# Guidelines for Unmanned Aircraft System (UAS)/Drone-Assisted Agricultural Input Application

## Department of Agriculture

## (Version 2; 28th July 2025)

### (1) Pre-requisites

- The UAS/ drone operators should carefully read, understand and follow the latest guidelines/regulations issued by the Civil Aviation Authority of Sri Lanka (CAASL) on the use of UAS/Drones (https://www.caa.lk/en/drones).
- An extract of the general UAS/drone guidelines released by the CAASL is given in Annex I.

### (2) Special Considerations

- The UAS/Drone Operators should ensure that appropriate personal protection equipment (PPEs) are used and take all possible measures to protect the non-targets (places/materials/properties) from pesticide contaminations during UAS/drone-spraying. For example, the drone operator, other human beings and domesticated animals should be kept at least 30 m away on the horizontal axis from the position of the UAS/drone during its operation.
- The UAS/Drone Operators shall follow and comply with the guidelines and regulations imposed by the Office of the Registrar of Pesticides in terms of pesticide spraying, and any other government authorities on different users of the UAS/drones.
- The UAS/drone operations by a service provider shall only be done with voluntary consent of the farmer/farmer organization.
- Spot application or localized application of pesticides is recommended whenever possible rather than blanket application.
- Aerial spraying is should be carried out when the surface wind speed is less than 3 m/sec (11km/h).
- Spraying height should be maintained as per the crop stage and above the crop canopy, which is a safe speed for aircraft handling and safety. Avoid any abrupt changes to the speed, and altitude of the UAV/drone during spraying.
- The general guidelines of the spraying height released by the DOA are given in Annex II.

### (3) Flying conditions

- Consider the changes in weather and temperature - Do not use UAS/Drones for spray operations during heavy rainfall and windy days.
- Identify the areas to be treated, the recommended products to be used, rates, etc.
- Prepare the maps of the surroundings, including the no spray zone for sensitive areas/ Environmentally-sensitive areas, housing & gardens, schools, common areas, medical facilities, public roads & amenities, presence of livestock, water bodies, wetlands, etc.

- Prepare maps (demarcate spraying area – minimum 1/2 Ac) and adjacent no spray zone including sensitive areas (i.e. Environmentally-sensitive areas, housing & gardens, schools, common areas, medical facilities, public roads & amenities, presence of livestock, water bodies, wetlands, etc.).
- Be aware of the presence of beehives and adjacent crops in bloom with bee activity.
- Record any nearby production sites where chemical use us restricted or prohibited (at least 30 m away from organic/ GAP fields).

**(4) Registration and Qualifications of the UAS/Drone Operators**

- UAS/Drone operators/entities should be licensed under the rules and regulations enacted under the No 33 of 1980 Control of Pesticides Act (Section 26) for commercial use of drones for pesticide application.
- Operators must have at least NVQ Level 4 certificate in drone operation.

**(5) Comprehend and Comply with the Applicable Regulations**

The operators and users should comprehend and comply with all the regulations imposed by the Civil Aviation Authority of Sri Lanka (CAASL) applicable to the use of drones to spray crops.

**(a) Documentation**

- Maintain up-to-date documents, which should be easily accessible to any authority for inspection.
- The required documents (including the following, but not limited to the list)
    - ✓ UAS/Drone registration or license (Operation license for the UAS/Drone);
    - ✓ Registered pesticide recommended by the Department of Agriculture to spray on the relevant agricultural land;
    - ✓ Registration of the operator/entity at the Registrar of Pesticides to do aerial spraying activities on a commercial basis;
    - ✓ Training/qualifications of the UAS/Drone Operators ; and
    - ✓ Names of UAS/Drone Operators.
- All records of the spraying process including sprayer calibration.
- Stored flight plans with any clearances as and when required.
- Any waivers that has been granted by the authorities.

**(b) UAS/Drone flight**

- Conduct the pre-flight checklist.
- Check sprayer for leaks and damage.
- Check the drone controller (remote controller) to ensure safe operations.
- Ensure availability of adequate numbers of charged batteries/power options, and battery charging equipment.
- Maintain automation.

**(c) UAS/Drone Software**

- Follow manufacturer's instructions and ensure the drone operation is supported by most recent UAS upgrade of the software (firmware).
- Calibrate the drone before operation for connectivity, navigation, and behavior.
- Check pre-flight settings e.g. GPS, satellite locks, flight controls, etc.
- Always upgrade the older models of the drone using the Real Time Kinematics (RTK) capabilities as this makes a considerable improvement to the quality of the work and precision that they produce.

**(d) Spray equipment - Before Spraying**

- Flush the sprayer to check for leaks or damages, faulty connections, hoses, etc.
- Follow manufacturer's manual for any other cleaning process of the spray tank prior to spraying.

**(e) Calibrate sprayer - essentially before the first use, and periodically during the season**

- The UAS/drone that are fitted with an automatic internal-pump calibration system are preferred for agricultural operations.
- After checking the sprayer as in part 4(d) above, follow the manufacturer's instruction to conduct sprayer calibration.
- Use the correct nozzle type/droplet size recommended by the Department of Agriculture or the Drone Manufacturer for application of specific products (e.g. Insecticides, Herbicides, Fungicides, etc.), while ensuring that they are not damaged or worn.
- Any irregularities should be corrected based on manufacturer's recommendations.

**(f) Pesticide Formulations**

- Follow the guidelines given by manufacturer of the pesticide formulations for their compatibility with UAS /drone applications.
- Do not use Dust/Powder or Smoke-generating formulations for drone-spraying. Use a spreader tank for spray granules.

**(g) Spraying for Target Crops and Pests (Insect Pests, Pathogens/Diseases, Weeds)**

- The farmer should obtain confirmation of the necessity of aerial spray with the help of the Agriculture Instructor (Al).
- Follow the guidelines below once the decision is made to have an aerial spray.

  i. Identify and confirm that the crop is at the correct growth stage and canopy height (e.g. extreme precautions should be taken when flying drones at a lower height during the reproductive and maturity stages of the crop to avoid damage to the final yield).

  ii. Identify the location of insect pests, diseases and weeds that requires treatment.

iii. Clearly know the recommendation of the use of the pesticides provided by the respective government Department/Institute on the use of the chemical for the intended use.

iv. The rate of pesticides should be as recommended to control the target pest, disease or weed. Under no circumstances, the rate of application of the pesticide should be increased subjecting the overall environment at risk.

Avoid swarm spraying/spreading (do not use more than one drone at a time in the vicinity).

v. Maintain recommended height from the crop canopy, and follow the recommendation of UAS/drone manufacturer for the speed of the drone movement along the horizontal axis (Annex II).

vi. In case of UAS/drones fitted with hydraulic nozzles, spray at 1.5-3 bar pressure.

**(h) Spray Equipment-After Spraying, and Disposal of Empty Pesticide Containers**

- Follow the instruction given by the Registrar of Pesticides on disposal of the remaining pesticides and empty pesticide containers, and cleaning the spray equipment.

**(i) Documentation after completion of the Spray Operations using UAS/Drones**

- Complete the reports before leaving the spray site, of what was done (products and amounts used, crops, targets, location), the equipment used, the personnel involved and the time and date of spray.
- Maintain the flight log with appropriate land data.

**(j) Reporting of Accidents**

- The UAS/Drone Operator or the owner shall report within 2 hrs, any occurrence of an accident or incident involving destruction of private or public property and any injury caused to the third party by any operation of pilotless aircraft to the nearest police station of the location of occurrence as per section 27 of the CAASL Implementing Standards (Document No. SLCAIS 053: Requirements for Operation of Pilotless Aircraft; CA- IS-2017-GEN-001).
- The UAS/Drone Operator or the owner shall report within 6 hrs, of any accidents related to pesticide spill as per label guidelines of the pesticide used.

**Please note that the above guidelines are subject to change periodically based on the scientifically-valid information gathered by the Department of Agriculture of Sri Lanka, with a view to improve the efficacy and safety in the use of UAS/Drones for Agricultural Operations and the legal provisions under the Control of Pesticides Act No. 33 of 1980 as amended by the acts of No. 06 of 1994 and No. 31 of 2011.**

**Annex I**
**General UAS/Drone Guidelines**
**(Civil Aviation Authority of Sri Lanka, 9 September 2021)**

1. UAS/Drones in Class A (weighing 25 kg or above), Class B (weighing more than 1 kg but below 25 kg) and Class C (weighing more than 200 g but at or below 1 kg) requires registration at CAASL.

2. The UAS/drone can be registered by sending completed CAA/AU/015 form to drone@caa.lk.

3. UAS/Drones which are not fitted with any data capturing device and weighs less than 200 g are not required to register with CAASL.

4. A UAS/drone can be used without approval, only when the drone;

- weighs below 200 g;
- Is not fitted with any data capturing device (e.g: camera);
- operates in own premises or with consent of the property owner; and
- operates below 150 ft. above ground level.

5. In all other situations, CAASL approval should be obtained, irrespective of the purpose:

- If the operator fails to obtain written approval to fly a drone (regardless of mass category) when equipped with data capturing sensors (i.e., Camera) that could pose a safety or security threat, then the operator shall obtain prior authorization from the area's local police.

- Prior authorization from the local police is not required if the operator obtains written approval from the airpo II in that region or if the aircraft is operated under the supervision of a CAASL-authorized person.

6. The CAASL will issue the flying approval, including for flying inside building. Airspace approval should be obtained from CAASL to legally-fly the drone.

7. As per the agreed procedure by defense authorities, security clearance is a pre-requisite.
For more information please contact Office of Chief of Defense Staff (OCDS). (Contact details of OCDS: Tel: +94 11 2674503; +94 11 2674506 E-mail: ocds.drone@gmail.com).

8. Need to apply for fresh approval for the new location.

9. Maximum height of flying is up to 150 ft above ground level.

10. Special permission is required to fly above 150 ft from ground level with special conditions, based on the purpose of drone operation.

11. A third party liability insurance is required for the drone to operate.

12. The UAS/drone can be flown at any time with an approval. An operator should mention the time duration when applying for approval.

13. A UAS/drone can be flown closer to an airport with a consent letter/ correspondence from the accountable manager of the airport. An operator needs to apply to CAASL to obtain airspace approval.

14. Operations from elevated ground, building or an object are not allowed during a normal operation. However, this can be done with a special permission with special conditions.

15. Operation from moving vehicle, platforms are not allowed during normal operation. However this can be done with a special permission with special conditions.

Note: Please follow CAASL Website for the most recent amendments to the above regulations.

**Annex II**
**General Guidelines for UAS/Drone Optimization and Pesticides Spraying in Rice and Maize**
**Department of Agriculture**
**28 July 2025**

## 1. UAS/Drone Optimization for Pesticide Spraying in Rice

- Operate the drone (UAS) in automated route mode.
- Do not use fungicides for drone-based spraying in rice fields.
- Avoid spraying pesticides during the flowering stage.
- Flying speed :
  Maintain a moderate flying speed of 11–18 km/hr. Excessive speed may cause missed areas, while very slow speed waste time and increases the risk of over-application.
- Flow rate:
  Keep a steady flow rate of 2–3 l/min to ensure adequate coverage and minimize runoff.
- Route spacing:
  Set route spacing at 3 m between parallel flight routes to ensure slight overlap in spray coverage, preventing missed strips while avoiding excessive overlap that could lead to over-application.
- Maintain a minimum distance of 1 m from bunds and field borders during spraying to prevent pesticides drift into neighboring fields.
- Flying height:
  Adjust the flying height according to the crop growth stage, fly relatively low to reduce drift and improve canopy penetration and uniformity.
- Use clean and clear water for mixing pesticides to prevent nozzle blockage and improve effectiveness.
- Keep the spraying area at least 30 m away from humans, animals, GAP-certified fields, and organic fields and 100 m away from water bodies.
- Apply in “route and boundary” flying mode.
- Set a 1 m buffer when necessary to avoid spray drifted to adjacent fields.
- Spray only when there are no active pollinators (eg: honey bee colonies) in adjacent crops.

### 1.1. UAS/Drone Optimization for Insecticide Spraying in Rice

Avoid spraying of pesticides during the peak anthesis time when the spikelets are open for about 7-10 days.

**Crop- early canopy stage**

| | | |
|---|---|---|
| Flying altitude/ height | : | 1.5 m (seedling stage), 2.5 m (vegetative stage) |
| Flying speed | : | 11- 18 km/hr (3-5 m/s) |
| Nozzle size/ droplet | : | 150-200 μm |
| Spray volume | : | 20 l/ha |

| | | |
|---|---|---|
| Flow rate | : | 2-3 l/min |
| Wind speed | : | < 3 m/s (11 km/h) |

**Crop- full canopy stage**

| | | |
|---|---|---|
| Flying altitude/ height for low height varieties: | | 2.5 - 3 m |
| Flying altitude/ height for traditional varieties and varieties prone to lodging | : | 3 – 3.5 m |
| Flying speed | : | 11- 18 km/hr (3-5 m/s) |
| Nozzle size/ droplet | : | 150-200 µm |
| Spray volume | : | 20 l/ha |
| Flow rate | : | 2-3 l/min |
| Wind speed | : | < 3 m/s (11 km/h) |

### 1.2. UAS/Drone Optimization for Herbicide Spraying in Rice

| | | |
|---|---|---|
| Altitude/ Height for Pre-emergent herbicides: | | 1.5 m |
| Altitude/ Height for Post-emergent herbicides: | | 2.5- 3.0 m |
| Maximum droplet size | : | 400-500 µm |
| Wind speed | : | <3 m/sec (11 km/h) |

## 2. UAS/Drone Optimization for Pesticide Spraying in Maize

- Maintain the UAS/ drone in automated route mode.
- Avoid spraying pesticides during the flowering stage.
- Keep the spraying area at least 30 m away from humans, animals, GAP-certified fields, and organic fields and 100 m away from water bodies.
- Spray only when there are no active pollinators (eg: honey bee colonies) in adjacent crops.
- Spray only when the wind speed is below 3 m/s (11 km/h).

### 2.1. UAS/Drone Optimization for Insecticide Spraying in Maize

**Crop- small canopy stage (3-5 weeks)**

| | | |
|---|---|---|
| Flying height | : | 2.5 m |
| Flying speed | : | 2.5 m/ sec |
| Nozzle size/ droplet | : | 140 µm |
| Volume | : | 20 l/ ha |

**Crop-medium canopy stage (6-9 weeks)**

| | | |
|---|---|---|
| Flying height | : | 2.5-3 m |
| Flying speed | : | 2.5-3 m/ sec |
| Nozzle size/ droplet | : | 140 -220 µm |
| Volume | : | 40 l/ha |

**Crop-later canopy stage (10-12 weeks)**

| | | |
|---|---|---|
| Flying height | : | 2.5-3 m |

| | | |
|---|---|---|
| Flying speed | : | 2.5-3 m/ sec |
| Nozzle size/ droplet | : | 140 -220 µm |
| Volume | : | 40 l/ha |

### 2.2. UAS/Drone Optimization for Herbicide Spraying in Maize

**Crop-low canopy stage (first 2 weeks) – for post-emergent herbicides**

| | | |
|---|---|---|
| Flying height | : | 2.5 m |
| Flying speed | : | 2.5 m/ sec |
| Volume | : | 20 l or 30 l / ha |
| Droplet size | : | 320-500 µm |

### 3. UAS/Drone Optimization for Seed Paddy Application

- Maintain the drone (UAS) in automated route mode.
- Keep the broadcasting area at least 30 m away from humans, animals, GAP-certified fields, and organic fields.
- Apply in route and boundary flying mode.
- Set a 1 m buffer when necessary to avoid seeds drifted to adjacent fields.
- Broadcast seeds only when the wind speed is below 3 m/s (11 km/h)

- Germinated seed amount minimum : 11 kg
- Hopper opening : 47%
- Flying speed : 16 km/hr
- Flying height : 2-2.5 m
- Estimated seed rate : 100 kg/ha