

A group of approximately 12 men of various ages, dressed in traditional Indian clothing like kurta-pajamas and turbans, are standing in a line in a rural, grassy field. They are all smiling and looking towards the camera. The background shows a hilly landscape with some trees under a clear sky.

# AGRICOPTER



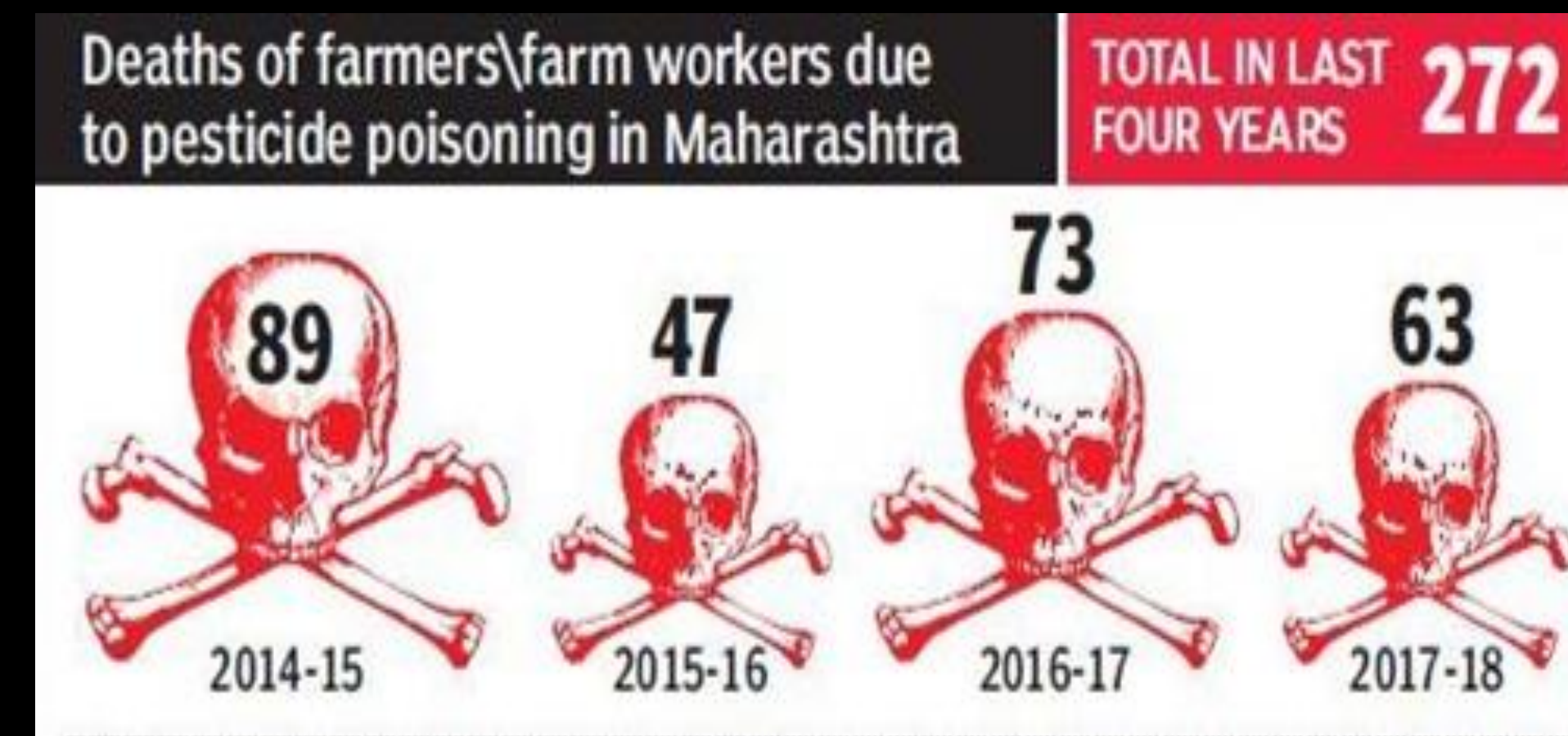


# OUR MISSION

**To replace manual pesticide spraying with safer and faster drone spraying**

# CHALLENGES WITH MANUAL SPRAYING

- **Health Hazard** : 10,000 farmers hospitalized every year due to pesticide poisoning (The Hindu)
- **Over-spraying** : 1.4 times the actual required amount of pesticides are sprayed yearly
- **Time consuming** : 2-5 hours per acre (Silsoe research institute)
- **Lack of awareness** : 99.5% farmers uneducated about optimum dosage and safety measures (NCIPM – National Centre for Integrated Pest Management)



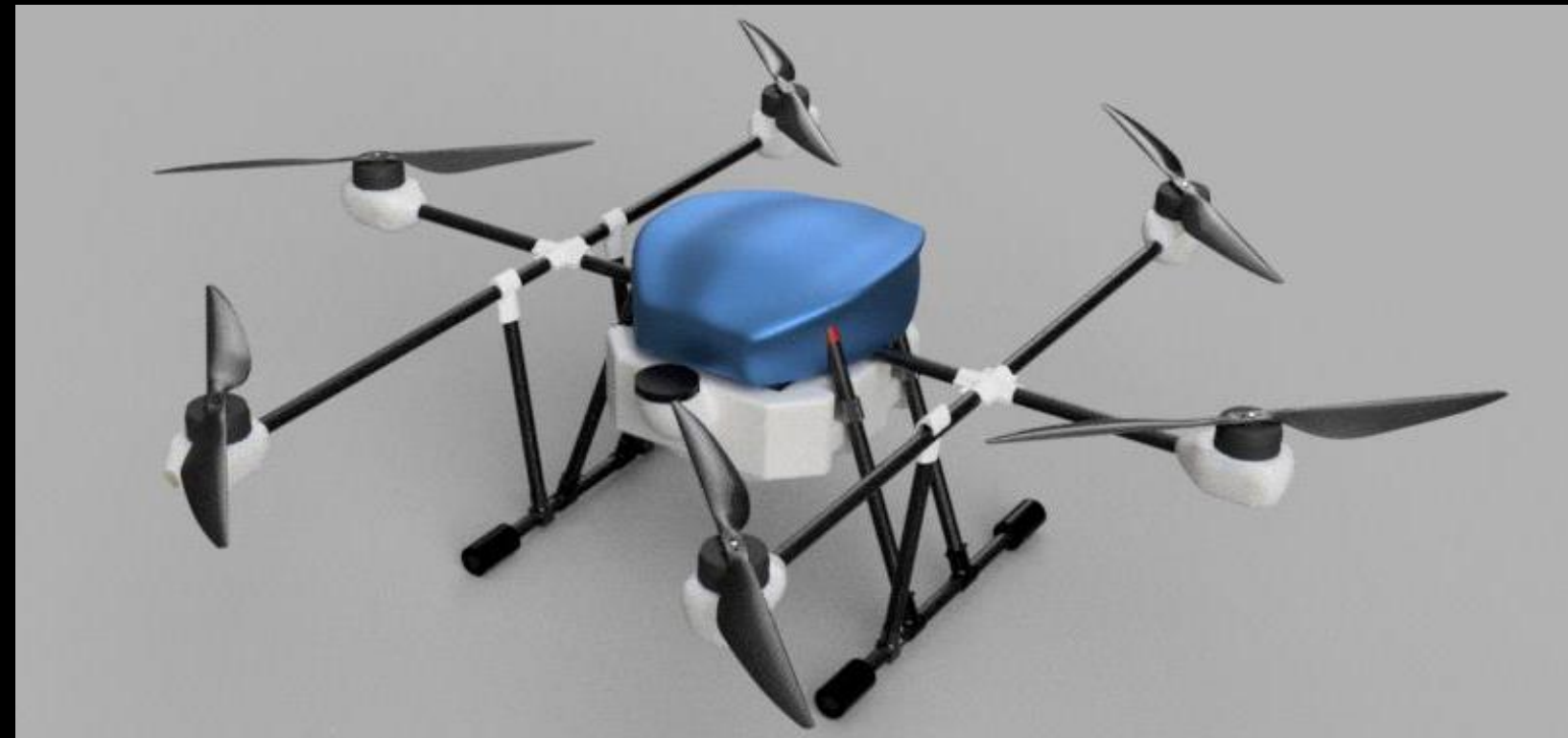
\*Source: Times of India



**Spraying without protective gear**



# THE SOLUTION



Capacity: 10L tank  
Flying: Autonomous  
Pesticide: 5L/acre  
Time: 5 min/acre  
Flying time: 15 min  
Power: Battery

**12x  
Faster**

5 min/acre

**Safer**

**Zero** contact  
with vapours

**Uniform  
spray**

**Better** yield

**Save  
Pesticide**

**40%**  
reduction

# OUR INNOVATION

## Other drones



- Side drift and vortex drift
- Spray drops evaporate before touching canopy in Indian conditions
- Obstacles hazard like trees and poles due to manual/autopilot flying
- Regular (50L/acre) or low-volume (10L/acre) spraying of pesticide

## Agricopter



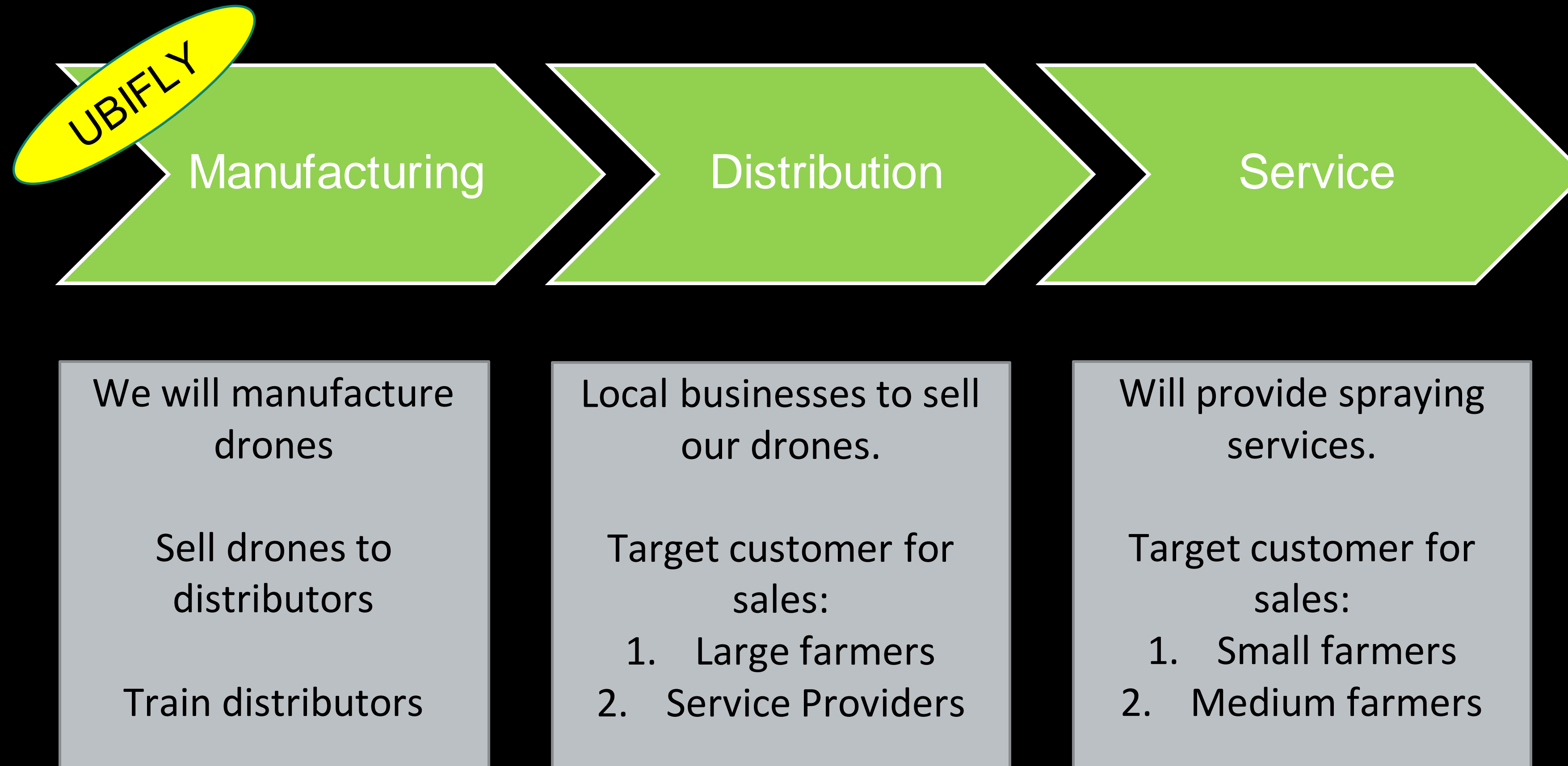
- Proprietary spraying unit mechanism to minimize these effects
- Ideal droplet size achieved through novel spray configuration
- Completely autonomous - 360 degree obstacle avoidance system
- Very low volume spraying – 5L pesticide per acre



# FUNCTIONAL PROTOTYPE



# BUSINESS STRATEGY

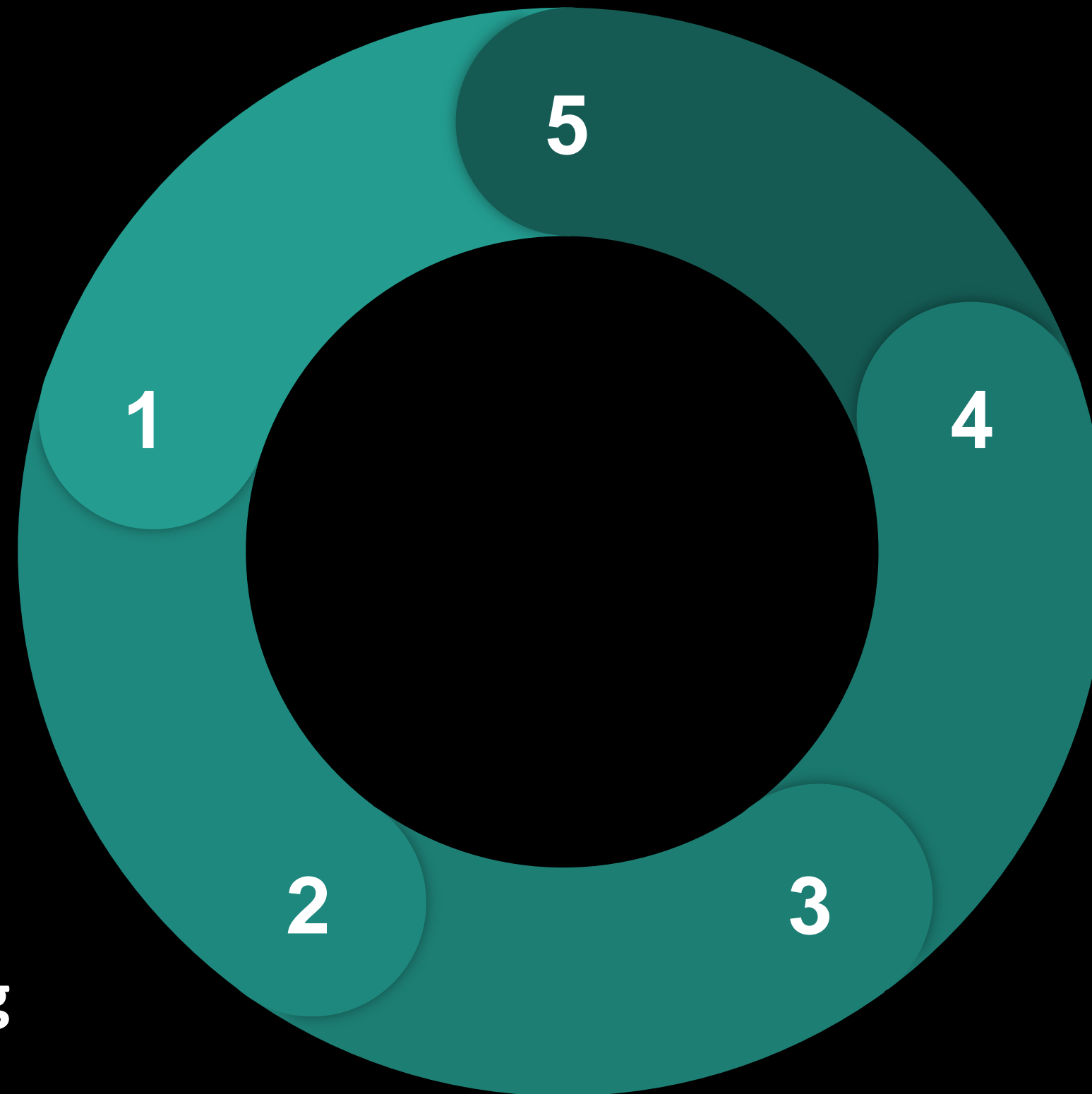


# HOW IT WORKS

## SERVICE OPERATIONS

**Technical Training**  
Setting up local service centers by providing drones and technical training needed

**Central Ground Station**  
Taking spraying requests from farmers and planning operations accordingly



**Farmer Friendly Reports**  
Software app to report savings and spray data

**Autonomous Smart Spraying**  
Aerial spraying with completely autonomous functionalities

**Path Planning**  
Pilot will set up a predefined flight path for the drone



# CUSTOMER ENGAGEMENT



**Trial in Tea Plantation**

Pilots planned with:

Rice cultivators

Corn plantations

Tea plantations

Cotton cultivators

Participated in  
International Textile Machinery Exhibition (ITME),  
Ethiopia, Feb 2020



# THE TEAM

**Prof. S. R. Chakravarthy:** Aerospace Dept. & NCCRD, IIT Madras

**Pranjal Mehta:** B.Tech (2019), IIT Madras

**Biswajit Behera:** B.Tech (2016), IIT (BHU), Varanasi

**Ramakrishna NG:** Engineer turned agri-entrepreneur, Bangalore

**Vishnu M:** E&C engineer (2015), Anna University, Chennai

**Niranjan:** Mechanical engineer (2014), Tamil Nadu

**Sambhav Jain:** 2<sup>nd</sup> year UG, Mechanical engineering, IIT Madras

**Currently seeking funds for commercialization**

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# WHAT OUR STAKEHOLDERS SAY

“No way for us to check plant health and take necessary action. We spray more than required as a result of manual inefficiencies.”

– Aniyam Thomas  
Farmer, Kerala

“Spraying is very time consuming. It takes us 6 hours to spray my 2 acre land.

– Bharat Patil,  
Farmer, Alwar, Rajasthan

“Over-spraying of pesticides is a pressing real world issue. New and innovative technology offers a promising way to tackle this problem.”

– Sandhya Seetharaman,  
RuTAG, IIT Madras

“Identification of diseases in certain areas of the field is impossible for our labourers. We have no option but to spray the entire field with pesticides every single time. Farmers in Punjab will be very happy to welcome new technologies in our farms and believe they can work miracles for us.”

– Sandeep Verma,  
Farmer, Punjab

“Regions around Chennai are currently facing a situation where the agriculture labour force is starting to decrease. There is a severe lack of cheap labour, and the cost of spraying is going north of Rs. 400 per acre. Lack of labour also implies delays in spraying, which has resulted in large crop losses over the past few years. Spraying of fertilizers through drones can prove to be highly promising.”

– Mr. Karthik,  
MCRC, Chennai

“Regular surveying is an absolute necessity in a situation where over 30% of crops are lost every year. “

– Siddharth Dialani,  
Founder, LeanAgri Solutions, Pune