

THE IMPLEMENTATION OF DRONES IN THE FARMING INDUSTRY

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1 INTRODUCTION

This proposal will handle on how DJI Tello Drones can improve on our current farming system. Drones have become more and more popular with farmers, and for good reason. Drones can provide aerial footage of anything from almost anywhere. This allows farmers to get an eye in the sky almost anywhere on their farm, no matter how tough the terrain. This can be especially beneficial when it comes to finding livestock, and even spotting dead spots in crops where a normal on the ground eye's view wouldn't have seen a thing.

2 BACKGROUND

Today's farming operations are vastly different from those of merely a few decades ago. Growers can now optimize every aspect of their operations, from field spraying to grow cycles and crop health, thanks to new technologies.

Drones and other unmanned aerial vehicles have played a significant role in this transition (UAV). Farmers may acquire in-depth data analysis and mission planning as well as new technologies capable of managing physical tasks with an agriculture drone.

Drone technology can help you beat your harvest targets and generate more crops with fewer resources, whether you're an independent farmer or the CEO of a larger enterprise. Effective crop spraying and field mapping are two of the keyways that the correct UAV and payload may aid. Any grower faces a constant difficulty in effectively applying the above. You may incur more fees and possibly lower the quality of your crop if you spray too much concentrated in one location. However, if the concentration is too low, your crops may get overrun with weeds, starved, or devoured by insects and other predators, thus lowering yields.

However, the correct farming drones and spraying payloads can uniformly and efficiently spread pesticides.

The end result? Improved crop quality and yield rate without the need for heavy physical work. Drones from DJI may be utilized on almost every crop, including rice, wheat, corn, citrus trees, cotton, and many more.

3 AIM

- By using drones to prevent hunger in certain areas by making sure crops are healthy from an aerial view.
- Defining exactly how beneficial these drones can be to farmers.
- Explaining how these drones can be used to further security.
- To be able to find lost livestock and in use with livestock counting even at night with use of thermal imaging.
- Determining how easy it is to set up and fly one of these drones.
- Showing farmers that they can save entire crops from dying due to the ability to see unfertile streaks in the soil where crops are struggling to grow.
- Improving farms in even rural areas.

4 OBJECTIVES

Drones, or unmanned aerial vehicles are flown over farmlands and pastures by licensed drone pilots. By using sensory imaging technology and thermal cameras, data can be collected about anything, from livestock location to crop health and topography.

This data is interpreted to produce insights and deliver recommendations to farmers, helping them to track and herd livestock, plan, and map out harvests or identify threats to crop health. The idea is to conserve resources, cut costs and increase yields by delivering targeted interventions — instead of irrigating or spraying pesticides on an entire field of crops, each crop is treated independently, in line with its individual needs.

5 RESEARCH QUESTION

5.1 Main Question

How can we make the usage of drones more accessible for people in rural areas?

5.2 Sub Question

- How can we ensure drone usage at night?
- How does using drones improve crop yield?
- How does using drones improve livestock yield?
- How can we ensure the safety of the livestock by using drones?
- What hardware and software will we require?
- How can we improve on said software and hardware to make it more accessible for rural areas?
- How will drones help in safety management around farms and livestock

6 Software and Hardware:

We will use 3D mapping technology to map the land and provide farmers a better visualization of their land, our prototype will assist farmers with crop care. Infrared and 3D mapping cameras will be used to accomplish our goal (Writer, 2021). The propellers will allow the drones to collect data from an airborne location, giving these farmers a significant advantage. Farmers will be able to research and analyze soil conditions to maintain nutritional levels and ensure that their crops have no dead zones. We'll use GPS technology to pin areas so that we can readily find what was discovered through the drone's footage, and if something goes wrong, we'll be able to find it again.

Because it will be flying through densely forested territory, the drone will be equipped with a protective cover to keep it safe from branches. When the drone is caught outside in damp weather, the cover should have waterproof qualities to protect it. We will also use unique thermal imaging cameras to manage cattle, which will help with the monitoring and managing the conditions of livestock.

6.1 Hardware

- Frame
- Motors
- ESC (Electronic Speed Control)
- Propellers
- Power distribution board
- Connectors
- Flight controller
- Batteries
- Battery monitor
- RC controller
- RC receiver
- Mounting pad
- Gimbal
- Camera

There are multiple kits that we can investigate, they will be approximately R9000 per set.

6.2 Software

- GPS mapping technology
- 3D mapping technology
- Infrared
- Databases

7 BUDGET

Budget				
	Hardware	Price	Software	Price
	Frame	R1,500.00	GPS mapping technology	R3,800.00
	Motors	R850.00	3D mapping technology	R4,500.00
	ESC (Electronic Speed Control)	R950.00	Infrared	R2,700.00
	Low Noise Propellers	R280.00	Databases	R3,000.00
	Power distribution board	R300.00		
	Connectors	R380.00	Total Software :	R14,000.00
	Flight controller	R1,200.00		
	Batteries	R300.00		
	Battery monitor	R450.00		
	RC controller	R300.00		
	RC receiver	R750.00		
	Mounting pad	R220.00		
	Gimbal	R1,000.00		
	Thermal Camera	R2,500.00		
	Total Hardware :	R10,980.00		
	Total Amount Budget :	R24,980.00		

<https://www.airbornedrones.co/farming-and-agriculture/>

<https://www.rocketmine.com/how-drone-tech-is-changing-the-future-livestock-farming/#:~:text=By%20using%20lightweight%20thermal%20cameras,and%20the%20risk%20of%20transmission.>

<https://www.precisionhawk.com/agriculture/crops>