

## T.18 SPRAYING

### What is this?

Spraying is the process that farmers use to protect their crops from insects or fungal infections by spraying pesticides and growing the produce with the help of fertilisers.

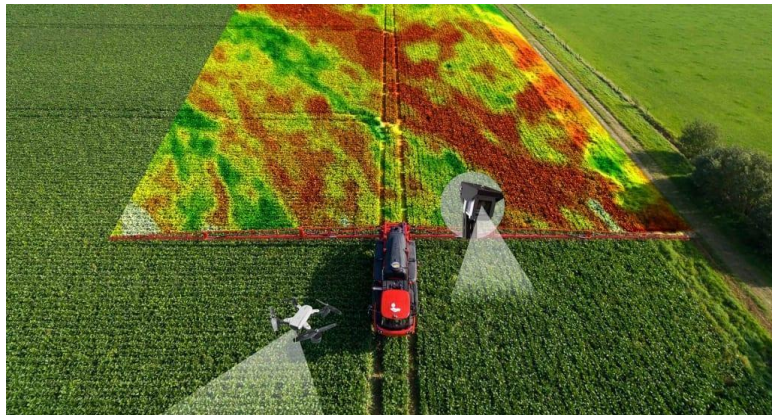
### Some additional information...

Crop spraying is the process of spraying insecticides, pesticides, fungicides, and other preventative treatments onto crops. Previously known in agricultural services as '*crop dusting*,' the process covers large areas of crops and protects them from local bugs and pests.

Traditionally, the process had been applied using planes that would spread the pesticide over the crops from a height. Modern methods now include using quad bikes, boom sprayers, and even drones to more accurately disperse the treatment without affecting surrounding homes and wildlife.

Crop spraying is used to deter pests causing damage to crops. A pest is a biological organism that will interfere with the production of crops, ultimately affecting the quantity or quality of the yield. If left untreated, pests can interfere significantly with the production of crops, resulting in irreversible effects on crops and ultimately resulting in higher costs for the consumer.

Crop spraying is used as part of an agricultural service offering to protect crops from local pests and bugs, which are likely to destroy, eat and infest crops if left untreated. Crop spraying can provide accurate pesticide or fertiliser application and is a highly economical option to prevent product loss.



Source: <https://www.agrifac.com/sustainable-farming/spot-spraying/>

The farm's location will affect the types of agricultural services required, including the types of crop protection products needed. Farmers must be able to understand how and why individual pesticides work and which crop spraying chemical is most appropriate to determine the types of products required maintaining levels of pests and disease.



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Precision spraying can include anything from a sprayer equipped with *GPS*, Automatic Steering, and Automatic Boom Shut-off Control to simply a sprayer equipped with an automatic rate controller.

#### *Automatic Rate Controllers*

With the use of an automatic rate controller, farmers could select a target rate and enter it into their controller. Then with the help of the controller, a flow metre, a control valve, and a speed sensor, this automatic rate controller could control application rates for farmers so that they could stay on target. The controller takes constant readings from their flow metre and speed sensor to determine how far to open the farmer's control valve. By doing this, it is controlling how much product to send out to your spray tips and how fast it gets there.

#### *Automatic Boom Height Levelling*

Boom levelling systems were quickly introduced to not only cut down on pricey repairs if one's boom height was overlooked and struck the field but also to cut down on operator fatigue. The auto height levelling does not need *GPS* technology to operate but is still an intricate piece of technology. There are two basic styles of auto-height levelling available today, one that uses ultrasonic sensors and one that utilises a gauge wheel to detect ground height. Both systems tie into the existing hydraulic system of the boom controls.

#### *Global Positioning Systems (GPS)*

Farmers not only had the auto rate controller controlling their application rates, but also the *GPS* guidance system would "paint the screen" to show them exactly where they had already applied in that field. Farmers also now had the capability to see if they had over or under-applied any certain areas or had any "skips" in their application so that they could easily go back and "touch up" those areas. With this, farmers were quickly introduced to data logging and were able to easily keep track of their chemicals and application rates for specific jobs in the field.

#### *Automatic Steering Control*

With the addition of autosteer, a farmer was able to set up guidance paths in the field that would be able to be followed quite accurately. An autosteer system would have to be used in conjunction with a *GPS* controller. This allowed the farmer to come into a field and set a heading line for the autosteer to follow. Some autosteer systems tie into the machines' steering hydraulics and allow the system to take control of the steering system to keep it online – while others are available that attach to the actual steering wheel and use servo motors to steer the machine. This technology allows a farmer to focus more on other monitors located in the cab instead of keeping his sprayer in the row. This feature also reduced farmer fatigue at the end of the day.



### *Automatic Boom Section Shut-off*

The automatic boom shut-off capability came about and made significant improvements in the application world. It allowed the operator greater control of their application out in the field. It didn't take long before the savings began to ring true for many of the users of this product. With the use of *GPS* tracking, a farmer was able to travel through the field at higher speeds as well as be less tired at the end of the day. The automatic boom shut-off was designed to work with the *GPS* guidance so that if a farmer came to an area where the "painting on the screen" had shown that the farmer had already applied that area, the automatic boom shut-off would automatically shut off his boom sections.

### *Different types of GPS signal*

The quality of the *GPS* signal is crucial for the possibility and effectiveness of applying new technologies. Wide Area Augmentation System or WAAS Signal has been adopted by the agricultural world as a free *GPS* signal solution. The problem with using the WAAS signal is discrepancies in the signal quality. WAAS generally runs a 15-minute 7-11 inch pass-to-pass accuracy. Although this may seem like a very accurate signal when farmers are talking about spraying fields that are hundreds of acres, on the grand scale of things, it could be better. Many newly available forms of *GPS* that are much more accurate than WAAS have begun to take hold in agriculture. Some examples are Omnistar, a subscription-based corrected differential that uses satellite broadcast techniques for sub-meter accuracy, and the Real Time Kinematics (RTK) solution which is also a subscription-based signal. The RTK is a repeatable sub-inch accuracy signal that can be provided in 2 different methods: through radio frequency or cellular data. Some technologies are also adaptable to run off of the existing Constant Operating Reference Station (CORS). The CORS networks function similarly, providing sub-inch accuracy via wireless communication.

### *Advantages of Spraying*

- ✓ More effectiveness;
- ✓ Less labour;
- ✓ More work in less time;
- ✓ Different variations in spraying to protect crops;
- ✓ Safe to use;
- ✓ Can cover a large area in less time;
- ✓ Farmers can use it under any farming type;



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- ✓ Cultivation and tillage are activities aimed at changing and improving the condition of the soil. Initially, tillage is associated with creating better conditions for crop establishment. However, this is far from exhausting the functions of the process. By tilling the soil, it is possible to achieve a change in the structure (by applying fertilisers, liming, and other necessary operations), control plant residues and the degree of weediness, and minimise some climatic and soil limitations. Each of these activities is subject to realisation through different operations, and their combination and synchronisation are called a tillage system;
- ✓ Comes under every field for maintenance.

#### *Disadvantages of Spraying*

- Pieces of machinery will be costly;
- The environment might get affected due to the heavy use of spraying, despite the use of precision technologies;
- Farmers will need proper maintenance for sprayers regularly.

#### **Links**

<https://agriculture.vic.gov.au/farm-management/chemicals/spraying-agricultural-chemicals/planning-an-agricultural-spraying-program>

<https://mitraweb.in/blogs/a-brief-guide-on-spraying-technology-in-agriculture/>

<https://awsmfarming.co.uk/services/farming/spraying-spreading-injecting/crop-spraying/>

<https://www.kisankraft.com/different-types-of-sprayer-and-its-uses/>

<https://www.britannica.com/science/spraying-and-dusting>

<https://encyclopedia.pub/entry/9481>

<https://www.spraysmarter.com/content/how-precision-agriculture-changed-the-field-we-spray-in>

#### **Video**

<https://www.youtube.com/watch?v=l9t2aP-LyIU>

<https://www.youtube.com/watch?v=x8v4VYPI2fo>

<https://www.youtube.com/watch?v=Dn7Q4oIrP3I>

<https://www.youtube.com/watch?v=aUtDPRQ13B4>



## **Keywords**

*Crop dusting*

*Automatic Rate Controllers*

*Automatic Boom Height Levelling*

*Global Positioning Systems (GPS)*

*Automatic Steering Control*

*Automatic Boom Section Shut-off*

*Advantages*

*Disadvantages*