Hansuja:
Good morning/afternoon everyone. Before we start, I want to ask a question.
We all have a favorite food, right? Pizza, biryani, burgers, pani puri, dosa. Whatever it is, I am sure we all have something we love.
Now what if I told you that your favorite food does not start on your plate. It does not start in the kitchen. It does not even start with the farmer.
It actually starts in the soil.
Soil is the foundation of every crop we eat and every harvest we depend on. Soil is where food is born. And that means if the soil is not healthy, nothing that grows in it can reach its full potential.
We realized something. All of us eat food every single day, yet we never really think about what the soil goes through. Farmers across India struggle with something many of us never notice. They do not always know the real-time condition of their soil. They do not always know if the soil has enough moisture, the right temperature, or is in the correct condition to support crops. And getting this information is not easy. Current solutions are expensive, complicated, and time-consuming. Many farmers rely on guesswork.
Imagine working every day and hoping your guess is correct. That is the life of many farmers right now. And that problem exists not just here, but across the world. That is where our idea began. We wanted to create a tool that makes soil understanding easy, affordable, and fast.
Our project is based on one problem. Farmers lack an affordable and simple real-time soil analysis tool that can help them make better decisions and improve their harvests. We believe GeoPulse can solve that problem.

Hridaan: (Solution and Prototyping)
GeoPulse is our solution. It is a low-cost soil analysis device that measures soil moisture at surface and root depth. It also measures temperature, humidity, and environmental conditions. All this data is sent straight to an app where farmers can see what is happening with their soil in real time and get recommendations.
We started by choosing the hardware. At first, we planned to build GeoPulse using an ESP32 because it is powerful and has built-in Wi-Fi. In the beginning it felt like a perfect choice. But then we realized our app setup at the time was still wired. It felt like bringing a Lamborghini onto a gravel parking lot. It was powerful, but the rest of our system was not ready to take full advantage of it.
So we switched to Arduino for our prototype. Arduino helped us reduce the cost, keep things simpler for beginners, and make the device more accessible to farmers. And that helped us keep our biggest promise which is affordability.
We built two prototypes. Our first enclosure looked amazing in CAD. It looked like a spaceship. Unfortunately, it printed like it cost as much as one. It wasted filament, took too long to print, and was far from practical for mass production. So we went back to the drawing board.
Our second prototype changed everything. We redesigned the enclosure to reduce printing time, save material, optimize sensor placement, and make repairs simple. Now our model prints faster, uses less filament, and can be opened easily if anything breaks. It became more efficient than our teachers wish we were at homework.

Shaurya: (App, AI Vision, Impact)

Our device connects to a mobile app built in MIT App Inventor. On the app, farmers can see live readings from the soil. They can track trends over time and even get clear status messages like:
Dry. Water within 24 hours.
This makes the data understandable even for first-time users.
We are now planning to integrate AI into GeoPulse. The app will be able to recommend crops based on soil conditions, suggest irrigation schedules, and identify risks like over-watering or heat stress. For example, a farmer can type: I want to grow tomatoes. And the app can respond: Great choice. Increase soil moisture and adjust planting depth for best results. We want to bring precision agriculture to everyone without making it complicated.
Why does this matter? Because GeoPulse is designed to be low-cost, easy to use, repairable, and scalable for rural communities. No labs, no paid subscriptions, and no complicated manuals required. Just plug in, measure, and grow. We want farmers to focus on their fields instead of fighting with technology.

Hansuja (Closing)
Our current prototype can be built for about 1000 rupees, and we believe we can reduce it further by bulk sourcing components. GeoPulse is more than just a makers asylum project. It is our step toward accessible precision agriculture that can improve lives, boost food production, and help farming communities grow stronger.