

Payton Hess

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Professor Stephens

### Drones in Agriculture

I have done a few research projects/ papers on the impact and place drones have in agriculture since I was a junior in high school. I have had an interest in unmanned aircraft for quite a while now. I would say middle school is when I first started my “passion” as one might call it.

Drones have been on the rise in a lot of areas of study and work. Some examples are firefighting, military, filming, delivery, and agriculture which will be discussed in depth throughout this paper. Some ways that drones helped in the previously stated occupations:

**Firefighting:** They could scope out the scene and get places humans could not to either drop water or anything to hopefully kill the fire, as well as discover possible victims that are trapped in the building or wherever there was a fire.

**Military:** Drones were a safe way to drop bombs or again, scan the area for enemies. The best part of it all was that it guaranteed human safety because there were no humans onboard the aircraft.

**Delivery:** As many people have been aware of companies such as Amazon have been using drones to deliver packages to your doorstep and/or designated locations.

Filming: Drones are used in many different ways regarding the camera it has. Drone footage can provide a next to none angle on whatever is going on through the lens. I have seen people film demolition derbies, football games, and hunting with drones and it provides very cool angles on the action.

Now moving into what drones do for agriculture. One of the most widely known uses for drones in agriculture is spraying. Drones are quite obviously flying objects which is a huge benefit when fields are too wet to drive in with a sprayer or whatever the farmer uses to treat his crops. Another big use that I have noticed through past research on this topic is how much farmers use drones to check their livestock. It is so much easier for the farmer to quickly fly over his/her pasture than it is to drive out and do a headcount from a four-wheeler or an ATV. Besides, we all know how busy farmers are these days. Using a drone is way less time-consuming than personally transporting his/herself out to wherever their livestock is grazing at the time.

Now using drones seems all simple and great but one of the big problems with drones is how they handle the weather. Drones can be very small or very large but one thing they have in common is their dislike of harsh weather. I have had a few drones in my lifetime, and they do not like the wind at all. My most recent drone can adjust to the wind if it is a tolerable amount but being from southwest Minnesota as some will come to find out, it is very windy and is just too much for my drone to handle. Drone owners also need to be careful responsible users. If one isn't careful somebody could get seriously hurt and especially the drone. If caution is neglected while using the unmanned aircraft and the user clips a tree the chances the drone comes out undamaged are very low.

Anyone who plans to use drones even for personal use needs to get a certified unmanned aircraft license. I have not done mine yet, but I plan to in the future which brings me to my next point.

Once I get my certification to fly unmanned aircraft, I plan to help my father in his occupation which is crop insurance. The ways I will be able to assist him will be the same situation as before. I will be able to get a close look at crops without having to drive out in the field which will eliminate the killing of time. This will also make it easier to get more jobs done and stay on schedule. Another situation it will help with is if it is not possible to drive in the fields due to drowned out areas.

Another personal use farmers use drones for is to examine and inspect their buildings/ implements. In the cold winter months, it is dangerous to climb cold bins or implements. A drone can easily fly and get a close look at any issue without the person risking their safety. The next item on the agenda is that if drones are so great and make everything simpler why aren't they more popular?

Anyone can get a drone for a cheap price but as well as anything else, we all know cheap doesn't mean better. To get a good drone with higher quality technological advances a person is going to need to spend a little bit of cash. In the long run, it will be worth it to spend a little more on a better piece of equipment. With that being said, drones are not something that everyone can just afford to just throw down the money for. The version of the drone and the equipment that I have with it has run me close to \$3200. That being said it is a good drone to use but there are way more expensive options than the current one that I use.

I believe that when more people know more about unmanned aircraft and new generations of agriculturists make their way into the system, drones will be the largest part of agriculture. With that being said as long as there is a demand for drones, companies such as Phantom and DJI will start advancing the technology and abilities that these aircraft already obtain. A few advances and improvements that I can see coming is drones becoming stronger and remaining an easily mobile size. At this point, drones can be the same size as a truck bed which is more than a one-man job to try and move.