

# Agricultural Data Specialist

The Agricultural Data Specialist acts as a specialised node within the broader data science family, distinguished by deep domain expertise in agronomy. Unlike a generalist data scientist, this professional understands the biological and phenological context of the data they analyse.

<ESCO Mapping> - <[link to ESCO \(European Skills, Competences, Qualifications and Occupations\)](#)>

ID	NAME	Concept URI
2511.9	ICT business analyst	<a href="http://data.europa.eu/esco/occupation/fe0fa514-b48d-4a53-9757-a283c0baacf0">http://data.europa.eu/esco/occupation/fe0fa514-b48d-4a53-9757-a283c0baacf0</a>
2132.1	agricultural development consultant	<a href="http://data.europa.eu/esco/occupation/c25b3700-6095-42b7-99fc-b87dc326c044">http://data.europa.eu/esco/occupation/c25b3700-6095-42b7-99fc-b87dc326c044</a>
3512.4	ICT technician	<a href="http://data.europa.eu/esco/occupation/3e7bf729-4442-4b9f-ad5e-83111963795c">http://data.europa.eu/esco/occupation/3e7bf729-4442-4b9f-ad5e-83111963795c</a>
2120	Mathematicians, actuaries and statisticians	<a href="http://data.europa.eu/esco/isco/C2120">http://data.europa.eu/esco/isco/C2120</a>
2165.3	GIS Specialist / Geospatial Analyst	<a href="http://data.europa.eu/esco/occupation/9af8907f-56a7-4170-83b1-3c6ba0997cfa">http://data.europa.eu/esco/occupation/9af8907f-56a7-4170-83b1-3c6ba0997cfa</a>

## Context

<b>EQF Levels</b>	1/2/3/4/5/6/7/8
<b>Departments</b>	Logistics Quality Assurance R&D (Research and Development) IT & Digital  <b>R &amp; D:</b> Developing new crop models and testing "Green ammonia" efficacy. <b>IT &amp; Digital:</b> Managing the IoT infrastructure and cloud databases. <b>Quality Assurance:</b> Monitoring compliance with environmental standards. <b>Logistics:</b> Analysing supply chain data for "Supply Chain Adaptation".
<b>Profile Sectors</b>	<b>Agri-Food:</b> Crop production and livestock management. <b>Agro-Chemical:</b> Manufacturing of fertilizers, specifically the transition to "Green and blue ammonia" <b>Agri-Tech:</b> Development of precision farming software and hardware.

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### Green Competences

Name	Type	Description	Level	ESCO
Carbon Footprint Calculation	Skill	The ability to quantify greenhouse gas emissions associated with specific agricultural activities and inputs, utilising data from machinery and chemical usage logs.	3	<a href="#">new</a>
Sustainable Resource Management	Knowledge	Understanding the principles of minimising resource depletion (water, soil, phosphate) and applying data optimisation to reduce consumption.	3	<a href="#">new</a>
Environmental Impact Assessment (Data-Driven)	Skill	Using computational models to simulate and assess the potential environmental consequences of farming decisions (e.g., nitrogen leaching risk) prior to execution.	3	<a href="http://data.europa.eu/esco/skill/e541c69c-ea80-4b17-87cb-4001d0b9d303">http://data.europa.eu/esco/skill/e541c69c-ea80-4b17-87cb-4001d0b9d303</a>
Circular Economy Principles	Knowledge	Comprehending the lifecycle of materials to design data systems that support closed-loop systems, waste reduction, and material reuse in the chemical and farming sectors.	2	<a href="http://data.europa.eu/esco/skill/22c45bf7-e52b-475f-847b-c32a87f65a5d">http://data.europa.eu/esco/skill/22c45bf7-e52b-475f-847b-c32a87f65a5d</a>
Precision Application of Inputs (VRT)	Skill	Creating Variable Rate Technology (VRT) prescription maps based on soil data to ensure fertilizers and pesticides are only applied where strictly necessary.	3	<a href="http://data.europa.eu/esco/skill/8ca08a35-2d2e-46f5-b440-8fc8ce736287">http://data.europa.eu/esco/skill/8ca08a35-2d2e-46f5-b440-8fc8ce736287</a>
Climate Change Adaptation Strategies	Knowledge	Understanding how shifting climate patterns affect agronomy and utilising predictive models to recommend adaptive crops or planting schedules.	3	<a href="http://data.europa.eu/esco/skill/04012dd1-478d-4eec-9951-dd623bfe86ca">http://data.europa.eu/esco/skill/04012dd1-478d-4eec-9951-dd623bfe86ca</a>

### Digital Competences

Name	Type	Description	Level	ESCO
Data Analytics and Statistical Analysis	Knowledge /Skill	Utilising advanced statistical methods to identify trends, patterns, and correlations in complex, multi-variate agricultural datasets.	3	<a href="http://data.europa.eu/esco/skill/97bd1c21-66b2-4b7e-ad0f-e3cda590e378">http://data.europa.eu/esco/skill/97bd1c21-66b2-4b7e-ad0f-e3cda590e378</a>  <a href="http://data.europa.eu/esco/skill/382c11ed-20d5-4ae7-b60e-15fec527fa6c">http://data.europa.eu/esco/skill/382c11ed-20d5-4ae7-b60e-15fec527fa6c</a>
Machine Learning and AI Implementation	Skill	Developing, training, and deploying machine learning algorithms to predict crop yields, pest outbreaks, and optimise resource allocation.	3	<a href="http://data.europa.eu/esco/skill/3a2d5b45-56e4-4f5a-a55a-4a4a65afdc43">http://data.europa.eu/esco/skill/3a2d5b45-56e4-4f5a-a55a-4a4a65afdc43</a>
Python Programming for Data Science	Knowledge	Writing efficient code in Python to manipulate data (Pandas), perform scientific computing (NumPy), and build predictive models (Scikit-learn).	3	<a href="http://data.europa.eu/esco/skill/ccd0a1d9-afda-43d9-b901-96344886e14d">http://data.europa.eu/esco/skill/ccd0a1d9-afda-43d9-b901-96344886e14d</a>  <a href="http://data.europa.eu/esco/skill/edebd83d-35f6-4ed5-a940-6c203d178c01">http://data.europa.eu/esco/skill/edebd83d-35f6-4ed5-a940-6c203d178c01</a>
Geographic Information Systems (GIS)	Skill	Managing and analysing spatial data, creating yield maps, and interpreting satellite imagery to guide location-specific farming interventions.	3	<a href="http://data.europa.eu/esco/skill/440f64e5-e66c-45ee-bc29-53c14a2ad720">http://data.europa.eu/esco/skill/440f64e5-e66c-45ee-bc29-53c14a2ad720</a>

IoT Sensor Integration & Telemetry	Skill	Configuring data pipelines to ingest, clean, and store real-time streams from field sensors (moisture, temperature) and autonomous machinery.	3	New skill
Big Data Infrastructure Management	Skill	Managing cloud-based storage solutions and distributed computing frameworks to handle petabytes of agronomic data.	3	<a href="http://data.europa.eu/esco/skill/47a49cd6-097d-457a-9f7b-c290c14930d5">http://data.europa.eu/esco/skill/47a49cd6-097d-457a-9f7b-c290c14930d5</a>
Data Visualization and Dashboarding	Skill	Translating complex data outputs into intuitive visual dashboards (e.g., PowerBI, Tableau) for decision-makers and farmers.	3	New skill
Database Management (SQL/NoSQL)	Knowledge	Designing and querying databases to ensure data integrity, accessibility, and security for agricultural records.	3	<a href="http://data.europa.eu/esco/skill/ab1e97ed-2319-4293-a8b7-072d2648822f">http://data.europa.eu/esco/skill/ab1e97ed-2319-4293-a8b7-072d2648822f</a>

### SSbD (Safe and Sustainable by Design Chemicals)

Name	Type	Description	Level	ESCO
Chemical Risk Assessment Modelling	Knowledge	Using computational models to predict the environmental fate, transport, and toxicity of agrochemicals based on molecular structure and soil interaction data.	3	<a href="http://data.europa.eu/esco/skill/7f27f1ff-2e17-4b69-990e-c23334478313">http://data.europa.eu/esco/skill/7f27f1ff-2e17-4b69-990e-c23334478313</a>
Life Cycle Assessment (LCA) Methodology	Skill	Applying LCA standards (ISO 14040) and software to quantify the environmental impact of a product from raw material extraction to disposal/reuse.	3	<a href="http://data.europa.eu/esco/skill/4e87c852-602a-4a0e-b8d8-20709ce14ac5">http://data.europa.eu/esco/skill/4e87c852-602a-4a0e-b8d8-20709ce14ac5</a>
Regulatory Compliance Data Management (REACH)	Knowledge	Understanding chemical regulations (REACH, CLP) to ensure data systems capture and report the necessary toxicological and safety information.	2	New
Green Chemistry Principles	Knowledge	Understanding the 12 Principles of Green Chemistry to support the design of data metrics that track progress toward benign chemical design.	2	<a href="http://data.europa.eu/esco/skill/b589fa82-f177-4cce-9fb4-31bbbebf792b">http://data.europa.eu/esco/skill/b589fa82-f177-4cce-9fb4-31bbbebf792b</a>

### Transversal Competences

Name	Type	Description/Context	Level	ESCO
Complex Problem Solving	Skill	Analysing complex, multi-factor scenarios (e.g., unexpected crop failure) to identify root causes using data evidence rather than intuition.	3	<a href="http://data.europa.eu/esco/skill/ad6c6dc11-3376-467b-96c5-9b0a21edc869">http://data.europa.eu/esco/skill/ad6c6dc11-3376-467b-96c5-9b0a21edc869</a>
Interdisciplinary Communication	Skill	Translating sophisticated data insights into actionable, plain language strategies for farmers, agronomists, and business stakeholders.	3	New
Project Management	Skill	Planning and coordinating cross-functional data projects, managing resources, timelines, and the diverse expectations of technical and non-technical teams.	2	<a href="http://data.europa.eu/esco/skill/7111b95d-0ce3-441a-9d92-4c75d05c4388">http://data.europa.eu/esco/skill/7111b95d-0ce3-441a-9d92-4c75d05c4388</a>
Data Ethics and Stewardship	Knowledge	Understanding the ethical implications of data ownership, privacy (GDPR), and the fair use of farmer-generated data in corporate systems.	2	<a href="http://data.europa.eu/esco/skill/e9575f7f-053a-439e-8074-f93df3334e92">http://data.europa.eu/esco/skill/e9575f7f-053a-439e-8074-f93df3334e92</a>

Collaborative Teamwork	Skill	Working effectively within the "collaborative innovation labs" and "multidisciplinary teams" identified as key industry trends.	2	<a href="http://data.europa.eu/esco/skill/326809fc-238d-40c2-881e-40042f7f2f0d">http://data.europa.eu/esco/skill/326809fc-238d-40c2-881e-40042f7f2f0d</a>
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### Sector Specific

Name	Type	Description/Context	Level	ESCO
Agronomy and Crop Physiology	Knowledge	Understanding plant growth stages (phenology), nutrient requirements, and the biological mechanisms of yield formation to interpret data anomalies.	2	Partially new
Soil Science Fundamentals	Knowledge	Knowledge of soil physics, chemistry, and biology to correctly interpret data from soil sensors and lab reports.	2	<a href="http://data.europa.eu/esco/skill/91a6da8d-24dc-4453-9821-de305864677c">http://data.europa.eu/esco/skill/91a6da8d-24dc-4453-9821-de305864677c</a>
Agricultural Supply Chain Dynamics	Knowledge	Understanding the flow of agricultural goods, cold chain requirements, and market drivers to optimise logistics and distribution data models.	2	<a href="http://data.europa.eu/esco/skill/f929c89e-c363-4132-a918-e021d57b307c">http://data.europa.eu/esco/skill/f929c89e-c363-4132-a918-e021d57b307c</a>
Pest and Disease Management	Knowledge	Recognising the biological signatures of pests and diseases to train predictive models and set accurate alert thresholds.	2	<a href="http://data.europa.eu/esco/skill/14dcd9eb-52e4-4353-ad4e-b2833e55ebe5">http://data.europa.eu/esco/skill/14dcd9eb-52e4-4353-ad4e-b2833e55ebe5</a>
Farm Machinery Operations	Knowledge	Understanding the capabilities and limitations of agricultural equipment (sprayers, seeders) to ensure digital prescriptions are executable in the field.	2	<a href="http://data.europa.eu/esco/skill/00dd3271-077f-4a12-a958-e297fdd724ce">http://data.europa.eu/esco/skill/00dd3271-077f-4a12-a958-e297fdd724ce</a>
Meteorology in Agriculture	Knowledge	Understanding the impact of weather variables (GDD, precipitation, evapotranspiration) on crop development for accurate yield forecasting.	2	Not specific for agriculture: <a href="http://data.europa.eu/esco/skill/840ea882-439c-4fa9-b219-edbe0607fe60">http://data.europa.eu/esco/skill/840ea882-439c-4fa9-b219-edbe0607fe60</a>

### Other

Name	Type	Description	Level	ESCO
Adaptability and Continuous Learning	Skill	Maintaining effectiveness in a rapidly changing environment (new regulations, new technologies) and proactively updating one's own skill set.	3	<u>new</u>