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Skills Framework for Agrifood (Agriculture and Aquaculture)

A Guide to Occupation and Skills

A Joint Initiative By



SKILLS *future* SG

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Introduction

SKILLS FRAMEWORK

The Skills Framework is a SkillsFuture initiative developed for the Singapore workforce to promote skills mastery and lifelong learning. Jointly developed by the Singapore Food Agency and SkillsFuture Singapore, together with employers, industry associations and unions, education, and training providers. The Skills Framework for Agrifood Sector provides useful information on:

- Career Pathways
- Job Roles and their Key Tasks and Functions
- Existing and Emerging Skills

With the Skills Framework, individuals are equipped to make informed decisions about career choices, as well as take responsibility for skills upgrading and career planning.

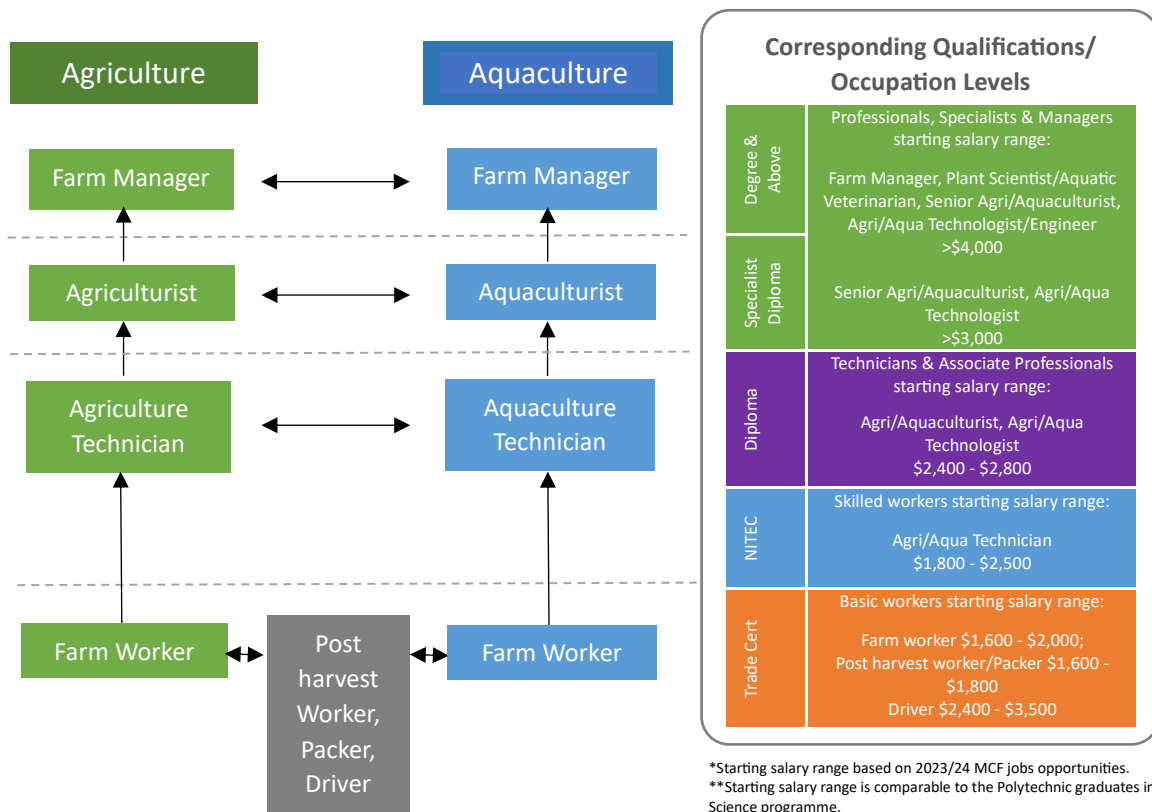
Assess Career Interests	Prepare for Desired Jobs	Find Avenues to Close Skills Gap	Renew, Upgrade and Deepen Skills
<ul style="list-style-type: none"> • Understand career pathways • Recognise personal attributes required 	<ul style="list-style-type: none"> • Understand skills and competency required 	<ul style="list-style-type: none"> • Identify relevant training programmes to equip oneself with the required skills and competencies • Participate in on-the-job training opportunities provided by companies 	<ul style="list-style-type: none"> • Plan for career development/transition • Recognise skills and competencies required for the intended job role • Identify training programmes to upgrade and deepen skills

Apart from individuals, the Skills Framework can also be utilised by:

Employers	Training Providers
<ul style="list-style-type: none"> • Recognise and understand the vital skills required for success in the agri-food tech sector • Invest in training and development programmes to enhance their employees' skills and support their career progression 	<ul style="list-style-type: none"> • Gain insights on the latest sector trends and emerging skill sets that are in demand • Design and develop training programmes that cater to the specific needs of the industry

Career Map

The agri-food sector is a growth sector that offers many jobs and diverse career opportunities for talent in agriculture and aquaculture sciences, engineering, and info-comm technology. The following illustrates potential career pathways skills upgrading and career planning.



Skills Maps of Job Roles in the AgriFood Sector

Farm Manager

JOB ROLE DESCRIPTION

The Farm Manager oversees the farm management and is accountable for fulfilling sales target. He/She is responsible for strategic planning on farm production capability and capacity, as well as managing the operating budget, agri-inputs materials, resources, and manpower deployment.

He leads farm production by establishing processes, systems, and technology integration to ensure that farm production is achieved in a timely, cost-effective and sustainable manner. He prepares the production schedules and ensures productivity objectives and targets are met. He develops and incorporates Good Agricultural Practices, Food Safety Standards and Workplace Safety and Health practices in the entire farming operations. He also drives the adoption of innovative and smart farming technologies to continuously improve the overall productivity and efficiency of the farming operations.

He is also responsible for leading the business development efforts to grow the farm business. He secures new clients and sales as well as takes part in agriculture industry events to promote the farm's produce.

	CRITICAL WORK FUNCTIONS	KEY TASKS
CRITICAL WORK FUNCTIONS AND KEY TASKS	Lead business development	<ul style="list-style-type: none"> • Formulate business development strategies and plans • Manage sales and expenditure • Build strategic partnerships with internal and external stakeholders to develop the business • Drive organisational development to improve productivity, innovation, and knowledge to strengthen strategic business position • Apply Good Agriculture Practices (GAPs) into organisational culture and business development • Organise promotion and publicity events to promote the farm's produce, participate in agriculture trade shows, sales road shows
	Manage regulatory and standards compliance	<ul style="list-style-type: none"> • Formulate and develop organisational farm biosafety, sustainability and Workplace Safety and Health strategies • Oversee organisational compliance with prevailing regulatory requirement and practices

**CRITICAL WORK
FUNCTIONS
AND KEY TASKS
(CONTINUED)**

CRITICAL WORK FUNCTIONS KEY TASKS

Develop farm management plans

- Establish farm management and operation plans with integration of Good Agriculture Practices (GAPs) and smart farming technology to streamline farming management and operation to achieve maximise productivity and sustainable food production
- Strategise and plan farming production capacity and capability development
- Manage operating budget for agri-inputs materials, resources, and manpower
- Develop standard operating procedures and work instructions to comply with prevailing regulations on agricultural practices and requirements
- Set productivity levels and targets for production schedule
- Manage manpower recruitment, training, and development
- Develop organisational sustainability policies and plans and implement sustainability farming practices on the use of clean energy, optimise water efficiency, minimise pollution, depleting of natural resources and impact on the environment

Manage farming facilities, equipment and machinery

- Lead smart farming technology adoption and implementation for farming facilities, equipment, and machinery
- Manage farming facilities, equipment, and machinery to meet production capability and capacity
- Manage farming facilities, equipment and machinery installation, service, and repair
- Source for new farming facilities, equipment, and machinery to improve operations and processes productivity

TECHNICAL SKILLS AND COMPETENCIES			
SKILLS & COMPETENCIES	Active and Smart Packaging	Level 4	
	Budgeting	Level 4	
	Business Continuity Management	Level 5	
	Business Opportunities Development	Level 5	
	Carbon Footprint Management	Level 5	
	Continuous Process Improvement	Level 4	
	Data and Statistical Analytics	Level 4	
	Environmental Management System Policies, Standards, Procedures and Practices Management	Level 4	
	Farm Biosecurity Compliance and Management	Level 5	
	Financial Management	Level 5	
	Food Safety Analysis	Level 4	
	Food Safety and Hygiene	Level 4	
	Food Safety Management	Level 4	
	Good Agriculture Practices Implementation	Level 5	
	Hazards and Risk Control, and Policy Management	Level 4	
	Internet of Things Management	Level 4	
	Market Research	Level 4	
	Quality Assurance Management	Level 5	
	Risk Management and Administration	Level 5	
	Robotic and Automation Technology Application	Level 5	
	Smart Farming Technology Implementation	Level 5	
	Stakeholder Management	Level 4	
	Sustainable Farming Practices Implementation	Level 5	
	Urban Farming Implementation and Management	Level 5	
	Workplace Safety and Health Performance Management	Level 4	
	TOP 5 CRITICAL CORE SKILLS		
	Communication	Advanced	
	Decision Making	Advanced	
Developing People	Advanced		
Problem Solving	Advanced		
Transdisciplinary Thinking	Intermediate		

Agriculturist

JOB ROLE DESCRIPTION

The Agriculturist manages the execution of daily farming operations, involving seedlings propagation, harvesting, and post-harvest activities in accordance with production schedule. He/She is to achieve productivity objectives and targets in a sustainable manner.

He is the agriculture science subject matter expert responsible for food crop health management to enhance the quality and yield of the food crops production. He is also responsible for ensuring the smooth operations of farming facilities, equipment, and machinery.

He leads the farming operation work in compliance with prevailing regulations on agricultural practices, food safety standards and Workplace Safety and Health practices and requirements. He allocates work, monitors performance, and reports to the management regarding all farming activities. He also provides daily updates on production reports and inventory status.

	CRITICAL WORK FUNCTIONS	KEY TASKS
CRITICAL WORK FUNCTIONS AND KEY TASKS	Support business development	<ul style="list-style-type: none"> Integrate business development strategies into farming operations Manage production targets to align with business development strategies
	Manage agriculture farming facilities, equipment and machinery	<ul style="list-style-type: none"> Integrate smart farming technologies into farming operations Manage farming equipment and machinery to ensure optimum operation performance Develop work instructions and implement preventive maintenance schedule for equipment and machinery servicing Troubleshoot and execute appropriate corrective maintenance and emergency recovery of farming equipment and machinery Manage equipment and machinery vendors and maintenance budget Optimise equipment utilisation and operational cost effectiveness Ensure housekeeping of farm premises, cleaning of workstations, farming machinery and tools Ensure sorting and disposal of waste are executed based on predefined standard operating procedures

**CRITICAL WORK
FUNCTIONS
AND KEY TASKS
(CONTINUED)**

CRITICAL WORK FUNCTIONS KEY TASKS

Manage agriculture food crop health

- Establish health management programmes in accordance with Good Agriculture Practices (GAPs) to ensure optimum food crop production quality and yield performances
- Inspect and calibrate smart farming technology devices and farm environment control systems to ensure optimum operation performance
- Manage food crop pests, diseases, and nutritional deficiencies issues
- Review food crop production quality and yield performances

Manage agriculture farming operations and production output

- Manage seedlings propagation, harvesting, and post-harvest activities in accordance with production schedule and achieve productivity targets
- Manage smart farming technologies, farm equipment and machinery performance at optimal operation levels
- Ensure effective execution of work processes according to standard operating procedures and in compliance with Good Agriculture Practices (GAPs)
- Manage implementation of organisational sustainability policies, plans and goals into farming operations
- Report utilisation of operating budget for agri-inputs materials, resources, and manpower
- Report food crop production and inventory status
- Manage the farm operation teams

Manage regulatory and standards compliance

- Incorporate farm biosafety, sustainability and Workplace Safety and Health regulatory requirement and standards practices into farming operations
- Implement Workplace and staff compliance with prevailing regulatory requirement and practices

TECHNICAL SKILLS AND COMPETENCIES	
Active and Smart Packaging	Level 3
Agriculture Techniques and Cultivation Programme Management	Level 4
Budgeting	Level 3
Business Continuity Management	Level 4
Business Opportunities Development	Level 4
Carbon Footprint Management	Level 4
Continuous Process Improvement	Level 3
Data and Statistical Analytics	Level 3
Environmental Management System Policies, Standards, Procedures and Practices Management	Level 3
Equipment Maintenance and Housekeeping	Level 3
Farm Biosecurity Compliance and Management	Level 4
Financial Management	Level 4
Food Safety Analysis	Level 3
Food Safety and Hygiene	Level 3
Food Safety Management	Level 3
Good Agriculture Practices Implementation	Level 4
Hazards and Risk Control, and Policy Management	Level 3
Internet of Things Management	Level 3
Market Research	Level 3
Quality Assurance Management	Level 4
Risk Management and Administration	Level 4
Robotic and Automation Technology Application	Level 4
Smart Farming Technology Implementation	Level 4
Stakeholder Management	Level 3
Sustainable Farming Practices Implementation	Level 4
Urban Farming Implementation and Management	Level 4
Workplace Safety and Health Performance Management	Level 3
TOP 5 CRITICAL CORE SKILLS	
Communication	Intermediate
Decision Making	Advanced
Developing People	Intermediate
Problem Solving	Advanced
Transdisciplinary Thinking	Intermediate

SKILLS & COMPETENCIES

Aquaculturist

JOB ROLE DESCRIPTION

The Aquaculturist manages the execution of daily farming operation, involving aquatic food animals breeding, harvesting, and post-harvest activities in accordance with production schedule. He/She is to achieve productivity objectives and targets in a sustainable manner.

He is the aquaculture science subject matter expert responsible for aquatic food animal health management to enhance the quality and yield of the aquatic food animal production. He is also responsible for ensuring the smooth operations of farming facilities, equipment, and machinery.

He leads the aquaculture teams in carrying out the farming operations work in compliance with prevailing regulations on aquacultural practices, food safety standards and Workplace Safety and Health practices and requirements. He allocates work, monitors performance, and reports to the management regarding all farming activities. He provides daily updates to the management on production reports and inventory status.

	CRITICAL WORK FUNCTIONS	KEY TASKS
CRITICAL WORK FUNCTIONS AND KEY TASKS	Support business development	<ul style="list-style-type: none"> Integrate business development strategies into farming operations Manage production targets to align with business development strategies
	Manage aquaculture farming operations and production output	<ul style="list-style-type: none"> Manage breeding, feeding, harvesting, and post-harvest activities in accordance with production schedule and achieve productivity targets Manage smart farming technologies, farm equipment and machinery performance at optimal operation levels Ensure effective execution of work processes according to standard operating procedures and in compliance with Good Agriculture Practices (GAPs) Manage implementation of organisational sustainability policies, plans and goals into farming operations Report utilisation of operating budget for agri-inputs materials, resources, and manpower Report aquatic food animal production and inventory status Manage the farm operation teams

CRITICAL WORK FUNCTIONS AND KEY TASKS (CONTINUED)

CRITICAL WORK FUNCTIONS	KEY TASKS
Manage aquatic food animal health	<ul style="list-style-type: none"> • Establish health management programme in accordance with Good Agriculture Practices (GAPs) to ensure optimum aquatic food animal production quality and yield performance • Inspect and calibrate smart farming technologies devices and farm environment control systems to ensure optimum operation performance • Manage aquatic food animal diseases and nutritional deficiencies issues • Review aquatic food animal production quality and yield performances
Manage aquaculture farming facilities, equipment and machinery	<ul style="list-style-type: none"> • Integrate smart farming technologies into farming operations • Manage farming equipment and machinery to ensure optimum operation performance • Develop work instructions and implement preventive maintenance schedule for equipment and machinery servicing • Troubleshoot and execute appropriate corrective maintenance and emergency recovery of farming equipment and machinery • Manage equipment and machinery vendors and maintenance budget • Optimise equipment utilisation and operational cost effectiveness • Ensure housekeeping of farm premises, cleaning of workstations, farming machinery and tools • Ensure sorting and disposal of waste are executed based on predefined standard operating procedures
Manage regulatory and standards compliance	<ul style="list-style-type: none"> • Incorporate farming biosafety, sustainability and Workplace Safety and Health regulatory requirements and standards practices into aquaculture farming operations • Implement Workplace compliance with prevailing regulatory requirement and practices

SKILLS & COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES	
	Active and Smart Packaging	Level 3
	Aquaculture Techniques and Production Programme Management	Level 4
	Budgeting	Level 3
	Business Continuity Management	Level 4
	Business Opportunities Development	Level 4
	Carbon Footprint Management	Level 4
	Continuous Process Improvement	Level 3
	Data and Statistical Analytics	Level 3
	Environmental Management System Policies, Standards, Procedures and Practices Management	Level 3
	Equipment Maintenance and Housekeeping	Level 3
	Farm Biosecurity Compliance and Management	Level 4
	Financial Management	Level 4
	Food Safety Analysis	Level 3
	Food Safety and Hygiene	Level 3
	Food Safety Management	Level 3
	Good Agriculture Practices Implementation	Level 4
	Hazards and Risk Control, and Policy Management	Level 3
	Internet of Things Management	Level 3
	Market Research	Level 3
	Quality Assurance Management	Level 4
	Risk Management and Administration	Level 4
	Robotic and Automation Technology Application	Level 4
	Smart Farming Technology Implementation	Level 4
	Stakeholder Management	Level 3
	Sustainable Farming Practices Implementation	Level 4
	Urban Farming Implementation and Management	Level 4
	Workplace Safety and Health Performance Management	Level 3
TOP 5 CRITICAL CORE SKILLS		
Communication	Intermediate	
Decision Making	Advanced	
Developing People	Intermediate	
Problem Solving	Advanced	
Transdisciplinary Thinking	Intermediate	

Agriculture Technician

JOB ROLE DESCRIPTION

The Agriculture Technician executes farming operation work in accordance with production schedule to support food crop production in a sustainable manner, while complying with prevailing regulations on agricultural practices and food safety standards.

He/She performs food crop propagation, crop cultivation, harvesting, post-harvest and related farming activities, as well as performs routine maintenance on farming equipment and facilities. He also produces production report on food crop health, and yield rate for supply management.

He executes agricultural farming tasks with some supervision by following prescribed standard operating procedures. He works in a controlled agriculture farming environment and adheres to biosecurity, sustainability and workplace safety and health practices and regulations.

	CRITICAL WORK FUNCTIONS	KEY TASKS
CRITICAL WORK FUNCTIONS AND KEY TASKS	Execute agricultural farming operations	<ul style="list-style-type: none"> • Set up workstations, farming equipment and machinery for daily farming operation • Operate farming equipment and machinery • Perform farming operations using smart farming technologies to achieve optimal productivity and sustainable food production • Execute seedlings propagation, harvesting, and post-harvest activities in accordance with production schedule • Execute work processes according to standard operating procedures and complying to Good Agriculture Practices (GAPs) • Implement organisation’s sustainability plans into farming operations • Assist in preparing food crop production reports and inventory status
	Manage regulatory and standards compliance	<ul style="list-style-type: none"> • Apply farm biosafety, sustainability and Workplace Safety and Health standard practices into farming operations • Lead and ensure in staff’s compliance with Workplace Safety and Health practices and regulations

	CRITICAL WORK FUNCTIONS	KEY TASKS
<p>CRITICAL WORK FUNCTIONS AND KEY TASKS (CONTINUED)</p>	<p>Maintain equipment and machinery for farming operations</p>	<ul style="list-style-type: none"> • Perform inspection and calibration of farming equipment and machinery to ensure optimum operation performance • Perform periodic preventive maintenance of farming equipment and machinery • Assist in troubleshooting and resolving equipment and machinery downtime issues • Implement housekeeping and maintenance of farm premises, cleaning of workstations, farming machinery and tools • Supervise in the sorting and disposal of wastes are executed based on predefined standard operating procedures
	<p>Maintain food crop health</p>	<ul style="list-style-type: none"> • Examine food crop for pests, diseases, and nutritional deficiencies • Perform health management programme in accordance with Good Agriculture Practices (GAPs) to ensure optimum food crop production quality and yield performance • Maintain the farm environment control systems with use of smart farming technologies to ensure precise farming, monitoring, and control of farming environment to achieve operational efficiency

SKILLS & COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES	
	Active and Smart Packaging	Level 2
	Agriculture Techniques and Cultivation Programme Management	Level 3
	Continuous Process Improvement	Level 2
	Data and Statistical Analytics	Level 2
	Environmental Management System Policies, Standards, Procedures and Practices Management	Level 2
	Equipment Maintenance and Housekeeping	Level 2
	Farm Biosecurity Compliance and Management	Level 3
	Financial Management	Level 3
	Food Safety Analysis	Level 2
	Food Safety and Hygiene	Level 3
	Food Safety Management	Level 2
	Good Agriculture Practices Implementation	Level 3
	Hazards and Risk Control, and Policy Management	Level 2
	Internet of Things Management	Level 2
	Quality Assurance Management	Level 3
	Risk Management and Administration	Level 3
	Robotic and Automation Technology Application	Level 3
	Smart Farming Technology Implementation	Level 3
	Sustainable Farming Practices Implementation	Level 3
	Urban Farming Implementation and Management	Level 3
	Workplace Safety and Health Performance Management	Level 2
	TOP 5 CRITICAL CORE SKILLS	
	Adaptability	Intermediate
	Collaboration	Intermediate
	Communication	Basic
	Problem Solving	Intermediate
Transdisciplinary Thinking	Basic	

Aquaculture Technician

JOB ROLE DESCRIPTION

The Aquaculture Technician executes farming operation work in accordance with production schedule to support the food fish production in a sustainable manner, while complying with prevailing regulations on aquacultural practices and food safety standards.

He/She performs aquatic food animal breeding, rearing, harvesting, post-harvest and related farming activities, as well as performs routine maintenance on farming equipment and facilities. He also produces production report on aquatic food animal health and growth rate for supply management.

He works in an open-water aquatic farms environment and/or large water aquatic tanks and must possess swimming abilities. He executes aquacultural farming tasks with some supervision by following the prescribed standard operating procedures and adherence to biosecurity, sustainability and workplace safety and health practices and regulations.

	CRITICAL WORK FUNCTIONS	KEY TASKS
CRITICAL WORK FUNCTIONS AND KEY TASKS	Execute aquatic farming operations	<ul style="list-style-type: none"> • Set up of workstation, farming equipment and machinery for daily farming operation • Operate farming equipment and machinery • Perform farming operations using smart farming technologies to achieve optimal productivity and sustainable food production • Execute breeding, feeding, harvesting, and post-harvest activities in accordance with production schedule • Execute work process according to standard operating procedures and complying to Good Agriculture Practices (GAPs) • Implement organisation’s sustainability plans into farming operations • Assist in preparing aquatic food animal production reports and inventory status
	Manage regulatory and standards compliance	<ul style="list-style-type: none"> • Apply farm biosafety, sustainability and Workplace Safety and Health standard practices into farming operations • Lead and ensure staff’s compliance with Workplace Safety and Health practices and regulations

**CRITICAL WORK
FUNCTIONS
AND KEY TASKS
(CONTINUED)**

CRITICAL WORK FUNCTIONS KEY TASKS

Maintain equipment and machinery for farming operations

- Perform inspection and calibration of farming equipment and machinery to ensure optimum operation performance
- Perform periodic preventive maintenance of farming equipment and machinery
- Assist in troubleshooting and resolving equipment and machinery downtime issues
- Implement housekeeping and maintenance of farm premises, cleaning of workstations, farming machinery and tools
- Supervise in the sorting and disposal of wastes are executed based on predefined standard operating procedures

Maintain aquatic food animal health

- Examine aquatic food animal for diseases and nutritional deficiencies
- Perform health management programme in accordance with Good Agriculture Practices (GAPs) to ensure optimum aquatic food animal production quality and yield performance
- Maintain the aquatic farming environment control systems with use of smart farming technologies to ensure precise farming, monitoring, and control of farming environment to achieve operational efficiency

SKILLS & COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES	
	Active and Smart Packaging	Level 2
	Aquaculture Techniques and Production Programme Management	Level 3
	Continuous Process Improvement	Level 2
	Data and Statistical Analytics	Level 2
	Environmental Management System Policies, Standards, Procedures and Practices Management	Level 2
	Equipment Maintenance and Housekeeping	Level 2
	Farm Biosecurity Compliance and Management	Level 3
	Financial Management	Level 3
	Food Safety Analysis	Level 2
	Food Safety and Hygiene	Level 2
	Food Safety Management	Level 2
	Good Agriculture Practices Implementation	Level 3
	Hazards and Risk Control, and Policy Management	Level 2
	Internet of Things Management	Level 2
	Quality Assurance Management	Level 3
	Risk Management and Administration	Level 3
	Robotic and Automation Technology Application	Level 3
	Smart Farming Technology Implementation	Level 3
	Sustainable Farming Practices Implementation	Level 3
	Urban Farming Implementation and Management	Level 3
	Workplace Safety and Health Performance Management	Level 2
	TOP 5 CRITICAL CORE SKILLS	
	Adaptability	Intermediate
	Collaboration	Intermediate
	Communication	Basic
	Problem Solving	Intermediate
	Transdisciplinary Thinking	Basic

Farm Worker

JOB ROLE DESCRIPTION

The Farm Worker performs farming operation works in accordance with instructions and under supervision to support the farm production.

He/She performs farming tasks including food crop cultivation and/or aquatic food animals rearing, harvesting, post-harvest, delivery, and related farming activities, as well as general housekeeping of the farm premises.

He works in a controlled farming environment and adheres to farm biosafety, sustainability and workplace safety and health practices and regulations. He must possess swimming abilities if working in an open-water aquatic farms environment and/or large water aquatic tanks.

	CRITICAL WORK FUNCTIONS	KEY TASKS
CRITICAL WORK FUNCTIONS AND KEY TASKS	Perform farming operation and related activities	<ul style="list-style-type: none"> • Prepare farming materials for daily operation • Perform farming activities in accordance with standard operating procedures and complying to Good Agriculture Practices (GAPs) • Perform farming activities in accordance with organisational sustainability operation plans • Perform harvesting, post-harvest processing, packing and delivery of farm produce
	Perform housekeeping of farming facilities, equipment & machinery	<ul style="list-style-type: none"> • Perform housekeeping of farm premises • Perform cleaning of workstations, farming equipment, machinery and tools • Perform sorting of organic wastes, processing of by-products and disposal of non-recyclable wastes
	Manage regulatory and standards compliance	<ul style="list-style-type: none"> • Carry out farming operations in accordance with organisational farm biosafety, sustainability and Workplace Safety and Health practices

SKILLS & COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES	
	Active and Smart Packaging	Level 2
	Agriculture Techniques and Cultivation Programme Management	Level 2
	Aquaculture Techniques and Production Programme Management	Level 2
	Continuous Process Improvement	Level 1
	Environmental Management System Policies, Standards, Procedures and Practices Management	Level 1
	Equipment Maintenance and Housekeeping	Level 1
	Food Safety and Hygiene	Level 1
	Food Safety Management	Level 1
	Good Agriculture Practices Implementation	Level 2
	Hazards and Risk Control, and Policy Management	Level 2
	Robotic and Automation Technology Application	Level 2
	Sustainable Farming Practices Implementation	Level 2
	Urban Farming Implementation and Management	Level 2
	Workplace Safety and Health Performance Management	Level 2
	TOP 5 CRITICAL CORE SKILLS	
	Adaptability	Basic
	Collaboration	Basic
	Communication	Basic
Problem Solving	Basic	
Transdisciplinary Thinking	Basic	

Technical Skills and Competencies (TSCs)

TSC Category	TSC Title	TSC Description	Proficiency Levels						
			1	2	3	4	5	6	
Business Management	Budgeting	Preparing organisational budgets to support short and long-term business plans through forecasting, allocation, and financial policy setting.			●	●			
	Business Continuity Management	Execute business impact analysis, risk analysis, testing and exercising to ensure the currency of the organisation's business continuity plans.				●	●		
	Business Opportunities Development	Identify new business opportunities to better meet the needs of existing markets and bring benefits to the organisation.				●	●		
	Financial Management	Manage organisation's finance to aid business growth and operations.			●	●	●		
	Market Research	Formulate market research frameworks, as well as develop market research study objectives, market research plans and methodologies to analyse market trends and developments to forecast emerging market needs.			●	●			
Environmental Sustainability	Carbon Footprint Management	Quantify and reduce the organisational carbon footprint.				●	●		
Farming Operations	Active and Smart Packaging	Application of active/smart packaging methodology and processes to improve shelf-life, quality, and safety of food product.		●	●	●			
	Agriculture Techniques and Cultivation Programme Management	Apply agriculture principles and techniques to cultivate and grow produce, incorporating agritechnologies and processes to optimise yield in accordance with business objectives.		●	●	●			
	Aquaculture Techniques and Breeding Programme Management	Apply aquaculture principles and techniques to rear aquatic food animals, incorporating aquatechnologies and processes to optimise yield in accordance with business objectives.		●	●	●			

TSC Category	TSC Title	TSC Description	Proficiency Levels						
			1	2	3	4	5	6	
Farming Operations (Continued)	Farm Biosecurity Compliance and Management	Develop and implement farm biosecurity management plans to control and mitigate environmental and biosecurity risks in farming operations in accordance with industry regulations and standards and to meet organisational business goals.			●	●	●		
	Urban Farming Implementation and Management	Develop strategic farm operational plan, manage, and implement the day-to-day farming operations, management of farming equipment and machinery housekeeping and maintenance.		●	●	●	●		
Food Regulatory Compliance	Food Safety Analysis	Apply methods to analyse ingredients and manufactured products for safety and quality management.		●	●	●			
	Food Safety and Hygiene	Implement and observe food safety and hygiene policies, identify areas for improvement following hygiene audits, develop and audit food safety and hygiene management systems.	●	●	●	●			
	Food Safety Management	Implement hygiene and food safety practices in food manufacturing.	●	●	●	●			
Info-comm Technology	Data and Statistical Analytics	Identify data sets for application of statistical techniques to analyse and interpret large complex data to uncover trends or patterns to locate and define new process improvement opportunities.		●	●	●			
Maintenance Management	Equipment Maintenance and Housekeeping	Maintain and upkeep tools and equipment and implement organisational housekeeping practices.	●	●	●				
Quality Management	Continuous Process Improvement	Apply continuous improvement processes to improve products, services or processes seeking incremental improvement over time or breakthrough improvement all at once.	●	●	●	●			

TSC Category	TSC Title	TSC Description	Proficiency Levels						
			1	2	3	4	5	6	
Quality Management (Continued)	Good Agriculture Practices Implementation	Establish and implement Good Agriculture Practices into organisational culture in the design, monitoring and control of farming processes and facilities management.		●	●	●	●		
	Quality Assurance Management	Establish and implement Quality Assurance procedures and conduct audits to ensure compliance with food safety and legislative requirements.			●	●	●		
Stakeholder and Customer Management	Stakeholder Management	Monitor and maintain constructive relationships with stakeholders by influencing their expectations appropriately to help a business move toward its stated goals.			●	●			
Sustainability Management	Environmental Management System Policies, Standards, Procedures and Practices Management	Apply an effective and systematic process for managing and maintaining Environmental Management System policies, standards, procedures, and practices in accordance with legislative requirement and management system requirements.	●	●	●	●			
	Sustainable Farming Practice Implementation	Develop organisational sustainability goals, policies and plans and implement sustainability practices to ensure that farming is carried out based on best practices and protocols that uses clean energy, optimise water efficiency, minimise pollution and impact on the environment.		●	●	●	●		
Technology Application	Robotic and Automation Technology Application	Integrate robotic and automation technologies in engineering services, including construction, operations, and maintenance to enhance productivity and precision and to reduce reliance on manual tasks.		●	●	●	●		

TSC Category	TSC Title	TSC Description	Proficiency Levels						
			1	2	3	4	5	6	
Technology Management	Internet of Things Management	Interrelate computing devices, equipment, and machines' data in a networked environment to provide specific solutions.		●	●	●	●		
	Smart Farming Technology Implementation	Strategise, integrate, and deploy emerging agriculture and/or aquaculture technology to streamline farming processes and operation practices, maximise productivity and achieve sustainable food production.			●	●	●		
Workplace Safety and Health	Hazards and Risk Control, and Policy Management	Ensure a systematic and objective approach for hazards identification and risk assessment to effectively manage the hazards that may occur within the workplace.		●	●	●			
	Risk Management and Administration	Identify, assess, and prioritise risks and apply resources to mitigate risks and impact of incidents.			●	●	●		
	Workplace Safety and Health Performance Management	Implement workplace safety and health (WSH) practices in accordance with legislative requirements.		●		●	●		

TSCs General Descriptor

Level	Responsibility (Degree of supervision and accountability)	Autonomy (Degree of decision-making)	Complexity (Degree of difficulty of situations and tasks)	Knowledge and Abilities (Required to support work as described under Responsibility, Autonomy and Complexity)
6	Accountable for significant areas of work, strategy, or overall satisfaction	Empowered to chart direction and practices within and outside of work (including professional field/ community), to achieve/exceed work results.	Complex	<ul style="list-style-type: none"> • Synthesise knowledge issues in a field of work and the interface between different fields and create new forms of knowledge • Employ advanced skills, to solve critical problems and formulate new structures, and/or to redefine existing knowledge or professional practice • Demonstrate exemplary ability to innovate and formulate new ideas and structures
5	Accountable for achieving assigned objectives, decisions made by self and others	Provide leadership to achieve desired work results; Manage resources, set milestones, and drive work.	Complex	<ul style="list-style-type: none"> • Evaluate factual and advanced conceptual knowledge within a field of work, involving critical understanding of theories and principles • Select and apply an advanced range of cognitive and technical skills, demonstrating mastery and innovation, to devise solutions to solve complex and unpredictable problems in a specialised field of work • Manage and drive complex work activities
4	Work under broad direction Hold accountability for performances of self and others	Exercise judgement; adapt and influence to achieve work performance.	Less Routine	<ul style="list-style-type: none"> • Evaluate and develop factual and conceptual knowledge within a field of work • Select and apply a range of cognitive and technical skills to solve non-routine/ abstract problems • Manage work activities which may be unpredictable • Facilitate the implementation of innovation

TSCs General Descriptor (Continued)

Level	Responsibility (Degree of supervision and accountability)	Autonomy (Degree of decision-making)	Complexity (Degree of difficulty of situations and tasks)	Knowledge and Abilities (Required to support work as described under Responsibility, Autonomy and Complexity)
3	<p>Work under broad direction</p> <p>May hold some accountability for performance of others, in addition to self</p>	<p>Use discretion in identifying and responding to issues, work with others and contribute to work performance.</p>	<p>Less Routine</p>	<ul style="list-style-type: none"> Apply relevant procedural and conceptual knowledge and skills to perform differentiated work activities and manage changes Able to collaborate with others to identify value-adding opportunities
2	<p>Work with some supervision</p> <p>Accountable for a broader set of tasks assigned</p>	<p>Use limited discretion in resolving issues or enquiries. Work without frequently looking to other for guidance.</p>	<p>Routine</p>	<ul style="list-style-type: none"> Understand and apply factual and procedural knowledge in a field of work Apply basic cognitive and technical skills to carry out defined tasks and to solve routine problems using simple procedures and tools Present ideas and improve work
1	<p>Work under direct supervision</p> <p>Accountable for tasks assigned</p>	<p>Minimal discretion required. Expected to seek guidance.</p>	<p>Routine</p>	<ul style="list-style-type: none"> Recall factual and procedural knowledge Apply basic skills to carry out defined tasks Identify opportunities for minor adjustments to work tasks

Critical Core Skills (CCSs)

Critical Core Skills (CCS) comprises of 16 competencies across three skills cluster, that workplaces deem essential. They are:

Interacting with Others: Learning from others is an effective way to acquire new skills, exchange ideas and build a shared understanding of a problem or situation.

Staying Relevant: Managing oneself effectively and paying close attention to trends that impact work and living, to provide the strategies, direction and motivation for technical skill development.

Thinking Critically: Cognitive skills are the root of technical skill development and progression. It is needed to think broadly and creatively to see connections and opportunities during change.

INTERACTING WITH OTHERS

CCS	CCS Description	Proficiency Levels		
		Basic	Intermediate	Advanced
Building Inclusivity	Collaborate with stakeholders from different backgrounds or with different abilities, to understand the interests of diverse groups and build an inclusive work environment.	Demonstrate sensitivity to the differences in diversity dimensions and perspectives.	Manage relationships across diverse groups within the organisation.	Oversee the develop and implement processes and practices which build an inclusive work environment and enable diverse groups to work effectively together.
Collaboration	Manage relationships and work collaboratively and effectively with others to achieve goals.	Contribute to a positive and cooperative working environment by fulfilling own responsibilities, managing interpersonal relationships and providing support to others to achieve goals.	Build relationships and work effectively with internal and external stakeholders to create synergies in working towards shared goals.	Establish team effectiveness and manage partnerships to create a cooperative working environment which enables the achievement of goals.

INTERACTING WITH OTHERS (CONTINUED)

CCS	CCS Description	Proficiency Levels		
		Basic	Intermediate	Advanced
Communication	Convey and exchange thoughts, ideas, and information effectively through various mediums and approaches.	Communicate with others to share information, respond to general inquiries and obtain specific information.	Tailor communication approaches to audience needs and determine suitable methods to convey and exchange information.	Synthesise information and inputs to communicate an overarching storyline to multiple stakeholders.
Customer Orientation	Identify the needs of customers, both internal and external, to deliver an effective customer experience.	Demonstrate an understanding of customer needs or objectives to respond in a way which delivers an effective customer experience.	Build relationships with customers to anticipate needs and solicit feedback to improve the customer experience.	Foster the creation of an effective customer experience.
Developing People	Empower others to learn and develop their capabilities to enhance their performance and achieve personal or professional goals.	Create individual career and development plans, and support co-workers in performing their work activities.	Develop and coach team members to identify and leverage their strengths to enhance performance.	Foster a conducive environment to enable employees' professional and personal development, in alignment with the organisation's objectives and goals.
Influence	Influence behaviours, beliefs, or attitudes to achieve desired outcomes and solutions.	Demonstrate empathy to understand the feelings and actions of others and communicate in ways that limit misunderstandings and influence others on operational issues.	Develop relationships with stakeholders to build confidence, alignment and communicate desired purpose, goals, or objectives.	Build consensus with stakeholders to achieve desired outcomes on matters of strategic importance.

STAYING RELEVANT

CCS	CCS Description	Proficiency Levels		
		Basic	Intermediate	Advanced
Adaptability	Exercise flexibility in behaviours or approaches to respond to changes and evolving contexts.	Modify behaviours and approaches to respond to changes and evolving contexts.	Manage change in evolving contexts.	Foster a culture of flexibility that caters to changes and evolving contexts.
Digital Fluency	Leverage digital technology tools, systems, and software across work processes and activities to solve problems, drive efficiency and facilitate information sharing.	Perform work processes and activities using identified digital technology tools, systems, and software.	Identify opportunities and evaluate risks of integrating digital technology tools, systems and software across work processes and activities.	Drive the creation of a digital culture and environment, educating stakeholders across the organisation on the benefits and risks of digital technology tools, systems, and software.
Global Perspective	Operate in cross-cultural environments, demonstrating an awareness of the wider global context and markets to identify potential opportunities and risks.	Demonstrate an understanding of global challenges and opportunities to work effectively in a cross-cultural environment.	Develop global networks and determine impact of global context and trends on the organisation's vision, objectives, and operating climate.	Lead the resolution of the challenges of operating in a cross-cultural environment and build the organisation's capabilities to compete in a global environment.
Learning Agility	Deploy different learning approaches which enable continuous learning across different contexts to drive self-development and the achievement of long-term career goals.	Identify opportunities and targets for learning to facilitate continuous career development.	Deploy various learning approaches in different settings to maximise opportunities for learning and self-reflection and measure their impact on the achievement of career goals.	Establish an organisational culture of continuous learning to encourage the adoption of new learning approaches and identification of new learning opportunities.

STAYING RELEVANT (CONTINUED)

CCS	CCS Description	Proficiency Levels		
		Basic	Intermediate	Advanced
Self-Management	Take ownership of managing one's personal effectiveness, personal brand, and holistic physical, mental, emotional, and social well-being.	Exercise self-awareness by monitoring own behaviours and ways of working in personal and professional capacities and implement techniques for improvement.	Analyse own wellbeing and personal effectiveness to develop strategies to regulate self and build personal brand.	Evaluate strategies to manage own wellbeing, personal effectiveness, and personal brand.

THINKING CRITICALLY

CCS	CCS Description	Proficiency Levels		
		Basic	Intermediate	Advanced
Creative Thinking	Adopt diverse perspectives in combining ideas or information and making connections between different fields to create different ideas, improvements, and solutions.	Connect ideas or information to propose and test ideas, improvements and solutions which challenge current assumptions or ways of working.	Integrate multiple ideas and information from across various fields to develop solutions and new ways of working which address specific issues and deliver impact.	Cultivate a culture of innovation and creativity across the organisation to push boundaries and reshape goals and possibilities.
Decision Making	Choose a course of action from several alternatives developed through a structured process to achieve intended goals.	Follow processes to make decisions which achieve intended goals using given information and guidelines.	Implement structured decision-making processes and analyse multiple sources of information to propose solutions.	Define decision-making criteria, processes and strategies and evaluate their effectiveness.

THINKING CRITICALLY (CONTINUED)

CCS	CCS Description	Proficiency Levels		
		Basic	Intermediate	Advanced
Problem Solving	Generate effective and efficient solutions to solve problems and capitalise on new opportunities.	Identify problems and implement guidelines and procedures to solve problems and test solutions.	Determine underlying causes of problems and collaborate with other stakeholders to implement and evaluate solutions.	Anticipate potential problems to drive a culture of continuous improvement which seeks to turn problems into opportunities across the organisation.
Sense Making	Leverage sources of qualitative and quantitative information and data to recognise patterns, spot opportunities, infer insights and inform decisions.	Organise and interpret information to identify relationships and linkages.	Analyse information and data and uncover patterns, opportunities, and impacts.	Evaluate relationships, patterns, and trends to inform actions and generate wider insights.
Transdisciplinary Thinking	Apply concepts from multiple disciplines, and synthesise different areas of knowledge and insights to guide decisions, foster cooperation, and drive continuous improvement.	Explore concepts from outside one's field of expertise to supplement one's knowledge, proficiency and work practices.	Identify opportunities for transdisciplinary collaboration and Knowledge transfer to facilitate the integration of knowledge from different disciplines.	Endorse collaboration and the integration of Knowledge across disciplines to make decisions and solve problems within and outside the organisation.

Learn more about CCS at

<https://www.skillsfuture.gov.sg/initiatives/mid-career/criticalcoreskills>