NSQF QUALIFICATION FILE
Approved in 17th NSQC Meeting-NCVET Dated- 31/03/2022
Approved on file dated 13.04.2023

Qualification Code
QG-04-AG-00515-2023-V1.1-ASCI

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

Name and address of submitting body:

Agriculture Skill Council of India (ASCI)
6th floor, GNG Building, Plot No – 10, Sector- 44, Gurugram,
Haryana – 122004

Name and contact details of individual dealing with the submission

Name: Ms Priyanka Prakash

Position in the organisation: Senior Manager – Standards & QA

Address, if different from above

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List of documents submitted in support of the Qualifications File

1. Qualifications Pack – Annexure 1
2. Model Curriculum – Annexure 2
3. Affiliation Protocol- Annexure 3
4. Industry Validations- Annexure 4

Model Curriculum to be added which will include the following:

- **Indicative list of tools/equipment to conduct the training**
- **Trainers qualification**
- **Lesson Plan**
- **Distribution of training duration into theory/practical/OJT component**

- **SUMMARY**

1	**Qualification Title**	Kisan Drone Operator
2	**Qualification Code, if any**	AGR/Q1006, v2.0
3	**NCO code and occupation**	NCO-2015/3142.9900
4	**Nature and purpose of the qualification (Please specify whether qualification is short term or long term)**	Nature of the qualification a Qualification Pack (QP) The main purpose of the qualification is - to train the incumbent for operating drone for agriculture and allied services and also for multispectral mapping.
5	**Body/bodies which will award the qualification**	Agriculture Skill Council of India (ASCI)
6	**Body which will accredit providers to offer courses leading to the qualification**	Agriculture Skill Council of India (ASCI)
7	**Whether accreditation/affiliation norms are already in place or not, if applicable (if yes, attach a copy)**	Yes (Annexure 3)
8	**Occupation(s) to which the qualification gives access**	Precision Farming
9	**Job description of the occupation**	A Kisan Drone Operator/pilot is responsible for operating and rendering the specific service using the drone and relevant technologies for agricultural and allied activities. The individuals operating the drone collect and analyse different types of data for enhancing productivity and profitability while ensuring sustainability and protection of the land resources and where applicable deploy the drone to

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		undertake specific activities like spray of Plant protection chemicals / fertilizer or obtain ground data for other related activities. The individual is also responsible for carrying out regular maintenance of drone and relevant equipment's.
10	**Licensing requirements**	As per DGCA/RPTO Guidelines
11	**Statutory and Regulatory requirement of the relevant sector (documentary evidence to be provided)**	NA
12	**Level of the qualification in the NSQF**	Level 4
13	**Anticipated volume of training/learning required to complete the qualification**	Total Duration: 390 Hours [Theory: 90, Practical: 120, Es: 60, OJT: 120]
14	**Indicative list of training tools required to deliver this qualification**	Attached herewith
15	**Entry requirements and/or recommendations and minimum age**	Minimum Educational Qualification: 12th grade pass OR Completed 2nd year of 3-year diploma (after 10th) and pursuing regular diploma OR 10th grade pass plus 2-year NTC OR 10th grade pass plus 1-year NTC plus 1 year NAC OR 8th pass plus 2-year NTC plus 1-Year NAC plus CITS OR 10th grade pass and pursuing continuous schooling OR 10th Grade Pass with 2-year relevant experience OR Previous relevant Qualification of

		NSQF Level 3.0 with minimum education as 8th Grade pass with 3-year relevant experience OR Previous relevant Qualification of NSQF Level 3.5 with 1.5- year relevant experience **Min Age**:18 Years
16	**Progression from the qualification (Please show Professional and academic progression)**	Custom Hiring Service Provider (NSQF Level-5)
17	**Arrangements for the Recognition of Prior learning**	RPL assessment will be as per normal ASCI assessment process.
	(RPL)	(ASCI recognize that there may be candidates who have prior learning experience in the Agriculture Sector and are desirous of being certified. Such candidates can apply to ASCI for testing and certification of their skills. Training Partners will be responsible for identifying and counselling candidates for RPL through mobilization camps and advertisements. The details of the RPL process have been defined by ASCI under the document- Guidelines for Recognition of Prior Learning under PMKVY).
18	**International comparability where known (research evidence to be provided)**	Not done as yet
19	**Date of planned review of the qualification.**	31-03-2025
20	**Formal structure of the qualification Mandatory components**	

Title of component and identification code/NOSs/Learning outcomes	**Estimated size (learning hours)**			**Level**
	Theory	**Practical**		

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(i)	AGR/N1037: Ensure adherence to the laws/procedures and principles of flight for drone operation	25	5		**4**
(ii)	AGR/N1038: Prepare for the operation of the drone	10	20		
(iii)	AGR/N1032: Undertake Drone Flying as per the requirement	10	20		
(iv)	AGR/N1030: Carry out drone based pesticide and crop nutrient application	15	45		
(v)	AGR/N1020: Ensure adherence of precautionary measures before, during and post- operation for drone based pesticide application	15	15		
(vi)	AGR/N1021: Use a drone to carry out multispectral mapping for various agriculture and allied activities	15	15		
(vii)	DGT/VSQ/N0102: Employability Skills (60 Hours) v1.0	60			4
	Sub-Total (A)	**150**	**120**		
	OJT (B)	**120 Hours**			
	TOTAL (A+B)	**390**			

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SECTION 1
ASSESSMENT

21	**Body/Bodies which will carry out assessment:** ASCI affiliated assessment bodies. 1. SHL India (Pvt.) Ltd 2. Trendsetters Skill Assessors Pvt Ltd 3. Mercer-Mettl 4. SP Institute of Workforce Development (SPIWD) 5. MSAG SI LLP More Assessment Agencies are being empanelled to cover wider geographical area
22	**How will RPL assessment be managed and who will carry it out?** RPL will be based on the same approved Qualification Pack and Assessment Criteria mentioned in the Qualification Pack and will be carried out as per normal ASCI assessment process. The Training Partner or any other authority as prescribed by the Steering Committee will identify and counsel candidates eligible for RPL through mobilization camps and advertisements. The mobilized candidates can be counselled, oriented about the standardized NSQF framework and basis their existing competency will be mapped against the suitable level of the concerned Job role for assessments. The candidates enrolled will be assessed by the Assessment Agency affiliated with the Sector Skill Council on the basis of assessment criteria decided by Sector Skill Council (SSC). The candidate will need to pass in the minimum assessment criteria of a particular QP decided by the SSC. Successfully assessed candidates with a valid Aadhaar or alternate ID (as per process) will be eligible for QP-NOS based Certification.

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23	**Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, reliable and fair and show that these are in line with the requirements of the NSQF.** A robust technology enabled assessment methodology has been designed keeping in mind the geographical/Physical constraints and target segment which assess a trainee's knowledge and skill set through three methods: a. An offline Tablet based test through the use of Multiple-Choice Text and Picture based questions in vernacular languages b. Actual demonstration on the field c. Viva **ASCI's assessment strategy:** ● Question sets are developed as per the weightage of each NOS of the Qualification Pack. ● Assessment criteria for each Qualification Pack developed, in which each Performance criteria (PC) assigned marks based on NOS ● Question Bank is developed to assess the theoretical and practical knowledge. To ensure the quality, each trainee get different set of question ● Empanelment of subject matter expert as assessor primarily from the Industry to assess trainee specifically on practical skills as per Industry demands Assessments are preferably conducted on tablets or pen or papers in regional languages according to the requirement.

Please attach most relevant and recent documents giving further information about assessment and/or RPL.
Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

ASSESSMENT EVIDENCE

Complete a grid for each component as listed in "Formal structure of the qualification" in the Summary.

NOTE: this grid can be replaced by any part of the qualification documentation which shows the same information – i.e. Learning Outcomes to be assessed, assessment criteria and the means of assessment.

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24. Assessment evidences

Title of Component:

Outcomes to be assessed/ NOSs to be assessed	Assessment criteria for the outcome
Means of assessment 1	
Pass/Fail	

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Job Role: Kisan Drone Operator

Qualification Pack: AGR/Q1006, v 2.0

Sector Skill Council: Agriculture Skill Council of India

Assessment Guidelines:

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criterion.
6. To pass the Qualification Pack, every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.
7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

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AGR/N1037: Ensure adherence to the laws/procedures and principles of flight for drone operation				
Assessment Criteria for Outcomes	**Theory Marks**	**Practical Marks**	**Project Marks**	**Viva Marks**
Dynamics and Principles of Drone Operation	**30**	**10**	**-**	**10**
PC1. comprehend various stakeholders & their laws (Basic) as per drone Rules 2021 and drone (Amendment) Rules, 2022 notified by Ministry of Civil Aviation	-	-	-	-
PC2. follow the basic principles of flight while operating a drone	-	-	-	-
PC3. follow the ATC procedures & Radiotelephony (non FRTOL) techniques	-	-	-	-
PC4. comprehend the Fixed-wing, Rotorcraft & Hybrid operations and Aerodynamics	-	-	-	-
PC5. assess the effects of weather and meteorology in drone operations	-	-	-	-
PC6. undertake necessary measures for hazardous weather avoidance	-	-	-	-
NOS Total	**30**	**10**	**-**	**10**
AGR/N1038: Prepare for the operation of the drone				
Carry out drone equipment maintenance and basic assembly	**5**	**10**	**-**	**5**
PC1. perform assembling & disassembling of drones	-	-	-	-
PC2. carryout Integration of sub-sections/ smodules	-	-	-	-
PC3. carryout Integration of engine/propulsion system	-	-	-	-
PC4. apply safety precautions while handling batteries	-	-	-	-

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PC5. maintain drone, flight control box, ground station	-	-	-	-
PC6. maintain ground equipment, batteries and payloads	-	-	-	-
PC7. check the drone sensors are working properly	-	-	-	-
PC8. keep track of the drone battery and other equipment for effective utilization of the drone	-	-	-	-
PC9. inspect the drone for any damages before and after the drone operation	-	-	-	-
PC10. detect faults and implement necessary measures for their rectification	-	-	-	-
PC11. carryout minor repair of the equipment and contact the manufacturer for major repair	-	-	-	-
PC12. ensure servicing of the drone as per the schedule	-	-	-	-
PC13. document repair maintenance related data as per organizations standards	-	-	-	-
Carry out risk assessment & analysis - Safety Management / TEM	**4**	**3**	**-**	**4**
PC14. obtain METAR from MET office/ ATC before flying to assess the weather conditions in advance	-	-	-	-
PC15. assess factors affecting human Performance & Pilot Incapacitation	-	-	-	-
PC16. assess the risk of contaminating waterbodies, affecting non-target crops	-	-	-	-
PC17. prepare the best possible flight route ensuring safety and minimizing risk	-	-	-	-
PC18. maintain buffer zones to avoid contaminating neighboring crops	-	-	-	-
PC19. observe safety guidelines, ATC procedures & Radio Telephony, Weather and meteorology while preparing to operate a drone	-	-	-	-
Carry out installation & utilization of payload and sample data analysis	**5**	**10**	**-**	**5**

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PC20. plan the payload considerations, camera options, resolution etc. & other pay load possibilities	-	-	-	-
PC21. estimate the payload capacity of the drone	-	-	-	-
PC22. install the payload on the drone as per the manufacturer's guidelines as per the specific operation	-	-	-	-
PC23. explore various features of payloads suitable for carrying out the assigned task	-	-	-	-
PC24. examine the payload for any faults and rectify the same	-	-	-	-
PC25. test the drone for specified activities as per the sample route map	-	-	-	-
PC26. carryout Photogrammetry	-	-	-	-
PC27. collect the data relevant to the specified operation	-	-	-	-
PC28. identify various types of image and video data	-	-	-	-
PC29. observe the data carefully	-	-	-	-
PC30. analyze the collected data such as images and videos and interpret their various elements	-	-	-	-
NOS Total	**14**	**23**	**-**	**14**

AGR/N1032: Undertake Drone Flying as per the requirement

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Perform pre-start checks	**2**	**5**	**-**	**3**
PC1. check the orientation of the remotely piloted aircraft system (RPAS)	-	-	-	-
PC2. Check controls related to drone operation	-	-	-	-
PC3. select the specific drone and aerodrome	-	-	-	-
PC4. identify the components of digital sky platform	-	-	-	-
PC5. prepare mission plan and instrument flying	-	-	-	-

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PC6. perform pre-flight checks and start-up	-	-	-	-
PC7. set auto mission & flight	-	-	-	-
PC8. prepare and coordinate drone flight	-	-	-	-
Carry out drone flying as per the requirement	**2**	**5**	-	**3**
PC9. take-off drone and carry out flight stage	-	-	-	-
PC10. undertake go- around, cruise and turns, climbing, climbing turns, descend & descending turns, maintaining height etc. as per the need	-	-	-	-
PC11. maintain levelled turns in both directions	-	-	-	-
PC12. carry out circuit flying- rectangle/square/circle/orbit/flying figure of 8 etc.	-	-	-	-
PC13. maintain basic controls: pitch, roll and yaw	-	-	-	-
PC14. handle gimbal controls (pan, tilt & zoom) appropriately as per the requirement	-	-	-	-
PC15. carry out night flying of drone	-	-	-	-
PC16. ensure the drone is recovered in case of disorientation/ straying	-	-	-	-
NOS Total	**4**	**10**	-	**6**

AGR/N1030: Carry out drone based pesticide and crop nutrient application

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare the drone for application of pesticides and fertilizers	**3**	**4**	-	**3**
PC1. select appropriate drones which can carry suitably sized reservoirs, which can be filled with fertilizers, herbicides, or pesticides for crop spraying	-	-	-	-
PC2. identify appropriate software and technology with reference to different farming practices for drone utilization in various agriculture activities	-	-	-	-
PC3. attach the nozzle system in an efficient manner for continuity in spray swath during spray from minimum permitted height above the uniformly distributed crop	-	-	-	-

PC4. make appropriate setting in drone software to self-adjust its altitude and speed for spraying on desired height above the crop.	-	-	-	-
PC5. Track the fields and fix the coordinates appropriately	-	-	-	-
PC6. ensure GPS and map accuracy of the drone to demarcate the target area boundary and safety/buffer margins	-	-	-	-
PC7. plan the appropriate route for the drone operation	-	-	-	-
PC8. check obstacle presence in the area of operation and make necessary mapping and adjustments in software or peripherals	-	-	-	-
PC9. make appropriate route adjustment as per applicable and available options in the software likerow spacing, row number, borders indentation, obstacle boundary distance, route type and setting etc.	-	-	-	-
PC10. ensure for leak proof drone spray system to avoid any dripping of pesticides/ agrochemicals	-	-	-	-
PC11. calibrate the drone spray system to ensure recommended accuracy on amount of input to be sprayed	-	-	-	-
PC12. Inspect the field to know the extent ofpest/disease/weeds infestation	-	-	-	-
Apply pesticides and fertilizers using the drone	**3**	**4**	**-**	**3**
PC13. select /use the agrochemicals duly approvedby Central Insecticide Board and Registration Committee	-	-	-	-
PC14. Follow critical parameters while applying infield by manual spraying or auto pilotining	-	-	-	-
PC15. ensure compatibility of selected agrochemicalswith drone spray system and nozzles for the desired dilution to ensure stability of agrochemical solubility formulation	-	-	-	-
PC16. Ensure proper formulation and their management	-	-	-	-

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PC17. Adhere to agrochemical safety guidelines prescribed by the manufacturer for their safe handling	-	-	-	-
PC18. Follow recommended spray schedule at various/ critical crop growth and infestation stagesas per crop protection guidelines	-	-	-	-
PC19. dilute the agrochemical in clean water as perrecommendations by the manufacturing company using appropriate PPE	-	-	-	-
PC20. perform crop spraying in safer and cost-effective way by its autonomous and pre-programmed run on specific schedules and routes.	-	-	-	-
PC21. Operate drone to apply soil/crop nutrients inthe form/concentration of the nutrients being sprayed/ broadcasted using sensors/ spraying systems installed	-	-	-	-
PC22. Ensure efficient fertigation use of water usingdrone (depending on the sprayer system of the drone)	-	-	-	-
PC23. Use different kinds of sprayer nozzles depending on the form and concentration of thenutrients to be applied	-	-	-	-
PC24. Evaluate residue and bio efficacy effects	-	-	-	-
PC25. Follow safe application standard	-	-	-	-
PC26. use the available advance feature of the software for accurate movement of drone and its control as per manifested various parameters likebattery discharge or low voltage in the area operation	-	-	-	-
PC27. identify and resolve common error messagesand corrections by debugging of Software appropriately	-	-	-	-
PC28. ensure the drone is at home position after taskcompletion	-	-	-	-
Safeguard the non-target while pesticide application	**3**	**4**	**-**	**3**

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PC29. Maintain sufficient buffer zone to counter agrichemical drift between the adjacent farm or different crops to avoid spray on non-target considering the severity of the agrochemical on thenon-targets	-	-	-	-
PC30. maintain suitable distance from the drone and avoid windward direction as much as possible during the spray operation	-	-	-	-
PC31. Conduct Drone based spray operations at anappropriate distance from water bodies, residentialareas, fodder crops, public utilities, dairy, poultry etc.as per DGCA or other concerned authority guidelines and ensure no human or animal movement within or in the close proximity of the farm during and immediately after the spray operations.	-	-	-	-
Drone, sensors data processing software and soil nutrient spraying system	**3**	**4**	**-**	**3**
PC32. use GPS and GIS-based sensors, along with drones and satellite imagery to get a 3-Dimensional(3D) analysis of the field and the composition of soil in the cultivated region	-	-	-	-
PC33. Carryout drone operation with appropriate sensors to capture high resolution pictures which canbe directly sent to the cloud/ software facilitating precise corrective measures in the form of prescription maps	-	-	-	-
PC34. Use multispectral and Hyper Spectral/ LiDARsensor to capture the data of soil fertility before sowing or planting	-	-	-	-
PC35. Use Recommended Dose of Fertilizer (RDF) Protocol to assess the soil nutrient status and post-process the data to generate the GPS tagged precision nutrient requirements map of the field as an input logic to the nutrient spraying drone with thehelp of soil indices	-	-	-	-
PC36. Use real-time operation protocol to live process the data from multispectral camera forspraying the nutrients simultaneously	-	-	-	-
PC37. Use electrostatic nozzle to avoid drift duringthe operation	-	-	-	-

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PC38. prepare the relevant reports in graphical or tabular form as per client requirement	-	-	-	-
PC39. assist end user to understand the report andto enhance decision making through accurate, reliable and timely information that have been obtained by ICT-driven tools and technologies	-	-	-	-
Precautions for storage of crop nutrients/ pesticides	**3**	**4**	**-**	**3**
PC40. Maintain written inventory of all materials andwith proper labelling	-	-	-	-
PC41. Ensure crop nutrients, herbicides, pesticidesare separately stored in a secured building with absorbent spill kits in all liquid storage areas and regularly inspect	-	-	-	-
PC42. Ensure provision of emergency eyewash and emergency drench showers within or near the storage area, and dispose the excess or obsolete materials or chemicals in accordance with rules andregulations of manufacturer and state law	-	-	-	-
Undertake post operation drone maintenance	**3**	**4**	**-**	**3**
PC43. examine the drone, their peripherals and relevant attachments post completion of operationfor signs of wear and tear or damage	-	-	-	-
PC44. perform maintenance as per the respective manufacturer's instructions using appropriate and recommended tools and equipment	-	-	-	-
PC45. coordinate with the manufacturer to resolve any manufacturing-related issues experienced whiledrone operation	-	-	-	-
PC46. schedule periodic maintenance of drone, their peripherals and relevant attachments as per the maintenance schedule suggested by their respectivemanufacturers	-	-	-	-
NOS Total	**18**	**24**	**-**	**18**

AGR/N1020 : Ensure adherence of precautionary measures before, during and post-operation for drone based pesticide application

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks

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Undertake pre-application precautionary measures	**2**	**5**	**-**	**4**
PC1. confirm not to fly in the drone-forbidden area (airport or electronic station)	-	-	-	-
PC2. adhere to the local aviation laws and regulations in area of operation	-	-	-	-
PC3. ensure that No alcoholic drinks have been taken within 8 hours preceding operation	-	-	-	-
PC4. calibrate drone spray system to ensue nozzle output and accurate application of labelled rates	-	-	-	-
PC5. check that drone is in good condition and there is no leak in the spraying system	-	-	-	-
PC6. confirm place for take-off and landing, tank mix operations etc.	-	-	-	-
PC7. check and mark the obstacles (wall, trees) around the field for safe operation	-	-	-	-
PC8. set up at least buffer zone (as specified by DGCA) between drone treatment and the non- target crop	-	-	-	-
PC9. confirm water sources and do not spray pesticides near water sources (less than 100 m) to avoid polluting water sources	-	-	-	-
PC10. Confirm selectivity nature of plant protection chemicals, especially herbicides	-	-	-	-
Follow precautionary measures during application	**3**	**5**	**-**	**4**
PC11. adhere to health and safety guidelines carefully	-	-	-	-
PC12. wear appropriate personal protective equipment(ppe) while solution preparation and spraying	-	-	-	-
PC13. avoid eating, drinking or smoking while solution preparation and carrying out spraying operation	-	-	-	-
PC14. confirm the flying route to minimize turn around	-	-	-	-
PC15. ensure that operation team always stay at the downwind end of the field and backlight direction	-	-	-	-
PC16. spray with pure water first to test operation for at least 5 min	-	-	-	-
PC17. follow two step dilutions to fully dissolve the pesticide	-	-	-	-
PC18. adopt proper pressure for optimized droplet spectrum (>l00pm).	-	-	-	-
PC19. check appropriate weather conditions for e.g wind speed, temperature, relative humidity etc.	-	-	-	-

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PC20. ensure appropriate flying height for the target crop, flying speed etc.	-	-	-	-
PC21. avoid walking through crop which has been contaminated by drifting spray	-	-	-	-
PC22. ensure not to spray during active bee foraging period of the day	-	-	-	-
PC23. abide by the product label requirements and take effective measures to avoid any associated risks	-	-	-	-
PC24. use anti-drift nozzle to decrease/avoid drift to human, environment, flowering nectar crop, non-target organisms such as fish, birds and silkworm etc.	-	-	-	-
Adhere to post application precautionary measures	**3**	**5**	-	**4**
PC25. ensure timely evacuation and transfer to fresh air post completion of the pesticide spray operation	-	-	-	-
PC26. rinse the empty container appropriately to avoid any contamination for next operation	-	-	-	-
PC27. dispose off the waste/ spills safely at appropriate place in correct manner as per the legal regulations and law	-	-	-	-
PC28. ensure that hazardous waste is never burnt or buried	-	-	-	-
PC29. dispose empty containers as per the insecticide rule 1971 and never leave empty containers in the field	-	-	-	-
PC30. set up warning signs in the spray area for reminding people	-	-	-	-
PC31. take a shower and put on clean cloths	-	-	-	-
PC32. ensure that leakage of remaining plant protection products is prevented in the process of transport	-	-	-	-
PC33. store the plant protection products securely away from unauthorized people, animals and food	-	-	-	-
PC34. follow the maintenance schedule of drone and their peripherals as prescribed by drone manufacturers	-	-	-	-
Administer appropriate emergency procedures	-	-	-	-
PC35. follow procedures for dealing with accidents, fires and emergencies, including communicating location and directions to the location of emergency, as per the workplace requirements	-	-	-	-
PC36. use emergency equipment in accordance with manufacturer's specifications and workplace requirements	-	-	-	-
PC37. provide treatment appropriate to the patient's injuries in accordance with recognized first aid techniques				

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	-	-	-	-
PC38. recover (if practical), clean, inspect/test, refurbish, replace and store the first aid equipment as appropriate	-	-	-	-
PC39. report details of first aid administered in accordance with workplace procedures	-	-	-	-
NOS Total	**8**	**15**	**-**	**12**

AGR/N1021: Use a drone to carry out multispectral mapping for various agriculture and allied activities

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare the drone for carrying out farm mapping	**3**	**4**	**-**	**3**
PC1. set the drone appropriately with all necessary peripherals to ensure it takes the required images and capture required data for intended operation	-	-	-	-
PC2. use the appropriate flight planning software to plan a route in the area that needs to be covered, allowing the drones to follow the automated flight path created by the software	-	-	-	-
Use a drone for crop surveillance and crop health monitoring	**6**	**8**	**-**	**6**
PC3. use GPS and GIS-based sensors, along with drones and satellite imagery to get a 3-Dimensional(3D) analysis of the field and the composition of soilin the cultivated region	-	-	-	-
PC4. identify with help of drones loaded with thermal, multispectral or hyper-spectral sensors the parts of the field with moisture deficits using multispectral indices.	-	-	-	-
PC5. use the appropriate types of sensors with drones to monitor the distribution of irrigation water in different parts of the field and inspect the irrigation equipment	-	-	-	-
PC6. use drones to monitor the effects of weather; crop growth and yield; weed and pest/ insect infestation; trespassing into the field by animals, preying by birds, and record the data	-	-	-	-

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PC7. fit and adjust camera and sensor appropriately to estimate the overall status of crops area-wise in the fields which require attention	-	-	-	-
PC8. use the information regarding the differences at specific locations in the field to manage or change the quantity of various inputs	-	-	-	-
PC9. obtain real-time and accurate information to improve the state of crops in any spot of the field	-	-	-	-
PC10. use the feature of crop surveillance and crop health assessment for facilitating agricultural insurance and for cross verifying farmers' insurance claims	-	-	-	-
PC11. use drone to set its monitoring routes by gathering multispectral geospatial and temporal datasets at pre-defined scales which relate to crop development and health	-	-	-	-
PC12. carry out crop health assessment using drones fitted with sensors which is capable of scanning crops using visible and near infrared light to track crop health over period of time and also tomonitor response to remedied measures	-	-	-	-
PC13. identify weeds efficiently using the advancedweed identification system and remove them	-	-	-	-
PC14. produce and obtain 3D maps of existing soil to monitor potential soil quality, nutrient management, moisture content, soil erosion and soil dead zone	-	-	-	-
PC15. determine the most effective patterns for planting, managing crops, soil, and other requiredfield operations	-	-	-	-
PC16. plan timely irrigation to the identified areas with precision using obtained multispectral indices	-	-	-	-
PC17. manage irrigation in the field based on the analysis of the data provided by dielectric soil moisture sensors to ensure optimum use of water according to varying site needs	-	-	-	-

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PC18. carry out appropriate adjustments in irrigationschedule and distribution of irrigation water based on the precise measurement of health, heat, and crop density data obtained with the use of drones	-	-	-	-
PC19. carry out repair and maintenance of the irrigation equipment, as per aerial analysis conducted by drones	-	-	-	-
PC20. follow the recommended practices for avoiding waterlogging, mitigating necessary damage to sensitive crops, and achieving effectivedrainage based on the aerial imagery captured by drones	-	-	-	-
PC21. use the data recorded by mechanical sensors to optimise the tilling methodologies and the inflowof water in the field	-	-	-	-
PC22. regulate the moisture levels in the soil toprevent damp conditions based on the data captured by dielectric soil moisture sensors	-	-	-	-
PC23. regulate the nutrient level in the soil based onthe data captured by electrochemical sensors	-	-	-	-
PC24. use drone for soil and field analysis for irrigation, planting planning, and nutrient level in soil	-	-	-	-
NOS Total	**9**	**12**	**-**	**9**

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DGT/VSQ/N0102: Employability Skills (60 Hours)				
Introduction to Employability Skills	1	1	-	-
PC1. identify employability skills required for jobs in various industries	-	-	-	-
PC2. identify and explore learning and employability portals	-	-	-	-
Constitutional values – Citizenship	1	1	-	-
PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
PC4. follow environmentally sustainable practices	-	-	-	-
Becoming a Professional in the 21st Century	2	4	-	-
PC5. recognize the significance of 21st Century Skills for employment	-	-	-	-
PC6. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
Basic English Skills	2	3	-	-
PC7. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
PC9. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
Career Development & Goal Setting	1	2	-	-
PC10. understand the difference between job and career	-	-	-	-
PC11. prepare a career development plan with short- and long-term goals, based on aptitude	-	-	-	-
Communication Skills	2	2	-	-

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PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
PC13. work collaboratively with others in a team	-	-	-	-
Diversity & Inclusion	1	2	-	-
PC14. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
Financial and Legal Literacy	2	3	-	-
PC16. select financial institutions, products and services as per requirement	-	-	-	-
PC17. carry out offline and online financial transactions, safely and securely	-	-	-	-
PC18. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
Essential Digital Skills	3	4	-	-
PC20. operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
PC22. use basic features of word processor, spreadsheets, and presentations	-	-	-	-
Entrepreneurship	2	3	-	-
PC23. dentify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
Customer Service	1	2	-	-
PC26. identify different types of customers	-	-	-	-
PC27. identify and respond to customer requests and needs in a professional manner.	-	-	-	-

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PC28. follow appropriate hygiene and grooming standards	-	-	-	-
Getting ready for apprenticeship & Jobs	2	3	-	-
PC29. create a professional Curriculum vitae (Résumé)	-	-	-	-
PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
PC31. apply to identified job openings using offline /online methods as per requirement	-	-	-	-
PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
NOS Total	**20**	**30**	**-**	-

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SECTION 2
EVIDENCE OF LEVEL

OPTION B

Title/ Name of qualification/ component: Kisan Drone Operator			**Level: 4**
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
Process	• Comprehend Stakeholders & their laws (Basic) as per Drone Rules 2021 and Drone (Amendment) Rules, 2022 notified by Ministry of Civil Aviation • Basic flight principles in drone operation • ATC procedures & Radio telephony (non FRTOL) • Fixed wing, Rotorcraft & Hybrid operations and Aerodynamics • Effects of Weather and Meteorology in drone operations	A Kisan Drone Operator/pilot is responsible for operating and rendering the specific service using the drone and relevant technologies for agricultural and allied activities. The individuals operating the drone collect and analyse different types of data for enhancing productivity and profitability while ensuring sustainability and protection of the land resources and where applicable deploy the drone to undertake specific activities like spray of Plant protection chemicals / fertilizer or obtain ground data for other related activities. The individual is also responsible for carrying out regular maintenance of drone and relevant equipment associated with it.	4

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	• Carry Out Drone Equipment Maintenance and Basic		

Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
	Assembly ● Risk Assessment & Analysis - Safety Management / TEM ● Installation and utilization of payload ● Analyze relevant drone collected data ● Flight Simulator Training & Practical Flying ● Drone based pesticide and crop nutrient application ● Ensure adherence of precautionary measures before, during and post-operation for drone based pesticide application ● Identify relevant employability and entrepreneurship opportunities in drone operations		

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	• Maintain health and safety at the workplace		

Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
Professional knowledge	• Understand various Stakeholders & their basic laws • Prepare for the drone operation • Procedures related to ATC & Radio telephony • Fixed-wing Operations and Aerodynamics • Rotorcraft Operations and Aerodynamics • Hybrid Operations and Aerodynamics • Weather and Meteorology • Undertake drone equipment maintenance • Perform Basic Assembly and Maintenance of drone • Risk Assessment & Analysis • Install and utilize payload	The job holder is expected to have the factual knowledge of field of knowledge or study. For Comprehending Stakeholders & their laws (Basic) as per Drone Rules 2021, the individual on the job needs to know and understand: 1. Various international rules, regulations, standards & practices 2. Civil aviation requirements, aips, notam 3. Classification & categorization of drones 4. Various type of certifications of drone 5. Registration, sale & de-registration of drones 6. Operations of various types of drones 7. Dos and don'ts while carrying out drone operation 8. Remote pilot certificate 9. Drone insurance 10. Unique Identification Number (UIN) For understanding Basic flight principles in drone operation, the individual on the job needs to know and understand: 1.Fundamentals of flight 2.Introduction to aerodynamics of flight 3.How to Take-off, flight, and landing 4.Maneuvers, turns and circuit pattern 5.Drone forbidden areas 6.Longitude/ Latitude 7.Different types of Drones and their Nomenclatures 8.current/future uses of drones 9.Newton's Laws of Motion, Bernoulli's Principle, four forces of Fight, three axes of Fight 10. how various laws, principles and forces applies to drone Flight For understanding ATC procedures & Radio telephony (non	4

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	• Collection of Drone data & Analysis • Flight Simulator Training		

Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
	• Practice drone flying with Instructor/ Solo Flying • Prepare the drone for application of pesticides and fertilizers • Apply pesticides and fertilizers using the drone • Safeguard the non-target while pesticide application • Drone, sensors data processing software and soil nutrient spraying system • Precautions for storage of crop nutrients/ pesticides • Undertake post operation drone maintenance • Undertake pre-application precautionary measures • Follow precautionary measures during application • Adhere to post application	FRTOL), the individual on the job needs to know and understand: 1.ATC operations 2.Airspace structure and Airspace 3.Rules and regulations for no drone zones 4.Various zones for drone flight 5.Various restrictions of no drone Zone 6.Flight regulations and procedures in Yellow Zone 7.How to communicate with ATC & RT Phraseology including Position and Altitude Reporting 8.Procedures for flight planning including Altimeter setting 9.Techniques/ measures for collision avoidance 10. Techniques for Radio Telephony (RT) 11. Importance of adopting a safety attitude when flying a drone 12. Issues aircraft pilots encounter including airspace, traffic patterns, and safe attitudes For understanding Fixed wing, Rotorcraft & Hybrid operations and Aerodynamics, the individual on the job needs to know and understand: 1.Types of fixed wing drones, make, parts, terminology 2.How to Operation and maneuver fixed wing drones, Flight Performance 3.Applications of fixed-wing UAVs 4.Pros and Cons of Fixed Wing Drones 5.Basic drone terminology & parts of Rotorcraft 6.Types of Rotorcraft drones, material used and size of drones 7.Rotorcraft drone Anatomy: Different parts of drones 8.Avionics & C2 Link 9.Introduction to Mission Planning, Instrument Flying & Navigation (GCS) of Fixed	

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	precautionary measures ● Identify employability opportunities		

Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
	• Identify and plan for entrepreneurship opportunities in drone operations • Follow the entrepreneurial practices • Practice inclusion at work • Communicate effectively at the workplace • Maintain personal hygiene • Maintain clean and safe workplace • Administer appropriate emergency procedures	wing, Rotorcraft & Hybrid 10. Applications and operations of Multirotor, Flight Performance 11. Pros and Cons of Rotorcraft Drones 12. Principles of Aerodynamics 13. Types of Hybrid Drones & Parts 14. Applications of Hybrid UAVs 15. Comparison with Rotorcraft & Aeroplane For understanding Effects of Weather and Meteorology in drone operations, the individual on the job needs to know and understand: 1. Weather and meteorology: The standard atmosphere, Measuring air pressure, Heat and temperature Wind Moisture, cloud formation etc. 2. Met Terminal Aviation Routine Weather Report (METAR) 3. effects of atmospheric components such as air pressure, heat, wind, moisture, cloud formation, icing etc. 4. Favorable conditions for drone operation 5. Emergency procedures during sudden shift in weather conditions 6. Effect of atmosphere on RPAS operation & hazardous weather avoidance 7. How to measure air pressure, heat, temperature and wind speed 8. Tools and equipment required to measure components of atmosphere For Carrying Out Drone Equipment Maintenance and Basic Assembly, the individual on the job needs to know and understand:	

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Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		1.Servicing schedule 2.How to repair drone equipment 3.General faults and their measures after drone operation 4.Components of flight control box and ground station 5.How to maintain ground equipment, batteries and payloads 6.emergency procedures in case of breakdown of the drone during operation 7.Various sensors of the drone 8.Assembling & disassembling of the drone equipment 9.How to carry out maintenance repair and overhaul of the drone 10. safety when using batteries including proper charging methods, discharging, handing, and disposal 11. Integration of sub-sections/ modules 12. Applicable documentation requirements 13. Integration of engine/propulsion system 14. General faults/ defects in drones and their rectification For Risk Assessment & Analysis - Safety Management / TEM, the individual on the job needs to know and understand: 1. Drone emergency and handling 2. emergency procedures during loss of C2-link 3. Consequences of loss of power 4. Emergency procedures during fly aways(strayining) 5. Control surface failures 6. Human Performance & Pilot Incapacitation 7. Fail safe features of drone 8. DGCA Safety	

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Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		Regulations & safety guidelines For Installation and utilization of payload, the individual on the job needs to know and understand:1. Various Types of payloads - What to carry , what not to carry 2. Parts of payloads 3. Mounting/installation of payloads on the drone 4. Features of payloads 5. Use of drone for various agricultural and allied operations 6. Capacities of various drones for handling payloads 7. Effects of leakage in the payload (chemical) For Analysing relevant drone collected data, the individual on the job needs to know and understand: 1. Principles of Observation 2. Elements of Image & Video Interpretation 3. Basic principles of Photogrammetry 4. Various Types of Image & Video Data 5. Data analysis and their interpretation For Flight Simulator Training & Practical Flying, the individual on the job needs to know and understand: 1.Introduction to Flight Simulator 2.How to check controls and sim familiarization 3.Pre-flight checks, Take off, Cruise 4.Flying techniques such as approach, Go-around & Landing, Post-Flight Checks 5.Terminology such as Cruise and Turns, Climbing and	

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Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		Climbing Turns, Descend & Descending Turns 6.Consequences of disorientation and measures to recover the path 7.Various flying techniques such as Circuit Flying - Rectangle/ Square/ Circle / Orbit 8.Gimbal controls 9.How to fly at night 10. Abnormal / Emergency Procedures 11. Introduction to Digital Sky Platform 12. Safety measures and RPAS familiarization 13. Introductory flight where the student experiences sensitivity of controls and learning the orientation of the RPA 14. Take-off, Climbing, descending and maintaining height 15. Basic Controls: Pitch, Roll and Yaw 16. Mission Planning & Instrument Flying 17. Auto Mission & Flight 18. How to fly Left and right square circuits patterns 19. How to Level turns in both directions 20. Progress Check - Multirotor For Drone based pesticide and crop nutrient application, the individual on the job needs to know and understand: 1.Principles of pesticide applications-Basic Principles, Drone Sop and Policy issues 2.Agriculture drone operations like- type of drone, parts of Agri drone, battery and their replacement, spray tank and balancing, Nozzle replacement etc. 3.obstacle in the area of operation for necessary mapping software adjustments 4.how to identify and resolve common error messages and corrections by debugging of	

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Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		Software 5.Critical parameter in Spraying viz drone parameter, Agrochemical parameter, environmental issues, operational Parameter, Non Target applications etc. 6.Nozzles and their use,type of nozzles,their classification,droplet measures,calibration of nozzle 7.the process of using drones to apply fertilisers, herbicides, pesticides and insecticides uniformly at the identified sites in the field 8.formulations and their types, various compatibility issues, formulation management and efficacy evaluation, dosage requirements etc. 9.Various types of spray equipment viz. High/Low/Ultra Low volume application eqipments 10. applicable documentation requirements 11. the process of obtaining the necessary regulatory approvals to use a drone for agricultural operations 12. how to select a drone appropriate for use according to the purpose and size of the agricultural field 13. spray dynamics, spray volume, droplet size, concentration, drift mechanism, specific nozzles, delivery mechanism and pressure 14. how to load pesticide/ fertilizer on the drone according to its payload capacity 15. how to use a drone to apply pesticides and fertilizers uniformly over an agricultural field 16. approved agrochemicals by Central Insecticides Board and Committee (CIB&RC) 17. Recommended dose of agrochemical for the crops and their droplet size for bio efficacy 18.	

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Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		agrochemical(liquid/solid) compatible with the drone spray system and their dilution requirements 19. CIB&RC specified guidelines for mixing of agrochemicals 20. Active ingredients dosage/ha and PHI interval 21. Comparison of drone spraying with other sprayer 22. How to attach the nozzle system in an efficient manner for continuity in spray swath during spray 23. How to make appropriate setting in drone software to self-adjust its altitude and speed for spraying on desired height above the crop 24. How to ensure GPS and map accuracy of the drone to demarcate the target area boundary and safety/buffer margins 25. Checking of leak proof drone spray system 26. Genral principle of calibration 27. Calibration of handheld/vehicle mounted sparyer 28. Calibration of the drone spray system 29. agrochemical safety guidelines prescribed by the manufacturer for their safe handling 30. recommended agro-chemical doses for specific crops 31. recommended spray schedule at various/ critical crop growth and infestation stages as per crop protection guidelines and phytotoxicity assessment 32. dilution methods of the agrochemical as per recommendations33. how to perform crop spraying in safer and cost-effective way 34. troubleshooting for common malfunctions as per the manufacturer's instructions 35. ways to minimize spray drift in non-target field 36. The hazardous	

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Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		effect of agri. Inputs/chemicals 37. Critical operational parameters for drift management 38. Height and speed of application to minimize drift 39. Importance of emergency eyewash and emergency drench showers and absorbent spill kits within or near storage areas 40. How to dispose excess/ obsolete materials and chemicals in accordance with manufacturers recommendation and state law 41. Use of multispectral and hyperspectral imaging sensors to determine soil fertility in the field 42. spares and accessories, maintenance of battery 43. different type of nozzles, their functions and maintenance 44. Difference between Recommended dose of fertilizer (RDF) protocol and real-time operation protocol 45. Report preparation in graphical or tabular form as per client requirement 46. Various ICT-driven tools and technologies in agriculture and allied sector 47. How to maintain necessary data and carry out documentation For Ensuring adherence of precautionary measures before, during and post-operation for drone-based pesticide application, the individual on the job needs to know and understand: 1.permissible and drone-forbidden area 2.local aviation laws	

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Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		and regulations applicable the in area of operation 3.calibration of drone spray system 4.working and leak proof condition of the drone spraying system 5.where to take-off and land and perform tank mix operations etc. 6.demarcation of obstacles for safe operation 7.how to set up buffer zone (as specified by DGCA) between drone treatment and the non- target crop 8.health and safety guidelines 9.requirements and use of personal protective equipment(PPE) 10. do and don't while solution preparation and carrying out spraying operation 11. how to fix flying route to minimize turn around 12. correct position of operation team during spray 13. how to perform dilution of agro-chemical as per recommendation14. appropriate weather conditions for agro-chemical spray 15. how to select flying height as per target crop 16. how to ensure vicinity of the drone 17. risk in entering contaminated area affected by drifting spray 18. correct timing for carrying out recommended agro chemical spray operation 19. product label requirements and effective measures to avoid any associated risks 20. use of anti-drift nozzle to decrease/avoid drift to human, environment, non-target organisms, crops etc.21. evacuation timing and transfer to fresh air post completion of the pesticide spray operation 22. how to rinse the empty container to avoid any contamination	

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NSQF QUALIFICATION FILE
Approved in 17th NSQC Meeting-NCVET Dated- 31/03/2022
Approved on file dated 07.02.2023

Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**

NSQC Approved

NCVET Code
QG-04-AG-00515-2023-V1.1-ASCI

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

Name and address of submitting body:

Agriculture Skill Council of India (ASCI)
6th floor, GNG Building, Plot No - 10, Sector- 44,
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Name and contact details of individual dealing with the submission

Name: Ms Priyanka Prakash

Position in the organisation: Senior Manager – Standards & QA

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Tel number(s): 0124 - 4670029/ 4814673/ 4814659

E-mail address: priyanka@asci-india.com

List of documents submitted in support of the Qualifications File

1. Qualifications Pack - Annexure 1
2. Model Curriculum - Annexure 2

for next operation23. how to do safe disposal of the hazardous waste/ spills at appropriate place in correct manner as per the legal regulations and law 24. insecticide act 1971 25. warning signs to be setup in the spray area for people awareness 26. health and safety requirements post agro-chemical operation 27. preventative measure during transport for leakage of remaining plant protection products 28. how to store the plant protection products 29. maintenance prescription given by the manufacturer of drone and their peripherals

For Identification of relevant employability and entrepreneurship opportunities in drone operations, the individual on the job needs to know and understand:1.Agri input companies and public entities having employability opportunities 2.scope of work and area of operation 3.relevant legislation, standards, policies, and procedures and approvals from authorized body for work 4.ethical practices of work 5.entrepreneurship/business opportunities in drone operations in public and private entities 6.resources for the business operations 7.manufactures for purchase of suitable drone 8.target customers and their needs and expectations with respect to the quality and price of the
service 9.service provider and customer hiring centres in the

NSQF QUALIFICATION FILE
Approved in 17th NSQC Meeting-NCVET Dated- 31/03/2022
Approved on file dated 07.02.2023

Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		selected region 10. preparation of a basic business plan for the agricultural entrepreneurship/business activities 11. appropriate sources of funding for entrepreneurship/ business development 12. relevant government authorities/stakeholder to subscribe to the relevant government schemes and programs to take benefit from them 13. compliance with the government structural reforms and framework along with the applicable rules and regulations while setting up the agricultural drone operation enterprise/ business 14. use of relevant and efficient technologies as per planning and availability of funds 15. efficient input resource management 16. optimisation of the drone operation services through the amalgamation of existing practices with smart technologies 17. professional coordination with the various stakeholders for efficient and sustainable agri- business growth and development 18. how to use the relevant digital services such as e-commerce, e- payments, electronic recordkeeping, etc 19. how to carry out outreach programs to expand business 20. setting up of Different type of bank accounts for business purpose 21. different type of investment funds 22. personal and business insurance services 23. effective team building at work 24. cost-effective solutions to work-related problems 25. business risk management 26. basic accounting and record	

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Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		keeping 27. various ICT-driven tools and technologies in agriculture and allied sector 28. conducive environment for all the genders and Persons with Disabilities (PwD) the workplace 29. appropriate verbal and non-verbal communication while interacting with Persons with Disabilities (PwD) and across all the genders **For Maintaining health and safety at the workplace, the individual on the job needs to know and understand:**1.relevant legislation, standards, policies, and procedures at work 2.relevant health and safety requirements applicable to the work environment 3.own job role and responsibilities and sources of information pertaining to work 4.who to approach for support in order to obtain work related information, clarifications and support 5.importance of following health, hygiene, safety and quality standards and the impact of not following the standards on consumers and the business 6.personal hygiene and fitness requirement 7.importance of sanitization of the workplace 8.types of Personal Protective Equipment (PPE) required at the workplace and their importance 9.the correct and safe way to use materials and equipment required for the work 10. the importance of good housekeeping at the workplace 11. safe waste disposal methods 12. methods for minimizing	

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Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		environmental damage during work 13. the risks to health and safety including contagious diseases and the measures to be taken to control those risks in the area of work 14. workplace procedures and requirements for the prevention and treatment of workplace injuries/illnesses. 15. basic emergency first aid procedure 16. local emergency services 17. why accidents, incidents and problems should be reported and the appropriate actions to be taken	
Professional skill	• Comprehend Stakeholders & their laws (Basic) as per Drone Rules 2021 and apply efficiently and appropriately • Apply correctly basic flight principles in drone operation • ATC procedures & Radio telephony (non FRTOL) • Fixed wing, Rotorcraft & Hybrid operations and Aerodynamics • Effects of Weather and Meteorology in drone operations	The job holder is expected to recall and demonstrate practical skill, routine and repetitive in narrow range of application, using appropriate rule and tool, using quality concepts. To be competent in understanding various Stakeholders & their laws (Basic) , the user/individual on the job must be able to 1. ensure adherence to International Rules, Regulations, Standards & Practices 2. Ensure Adherence Adhere to Civil Aviation Requirements, AIPs, NOTAM 3. Classify and categorize drones based on weight, size etc. 4. Comprehend the type certification of drone and apply for the same 5. Carryout Registration, Sale & De-Registration of Drones 6. Assimilate process of Operation of Drones 7. Practice DGCA safety regulations, Do's and Don'ts 8. Ensure Drone is insured 9. Apply for Remote Pilot Certificate	4

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Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
	• Carry Out Drone Equipment Maintenance and Basic Assembly • Risk Assessment & Analysis - Safety Management / TEM • Installation and utilization of payload • Software identification and application for drone operation • Prepare for the drone operation • Check the appropriate conditions for using the drone • Flight Simulator Training & Practical Flying • Undertake post operation drone maintenance • Collect the required and accurate data	and Unique Identification Number (UIN) from DGCA for operating in controlled airspace To be competent in Preparation of drone for operation, the user/individual on the job must be able to:1. Identify Different types of Drones 2. Select basic components 3. Recognise basic principles of flying like Bernoulli's Principle etc. 4. Ensure drone is in good condition 5. Apply principles of flight to Drones 6. Carryout Take-off, flight, and landing 7. Carryout flying techniques such as pull, roll and yaw to operate flight 8. Carryout Maneuvers, turns and circuit pattern 9. Ensure drone operation is not carried out in drone-forbidden areas 10. Ensure that no alcohol drinks are consumed within 8 hours preceding operation 11. Ensure drone is not operated over group of people, public events, or stadium without permission To be competent in the Procedures related to ATC & Radio telephony, the user/individual on the job must be able to: 1. Comprehend ATC operations and carryout as per requirement efficiently 2. Ensure drone operations are not carried out in no drone zones 3. Adhere to drone restriction rules and regulations 4. Carryout Flight regulations and procedures in Yellow Zone 5. Ensure appropriate and timely communication with ATC & RT Phraseology including Position and Altitude Reporting 6. Identify specific Flight	

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	• Analyse the collected data • Prepare report based on analysed data		

Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
	• Identify and plan for entrepreneurship opportunities in drone operations • Prepare the drone for application of pesticides and fertilizers • Prepare the drone for carrying out farm mapping • Use a drone for crop surveillance and crop health monitoring	Planning Procedures for specific drone flights including Altimeter setting procedures 7. Ensure adherence to appropriate measures of collision avoidance 8. Recognise issues Drone pilots encounter including airspace, traffic patterns etc 9. Practice Radio telephony using Standard radio terminology and RT Phraseology To be competent in operations and aerodynamics of Fixed- Wing, the user/individual on the job must be able to:1. Identify various Types of fixed wing drones, make, parts, terminology 2. Carryout Operation and maneuvers of fixed wing drones, 3. Ensure good Flight Performance 4. Carryout Mission Planning, Instrument Flying & Navigation (GCS) 5. Explore various applications of fixed- wing UAVs 6. Enlist pros and cons of fixed wing drones To be competent in operations and aerodynamics of Rotocraft, the user/individual on the job must be able to: 7. Identify Basic drone terminology & parts 8. Classify Types of drones based on material used and size of drones 9. Identify Different parts of drones 10. Carryout Avionics & C2 Link 11. Carryout Mission Planning, Instrument Flying & Navigation (GCS) 12. Carryout proper application and operations of Multirotor 13. Ensure good Flight Performance 14. Enlist pros and cons of Rotorcraft Drones To be competent in operations and aerodynamics of Hybrid	

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Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	NSQF Domain	NSQF Domain	NSQF Domain
		Drones the user/individual on the job must be able to: 15. Classify Types of Hybrid Drones and their Parts 16. Carryout Mission Planning, Instrument Flying & Navigation (GCS) 17. Explore various applications of Hybrid UAVs 18. Compare Rotorcraft & Aeroplane To be competent in in understanding the effects of Weather and Meteorology in drone operations , the user/individual on the job must be able to: 1. Recognize importance of optimal Weather and meteorology in drone flight 2. Carryout drone operations in standard atmospheric conditions 3. Carryout measuring air pressure 4. Comprehend the effects of Heat , temperature ,Wind speed, Moisture, cloud formation, icing etc in drone operations 5. Estimate effect of atmosphere on RPAS operation 6. Undertake necessary measures for hazardous weather avoidance 7. Take METAR from MET office/ ATC before flying 8. List tools and equipment required to measure components of atmosphere 9. Set the tools and equipment in correct manner to avoid errors 10. Maintain tools and equipment post usage of measuring tools and equipment To Undertake drone equipment maintenance, the user/individual on the job must be able to: 1. Maintain drone, flight control box, ground station 2. Maintain ground equipment, batteries and payloads 3.	

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Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		Ensure servicing of the drone as per the schedule 4. Carryout minor repair of the equipment and contact the manufacturer for major repair 5. Detect faults and implement necessary measures for their rectification 6. Carryout emergency procedures in case of breakdown of the drone during operation 7. Inspect the drone for any damages before and after the drone operation 8. Check the drone sensors are working properly 9. Keep track of the drone battery and other equipment for effective utilization of the drone To Perform Basic Assembly and Maintenance of drone the user/individual on the job must be able to: 1. Perform assembling & disassembling of drones 2. Carryout Integration of sub-sections/ modules 3. Carryout Integration of engine/propulsion system 4. Detect Faults in the drone and take appropriate measures for rectification 5. Carry out Maintenance Repair and Overhaul of the drone 6. Apply safety precautions while handling batteries 7. Document repair maintenance related data as per organizations standards To carryout Risk Assessment & Analysis, the user/individual on the job must be able to: 1. Undertake appropriate handlining procedures in case of emergencies 2. Undertake necessary procedures during	

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Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		loss of C2-link 3. Ensure drone is recovered in case of Fly- aways (Straying) 4. Carryout emergency measures during loss of power 5. Handle appropriately control surface failures 6. Assess factors affecting human Performance & Pilot Incapacitation 7. Handling In flight emergencies, fail safe mechanisms 8. Assess the risk of contaminating waterbodies, affecting non-target crops 9. Prepare the best possible flight route ensuring safety and minimizing risk 10. Maintain buffer zones to avoid contaminating neighboring crops 11. Interpret DGCA Safety Regulations & observe safety guidelines, ATC procedures & Radio Telephony, Weather and meteorology while operating a Drone To Install and utilize payload, the user/individual on the job must be able to do: 1. Plan & estimate payload considerations, camera options, resolution etc. & other pay load possibilities 2. Identify types of payloads - What to carry, what not to carry 3. Identify Parts of payloads 4. Explore various features of payloads suitable for carrying out assigned task 5. Install the payload on the drone as per the manufacturer's guidelines 6. Use different payloads in drone flying/maintenance 7. Estimate the payload capacity of the drone and install accordingly based on specific operation 8. Examine the payload for any faults and rectify the same 9. Operate the drone for specified activities as per the route	

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NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		map The Individual at work must be able to identify appropriate software and application for drone operation, launching through manual mode or automatic mode, plan the appropriate route for the drone operation, check obstacle presence in the area of operation and make necessary mapping and adjustments in software or peripherals; make appropriate route adjustment as per applicable and available options in the software like row spacing, row number, borders indentation, obstacle boundary distance, route type and setting etc.; use the available advance feature of the software for accurate movement of drone and its control as per manifested various parameters like battery discharge or low voltage in the area operation; identify and resolve common error messages and corrections by debugging of Software appropriately; ensure the drone is at home position after task completion Individual must be able to prepare for the drone operation, Check the appropriate conditions for using the drone, Undertake post operation drone maintenance, Practice inclusion at work etc.To be competent, the user/individual on the job must be able to:1.select a drone appropriate for use according to the purpose and size of the agricultural field	

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NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		2.obtain the necessary regulatory approvals to use a drone for agricultural operations (where applicable) 3.adhere to all regulatory permission from authorized body 4.ensure that drone is in green zone before carrying out planned operation 5.conduct the pre-launch checks as per manufacturer's instructions 6.unfold the drone for operation as per the manufacturer's instructions 7.test the key drone components and systems for correct functioning, wear and tear or damage (e.g. battery/Antenna/GPS etc.) 8.check that batteries are installed correctly and secured in the drone 9.test the batteries for sufficient charge to carry out operations 10. turn on the remote after unfolding and control from the remote control after pairing 11. set up the drone with the relevant parameters for operations such as the home-point to return to, internal compass, camera, etc. 12. check if internal compass is working fine or calibration is required and calibrate as per requirement (if necessary) 13. carry out minor repair/adjustments for any issues identified with the drone during the checks as per manufacturer's instructions 14. inspect the area of operations to ensure surrounding and take-off point are free from any obstructions such as large trees/ electricity poles/ structures15. ensure surface is levelled from take-off point16. analyse the weather conditions to ensure there are no strong winds and	

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Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		rain 17. select a spot in the field that provides a clear line of sight throughout the drone operations 18. examine the drone, their peripherals and relevant attachments post completion of operation for signs of wear and tear or damage 19. perform maintenance as per the respective manufacturer's instructions using appropriate and recommended tools and equipment 20. coordinate with the manufacturer to resolve any manufacturing-related issues experienced while drone operation 21. schedule periodic maintenance of drone, their peripherals and relevant attachments as per the maintenance schedule suggested by their respective manufacturers 22. maintain a conducive environment for all the genders at the workplace 23. ensure appropriate behaviour and conduct with people across gender and PwD 24. ensure suitable verbal and non-verbal communication while interacting with Persons with Disabilities (PwD) 25. ensure equal participation of the people across genders in discussions Individual work scope includes activities/ tasks viz. 1. Collect the required and accurate data 2. Analyse the collected data 3. Prepare report based on analysed data 4. Identify employability opportunities 5.Identify and plan for entrepreneurship opportunities in drone operations 6.Follow	

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Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		the entrepreneurial practices 7.Maintain personal hygiene 8.Maintain clean and safe workplace 9.Administer appropriate emergency procedures 10.Prepare the drone for application of pesticides and fertilizers 11.Apply pesticides and fertilizers using the drone 12.Safeguard the non-target while pesticide application 13.Undertake pre-application precautionary measures 14.Follow precautionary measures during application 15.Adhere to post application precautionary measures 16.Prepare the drone for carrying out farm mapping 17.Use a drone for crop surveillance and crop health monitoring	
Core Skills	1. Collect the required and accurate data 2. Analyse the collected data 3. Prepare report based on analysed data 4. Apply correctly basic flight principles in drone operation 5. ATC procedures & Radio telephony (non FRTOL)	The job holder is expected to know language to communicate written or oral, with required clarity, skill to basic arithmetic and algebraic principles, basic understanding of social political and natural environment. Individual on the job needs to know how to:**1.** maintain work-related notes and records, **2.** communicate clearly and politely with co-workers and clients,**3.** read the relevant literature to get information about the latest developments in the field of work,**4.** plan and prioritise tasks to ensure timely completion,**5.** take quick decisions to deal with workplace emergencies/ accidents,**6.** listen attentively to understand the information/ instructions being shared by the speaker,**7.**	4

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NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
		identify possible disruptions to work and take appropriate preventive measures,**8.** co-ordinate with co-workers to achieve work objectives,**9.** evaluate all possible solutions to a problem to select the best one Individual must have the skills to 1.Identify & select different types of Drones and illustrate Fundamentals of Flight (Aerodynamics). 2.Interpret DGCA Safety Regulations & observe safety guidelines, ATC procedures & Radio Telephony, Weather and meteorology as a Drone Pilot in flying a Drone. 3.Identify & select different Airframes & Propellers in drone flying. 4.Explain & apply knowledge of Power systems viz. Electric motors, Batteries, Chargers, Connectors etc. in drone flying 5.Plan & estimate different payload considerations like Cameras, Gimbals & other payloads and make use of them in drone flying/maintenance 6.Identify basic operating features of a drone flight simulator and fly a Drone in simulator training & live training for various applications first with instructor & then solo	
Responsibility	• Undertake pre-application precautionary measures • Follow precautionary	Kisan Drone Operator takes responsibility for own work and learning. An Kisan Drone Operator/pilot operates and render the	4

Title/ Name of qualification/ component: Kisan Drone Operator			Level: 4
NSQF Domain	**NSQF Domain**	**NSQF Domain**	**NSQF Domain**
	measures during application ● Adhere to post application precautionary measures ● Apply pesticides and fertilizers using the drone ● Safeguard the non-target while pesticide application	specific service in Agriculture and Allied sector using the drone and relevant technologies. The individuals also collect and analyse different types of data for enhancing productivity and profitability while ensuring sustainability and protection of the land resources and where applicable deploy the drone to undertake specific activities like spray of Plant protection chemicals / fertilizer or obtain ground data for other related activities. The individual is also responsible for carrying out regular maintenance of drone and relevant equipment's	

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SECTION 3
EVIDENCE OF NEED

26	**What evidence is there that the qualification is needed? What is the estimated uptake of this qualification and what is the basis of this estimate?**
Basis	
Need of the qualification	Agricultural drone technology has been improving in the last few years, and the benefits of drones in agriculture are becoming more apparent to farmers. Drone applications in agriculture range from mapping and surveying to crop dusting and spraying. Drone technology has gotten most of the recognition in the industry because of its diversity and considered the future for the agrarian community. Drones can help farmers to optimize the use of inputs (seed, fertilizers, water), to react more quickly to threats (weeds, pests, fungi), to save time crop scouting (validate treatment/actions taken), to improve variable-rate prescriptions in real time and estimate yield from a field. The PLI scheme, which was launched in August 2021, envisages an outlay of Rs. 120 crores (US$ 16.06 million) spread over three years for drone manufactures. The PLI for a drone manufacturer will be capped at 25% of the total annual outlay. This scheme is expected to double the combined sales turnover of all domestic drone manufacturers in FY2021-22. The Civil Aviation Ministry estimates India's drone sector to achieve a total turnover of Rs. 120-150 billion (US$ 1.63-2.04 billion) by 2026, from its current turnover of about Rs. 800 million (US$ 10.88 million). In addition, the government plans to attract investments of Rs. 5,000 crores (US$ 669.07 million) in the next three years in the drone manufacturing industry and create >10,000 job opportunities. The government is also encouraging start-ups and MSMEs (Micro, Small and Medium Enterprises) to invest in drone technology by easing the eligible annual sales bracket at a minimum level—Rs. 2 crores (US$ 267.63 thousand) for drones and Rs. 50 lakhs (US$ 66.91 thousand) for drone components. There is a need for the Qualifications in the market: 1. Survey of India-Mapping of Land Records 2. Drone Companies-Drone Services 3. Academic and research Initiations 4.Farmer Producer Organizations-Drone Spraying service **Utility of Agricultural Drone Technology** **(a)Precision Agriculture:** Precision agriculture refers to the way

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	farmers manage crops to ensure efficiency of inputs such as water and fertilizer, and to maximize productivity, quality, and yield. The term also involves minimizing pests, unwanted flooding, and disease. Drones allow farmers to constantly monitor crop and livestock conditions by air to quickly find problems that would not become apparent in ground-level spot checks. For example, a farmer might find through time-lapse drone photography that part of his or her crop is not being properly irrigated. **(b) Mapping/Surveying:** The process of using a drone to map or survey crops is a relatively straightforward one. Many newer agricultural drone models come equipped with flight planning software that allows the user to draw around the area he or she needs to cover. Then, the software makes an automated flight path and, in some cases, even prepares the camera shots.As the drone flies, it automatically takes pictures using onboard sensors and the built-in camera, and uses GPS to determine when to take each shot. But if your drone does not have these automatic features, then one person needs to fly the drone while the other takes the photos. **(c) Crop-dusting /Spraying:** Drone can carry tanks of fertilizers and pesticides in order to spray crops. Drones are capable of spraying crops with far more precision than a traditional tractor. This helps reduce costs and potential pesticide exposure to workers who would have needed to spray those crops manually. Global Market Insights forecasts that the agricultural drone market size will exceed $1 billion and 200,000 units shipped by 2024. GMI attributes the growth through 2024 to increasing awareness of the pros and cons of drones in agriculture among farmers. Utility of the Farm Drones will increase to many folds in due course of time
Industry Relevance	Validations have been received from Saptrishi Consultancy Services Limited, Department of Remote Sensing and GIS TNAU, Coimbatore, TN and WOW Go Green LLP. More validations are awaited
Usage of the qualification	An NSQF aligned training to the persons involved in grooming of **Kisan Drone Operator** shall provide opportunities to the incumbents for horizontal and vertical career progression. Competency-based training shall imbibe professionalism in the job- role. Being an important and ever-expanding job, the job-role of Kisan Drone Operator may well be included in the vocational education stream of school education. An industry-determined specification of performance, sets out the

skills, knowledge and attitudes required to operate effectively in employment.

For employers, the **Kisan Drone Operator** Qualification standards offer:

- a means of assessing occupational competence objectively, including knowledge and understanding of the subject
- a guide for job descriptions and recruitment requirements
- a basis for staff appraisals
- a systematic approach to analyzing training needs
- an opportunity to improve overall company performance by developing a better-trained, better-equipped and more effective workforce.

To employees and freelancers, the **Kisan Drone Operator** Qualification standards provide:

- a means for recognizing ability
- a means for determining gaps in knowledge, experience and skills
- an objective process for identifying training needs
- performance indicators and a guide to effectiveness and efficiency.

One of the most valuable uses of the occupational standards is in the assessment of a person's performance within a particular job. Because the standards are based on the industry's requirements for ability, skills and knowledge, they provide an objective and directly relevant measure for employers and employees alike.

The Qualification Pack shall also be helpful in conducting Recognition of Prior Learning of the Kisan Drone Operator

Estimated uptake

QP/Job Role Name	"States where Demand exist	"District where Demand exist	Projections for the next 3 years
Kisan Drone Operator	PAN IDIA	Various District	15000

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27	**Recommendation from the concerned Line Ministry of the Government/Regulatory Body. To be supported by documentary evidences** Concurrence is in process from Mechanization and Technology Division, Ministry of Agriculture & Farmers Welfare, Department. of

	Agriculture, Coop. and Farmers Welfare
28	**What steps were taken to ensure that the qualification(s) does (do) not duplicate already existing or planned qualifications in the NSQF? Give justification for presenting a duplicate qualification** NQR has been checked and there is no similar Qualifications
29	**What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated? Specify the review process here** Any institution or individual is welcome to send the feedback, which is recorded and considered during next review cycle. Communication will be sent for any feedback to all the main stakeholders/users one month prior to the review of the qualifications pack. A formal review is scheduled in three years. Post NSQC Approval

Please attach most relevant and recent documents giving further information about any of the topics above.
Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

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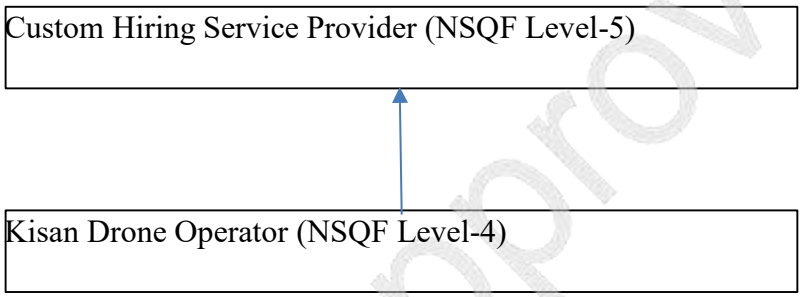
SECTION 4

EVIDENCE OF PROGRESSION

30	**What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?** ***Show the career map here to reflect the clear progression*** Career path in the agriculture sector is generally in terms of activities done & ownership of responsibility because they are primarily self-wage employment/ entrepreneurship roles. **Annexure 1: Career Map of Kisan Drone Operator** 

Please attach most relevant and recent documents giving further information about any of the topics above.
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