. (Technology Bucket: IoT, AI, ML etc.)
Expected Output	Create app-based solution to detect soil parameters like moisture content, temperature, relative humidity, nutrient, Ph, CEC, NPK etc. and provide crop suggestions to be produced based on soil parameters & environment values. *Bonus Objective*: Provide remedies & alerts on soil deficiencies like Watering for low Moisture level, Fertilizers for Nutrient deficiencies etc.
How Does it help	Currently farmers follow Traditional Crop yielding pattern and irrespective of soil condition, farmers take routine crops. Farmers irrespective of whether soil nutrient requirement uses blanket fertilizers for crop. Because of these issues, losses in crop yielding and soil health gets affected. With the help of solution, farmer can plan which crop to take based on soil condition and plan quickly possible remedies for soil deficiencies.

Problem Statement - 2	
Focused Area	**Digital Farming**
Problem statement including use of ICT	Develop app-based solution for Cotton Crop health monitoring and suggest remedial actions. (Technology Bucket: IoT, UAVs, Satellite Imagery, AI, ML etc.)
Output	With the help of sensors/ imaginary input create cotton crop health monitoring application which will provide various parameters related to cotton crop like moisture level, nutrient level, pest infection level, maturity/harvesting time etc. and create alert for remedial action. *Bonus Objective*: To identify type & level of pest infection and pesticide to be used
How Does it help	Cotton is one of the largest cash crops grown in Vidarbha region. Most of the farmers in Vidarbha region follow traditional agriculture practice and because of which losses are seen in cotton yield. For example, huge use of fertilizers and pesticides irrespective of what crop actually required. With the help of solution, cotton crop will be monitored at different growth stages till maturity and farmers can take timely actions based on suggestions including watering, timing &amount of pesticides and fertilizers, harvesting time etc.

Problem Statement – 3	
Focused Area	**Enhancing Farmer income in off-season using Hydroponic VF System**
Problem statement including use of ICT	To create affordable IoT based smart hydroponic vertical farming system (Technology Bucket: IoT, AI, GPS etc.)
Output	With the help of IoT sensor create affordable hydroponic system for growing spinach, fenugreek, coriander, lettuce plant which will utilize maximum available natural light exposure in Vidarbha region and develop mobile app for monitoring & controlling of various environmental factors like temperature, relative humidity, CO2 concertation, light intensity and quality parameters of solution like pH, total dissolved solid (TDS) etc. Standardize the nutrient uptake of each high value vegetable.
How Does it help	In Vidarbha region problems related to traditional agriculture includes water issue, less land holding capacity, Climate issue, Traditional crops mainly based on rainfed agriculture, labor issues etc. because of which many times farmers get small income compared to total cost for farming. With the help of Hydroponic based Vertical farming (VF), famers can earn money with 80-90% less water, in very small space, can grow 100% Organic Food, less & controlled nutrient supply, may opt indoor farming, VF is climate independent, can grow Veggies & Medicinal crop having high market values, High Yielding in small time, All year-round yielding.

Problem Statement – 4	
Focused Area	**Smart Techniques for Crop Protection & Management**
Problem statement including use of ICT	Develop smart & affordable solution to protect crops from wild animals (Technology Bucket: IoT, UAV, AI, GPS etc.)
Output	With the help of remote sensing technologies develop crop protection solution from wild animal attacks. Provide alerts on any crop damage in case animals destroy crops.
How Does it help	In Vidarbha region, Main Cash Crops such as Pigeon Pea, Green Gram, Black Gram, Jowar, Cotton, Soybean etc. present and are badly affected by wild animals like Deer, Rohi (Neel Gai), wild Pigs, Peacock etc. In few districts in Vidarbha crop loss is more than 35%. Main Wild animals attacking crops in region are Akola, Buldhana Washim etc.

	Along with crop loss, landscape loss and due to wild animals-human conflicts, loss of lives of animals & human as well present.

Problem Statement – 5	
Focused Area	**Forecasting using Predictive Analytics**
Problem statement including use of ICT	Develop system for predicting potential pest, disease, insect attacks (before at least 15-day & more) on Cotton crop and yield prediction of cotton. (Technology Bucket: Big Data, Cloud computing, Satellite imagery, IoT data (on field sensors), Drone Imagery etc.)
Output	To develop app-based forecasting system which provide prediction of possible pest/disease/insect attack on Cotton crop &Predict the cotton crop yield production for Vidarbha region farmers based on the farm historical data, local terrain, weather scenario, various sensor inputs rather than generic guidance. The prediction expected to be at farm level so that individual farmer may take immediate action.
How Does it help	Farmers can take immediate actions resulting better crop produces and farmers have better income. High Yield and prescriptive guidance.