NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING

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PROPOSED OCCUPATIONAL STANDARDS

OCCUPATION: AQUACULTURE TECHNICIAN

LEVEL: NTA 5

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ABBREVIATIONS

CBET	Competency Based Education and Training
NACTVET	National Council for Technical and Vocational Education and Training
NOS	National Occupational Standards
OS	Occupational Standards
TET	Technical Education and Training
TVET	Technical and Vocational Education and Training

GLOSSARY OF TERMS

Circumstantial Knowledge:	Detailed knowledge, which allows the decision-making in regard to different circumstances and cross cutting issues.
Competence:	The ability to use knowledge, understanding, practical, and thinking skills to perform effectively to the workplace standards required in employment.
Competency:	A description of the ability one possesses when able to perform a given occupational task effectively and efficiently.
Competency-based Education:	An instructional programme that derives its content from validated tasks and bases assessment on the learner's performance.
Curriculum:	A description or composite of statements about "what is to be learned" by the trainee/student in a particular instructional programme; a product that states the "intended learning outcomes".
Educational/Training Programme:	The complete curriculum and instruction (what and how) that is designed to prepare a person for employment in a job or other particular performance situation.
Occupation:	A specific position requiring the performance of specific tasks – essentially the same tasks are performed by all employees having the same title. (Example: baker)
Occupational Area:	This is a broad grouping of related jobs. (Example: food service)
Occupational Competence:	The application of knowledge and skills that consistently meet the standards required by the work context.
Occupational Standards:	Specific requirements of competences people are expected to demonstrate in a particular occupational area, including knowledge and relevant attitudes. They also act as a performance tool of assessment of the prescribed outcomes.
Occupational/Job Analysis:	A process used to identify the tasks that are important to employees in any given occupation.
Performance Criteria:	Indicate expected end results or outcomes in the form of evaluative statements.
Skills:	The ability to perform occupational tasks with a high degree of proficiency within a given occupation. Skill is conceived of as a composite of three completely interdependent components: cognitive, affective, and psychomotor.

Standards:	A set of statements, which if proved true under working conditions, means that an individual is meeting an expected level and type of performance.
Task Analysis:	The process of analysing each task to determine the steps, circumstantial knowledge, attitudes, performance standards, tools and materials needed, as well as safety concerns required for the employees performing it.
Task:	A work activity that has a definite beginning and ending, is observable or measurable, and consists of two or more definite steps that leads to a product, service, or decision.
Underpinning Knowledge:	Crucial knowledge that an individual must acquire in order to demonstrate competences that are associated in performing a given task.
Verification Process:	The process of having experts review and confirm the importance of the task (competency) statements identified through occupational analysis. Other questions, such as the degree of task learning difficulty are also frequently asked. This process is also sometimes referred to as validation.

1.0. INTRODUCTION

Technical Education and Training (TET) is one of the most important education sub-sectors in Tanzania, responsible for developing a skilled workforce to support the country's industrialization economic agenda. Tanzania's *Development Vision 2025* intends to raise the country's economy to a middle-income status. This requires a skilled workforce that is aligned with the needs of the public and private sectors of the economy. The National Council for Technical and Vocational Education and Training of Tanzania has begun the job of drafting Occupational Standards that will eventually be adopted as National Occupational Standards for TET in order to ensure that it meets the needs of the labour market and the country's economic agenda.

National Occupational Standards (NOS) are performance criteria that are matched with labour market demands. Each National Occupational Standard describes functions, performance standards, and knowledge/understanding for one important function or task. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruiting, supervision, and appraisal, as well as TET standards. They're also helpful for benchmarking and harmonizing qualifications on a national and international level. Standards, in general, provide a solid framework for high-quality TET that is labour market-relevant, current and consistent in delivery across all public and private institutions.

However, it must be noted that, Occupational Standards and Training Standards/Qualifications Standards are different. Occupational Standards are defined in terms of activities performed by a person in a selected occupation (e.g., an electrical engineer designs electrical circuits, performs fault in electrical wiring, etc.) and they are usually defined by employers following procedures agreed upon by all stakeholders. Education and Training standards are developed from the activities defined in occupational standards, and they include learning objectives to ensure that the necessary skills and knowledge are developed by a person to enable him or her to function at an agreed level in an occupation. Education and Training standards are used to define curricula in training institutions. It is however critical that there must be a direct link between the Occupational Standards and the training standards to respond to demands of the labour market.

In TET delivery, Tanzania adopted the Competence Based Education and Training (CBET) approach. The CBET approach focuses on providing learners with the skills and knowledge required to meet the Occupational Standards. Occupational Standards are thus the starting point for developing competency-based training (CBET) programmes. TET institutions will be required to benchmark their curricula with relevant Occupational Standards.

Occupational Standards are developed based on a given occupation's current and future demands. As a result, they serve as a means of bridging the gap between the worlds of employment and technical education and training (TET).

The Aquaculture Technician Occupation has its own set of occupational standards. The document explains how the Occupational Standards were developed, as well as the scope, the occupational profile in the form of DACUM charts, and the Occupational Standards.

2.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS

The Occupational Standards development process began with an examination of major documents that guide Tanzanian skill development. The *10-year National Skills Development Strategy (2016-2026)* was one of the documents reviewed, and it outlined six (6) economic sectors that should be prioritized when developing skills development programmes.

These sectors include: Transport and Logistics, Tourism and Hospitality, Agribusiness, Construction, Energy and ICT. NACTE labour market reports were also used in the literature review to determine the skills demand in the Tanzanian labour market as a whole.

After the literature review, a workshop comprised of experts and educators with substantial knowledge and experience in the occupation conducted an occupational analysis utilizing the DACUM approach to produce the occupational profile. The analysis resulted in DACUM Charts, which are attached as **Appendix 1** to this document.

The Occupational Standards were then developed. Experts in Occupational Analysis and the Development of Occupational Standards facilitated the workshop. Interviews, online surveys, and a stakeholder forum were used to validate the Occupational Standards. Engineers, supervisory technicians on the job, and experienced Aquaculture Technicians were key informants in the survey to discover occupational trends. The information was used to gain insight from the workplaces regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation. A total of ..... online surveys were completed by experts from the labour market across the country. Apart from the survey aiding in defining the scope for the occupational analysis, they also served to engage a wide cross-section of experts in the occupation. Apart from this, the stakeholders' forum was attended by ... participants from different parts of the country representing various companies.

3.0. THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR AQUACULTURE TECHNICIANS

The standards cover a broad range of duties and tasks that can be performed by an Aquaculture Technician. However, the occupational standards are not meant to replace individual job

descriptions. Instead, they are to be used for guidance in defining skill levels and knowledge for the technician in specific settings or positions. Aquaculture Technicians may perform tasks in a number of key areas of the occupational standards, but not necessarily in all areas. For example, in large operations, other individuals may be employed or designated to perform specific tasks.

The Aquaculture TechnicianS shall work under the supervision of engineers. Generally, the Aquaculture Technician performs the following responsibilities:

a) Aquaculture pond preparation

b) Cultivation of water quality

c) Fingerling transportation

d) Fingerling stocking

e) Adult aquaculture

f) Aquaculture process management

g) Fishing

h) Live transportation

The Occupational Standards have been clustered into NTA qualification levels i.e. NTA 5.

4.0. VALIDITY PERIOD

Due to the rapid development of technology, the validity period of occupational standards is 3-5 years. The review will proceed in the same manner as the one before it, with new occupational standards being developed based on current trends of the labour market.

5.0. OCCUPATIONAL STANDARDS

5.1 OCCUPATIONAL STANDARDS FOR AQUACULTURE TECHNICIAN - NTA 5

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	AQUACULTURE POND PREPARATION	**DUTY NO.**	501
TASK TITLE	POND RENOVATION, CLEANING AND DISINFECTION	**TASK NO.**	5011
PERFORMANCE CRITERIA	The person performing this task must be able to renovate, clean and disinfect the ponds in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Hoes; 2. Spades; 3. Wooden rakes; 4. Plastic bailers.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Inspect the condition of the pond, including the condition of the pond bottom and the integrity of the fencing, and carry out necessary repair work; 2. Clean up weeds, sludge, and other debris in the pond; 3. Disinfect the pond with appropriate disinfectants such as bleach or other aquaculture-specific disinfectants to kill possible pathogens or bacteria; 4. Install and debug equipment to ensure its normal operation; 5. Lay coverings; 6. Inspect and maintain the operation of the pond regularly, including water quality monitoring, feedstuff replenishment and disease and insect pest control.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Develop pond renovation plans for the following items; a. Drain the pond; b. Remove the grass; c. Bulldoze the bottom of the pond and repair gaps and landslides; 1.2 Clean and disinfect the pond. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The principle of safety; 2.2 The principle of sanitation; 2.3 Environmental principles; 2.4 The principle of efficiency; 2.5 Economical principles. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The role of renovating ponds; 3.2 The importance of cleaning and disinfection;

	3.3 Determination of the repair target; 3.4 Pond measurement and planning; 3.5 Environmental protection. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Operation skills; 4.4 Knowledge of disease prevention and control; 4.5 Safety consciousness; 4.6 Problem-solving skills; 4.7 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Ponds are renovated, cleaned and disinfected in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Pond drainage operations; 2. Pond cleaning operations; 3. Pond cleaning operations with quicklime; 4. Aquaculture knowledge.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	AQUACULTURE POND PREPARATION	**DUTY NO.**	501
TASK TITLE	RENOVATION AND MAINTENANCE OF INLETS AND DRAINAGE CHANNELS	**TASK NO.**	5012
PERFORMANCE CRITERIA	The person performing this task must be able to renovate and maintain the inlets and drainage channels in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Hoes; 2. Spades; 3. Wooden rakes; 4. Water pumps.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Clean up the channel: Clean up the sludge, weeds and other blockages in the channel to ensure smooth water flow; 2. Repair cracks and fill collapsed openings to maintain the integrity and stability of the channel; 3. Inspect the channel regularly to find and repair the leakage and seepage to ensure normal operation; 4. Clean and disinfect the channel regularly by using the knowledge and skills of disinfectants and cleaning agents to prevent the growth and spread of pathogenic bacteria; 5. Overhaul and maintain sluices and dams; 6. Follow the operating procedures and take corresponding protective measures.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Develop plans for the following items; a. Repair gaps and landslides; b. Dredge the inlets and drainage channels; 1.2 Open and close inlet and drainage pumps. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Basic principles for inlet and drainage; 2.2 The principle of safety; 2.3 Regular maintenance of infrastructures; 2.4 The principle of efficiency; 2.5 Environmental principles. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Repair of gaps and landslides; 3.2 Dredging of inlets and drainage channels. **4.0 Essential Skills** 4.1 Communication skills;

	4.2 Teamwork skills; 4.3 Operation skills; 4.4 Knowledge of disease prevention and control; 4.5 Safety consciousness; 4.6 Problem-solving skills; 4.7 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The inlets and drainage channels are renovated and maintained in accordance with technical requirements.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	AQUACULTURE POND PREPARATION	**DUTY NO.**	501
TASK TITLE	KNOWLEDGE OF MECHANICAL EQUIPMENT FOR EXCAVATION AND RENOVATION OF PONDS	**TASK NO.**	5013
PERFORMANCE CRITERIA	The person performing this task must be able to understand the knowledge of mechanical equipment for excavation and renovation of ponds in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Long arm excavators; 2. Bulldozers; 3. Carry scrapers; 4. Dump trucks; 5. Shovels (pointed and flat); 6. Handcarts; 7. Level gauges; 8. Steel tapes.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Operate in accordance with the size of the pond and the specific needs for excavation or renovation; 2. Develop a detailed construction plan before excavation or renovation; 3. Possess skilled mechanical equipment operation skills and be able to precisely control the motion of mechanical equipment; 4. Recognize terrains and adapt to operations; 5. Monitor construction sites and control the quality; 6. Determine excavation sequence and the slope; 7. Trim the edges and clean the bottom.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Develop plans for the following items; a. Determine excavation sequence and the slope; b. Trim the edges and clean the bottom; 1.2 Inspect the elevation, length, width and slope of the pond surface. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The principle of safety; 2.2 The principle of environmental protection; 2.3 The principle of construction. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Determine excavation sequence and the slope; 3.2 Trim the edges and clean the bottom;

	3.3 Determine terrains and control the quality. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills; 4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The knowledge of mechanical equipment for excavation and renovation of ponds are comprehended in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Determination of excavation sequence and slope; 2. Edge trimming and bottom cleaning; 3. Inspection of level gauges; 4. Measurement operations.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CULTIVATION OF WATER QUALITY	**DUTY NO.**	502
TASK TITLE	CULTIVATION OF POND WATER	**TASK NO.**	5021
PERFORMANCE CRITERIA	The person performing this task must be able to cultivate the pond water in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Bolting silks; 2. Impeller aerators; 3. Automatic dissolved oxygen controllers; 4. Aerator switches; 5. Cables; 6. Nylon ropes; 7. Shovels.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Install impeller aerators; 2. Install impeller aerator switches; 3. Install dissolved oxygen controllers; 4. Ferment the organic fertilizer; 5. Open and close inlet pumps.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Identify water color; 1.2 Perform pond oxygen supplement; 1.3 Identify wild fishes and their hazards. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The principle of water quality detection; 2.2 The principle of adjusting water quality; 2.3 The principle of feedstuff management. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Identification of high-quality water colors; 3.2 Identification of wild fishes and their hazards. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills;

	4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The pond water is cultivated in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Pond inlet operations; 2. Installation and commissioning of aerators; 3. Identification of high-quality water colors; 4. Identification of wild fishes and their hazards.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CULTIVATION OF WATER QUALITY	**DUTY NO.**	502
TASK TITLE	USE OF VARIOUS WATER QUALITY DETECTION KITS	**TASK NO.**	5022
PERFORMANCE CRITERIA	The person performing this task must be able to use various water quality detection kits in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Hydrophores; 2. Reference cards; 3. pH meters; 4. Black-and-white transparent scales; 5. Mercury thermometers; 6. Water quality kits for ammonia nitrogen, hardness, total alkalinity, dissolved oxygen and nitrite;		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Carry out water collection by hydrophores; 2. Use pH meters; 3. Use the ammonia nitrogen kit to detect ammonia nitrogen; 4. Use the hardness kit to detect hardness; 5. Use the total alkalinity kit to detect total alkalinity; 6. Use the dissolved oxygen kit to detect ammonia nitrogen; 7. Use the nitrite kit to detect nitrite.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Develop aquaculture water measurement projects and functions; 1.2 Comprehend the rapid determination method of conventional water quality factors. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The principle of water quality monitoring; 2.2 The principle of adjusting water quality; 2.3 The principle of feedstuff management; 2.4 The principle of disease prevention and control. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Aquaculture water measurement projects and functions; 3.2 Rapid determination methods of conventional water quality factors.

	4.0 Essential Skills 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills; 4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Various water quality detection kits are used in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Commonly-used water quality detection items; 2. Rapid determination of commonly-used water quality factors.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	FINGERLING TRANSPORTATION	**DUTY NO.**	502
TASK TITLE	PREPARATION OF EQUIPMENT AND METHODS OF FINGERLING TRANSPORTATION	**TASK NO.**	5022
PERFORMANCE CRITERIA	The person performing this task must be able to prepare fingerling transportation equipment in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Special nylon bags; 2. Special transport vehicles; 3. Oxygen cylinders; 4. Oxygen gauges; 5. Inflation tubes.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate transportation equipment based on the type and quantity of fingerlings; 2. Prepare suitable transportation media according to the needs of fingerlings; 3. Ensure a suitable water quality; 4. Pack fingerlings; 5. Provide a suitable temperature environment based on the characteristics of fingerlings; 6. Provide proper ventilation; 7. Check the fingerling status regularly; 8. Transport fingerlings safely.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Identify fingerling transportation equipment; 1.2 Transport fingerlings. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Important principles of safety during transportation; 2.2 The principle of breathability; 2.3 The principle of safety transportation; 2.4 The principle of ventilation. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Fingerling transportation equipment; 3.2 Fingerling transportation methods. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills;

	4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Fingerling transportation equipment is prepared in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Fingerling transportation equipment; 2. Fingerling transportation methods.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	FINGERLING TRANSPORTATION	**DUTY NO.**	502
TASK TITLE	FINGERLING TRANSPORTATION MANAGEMENT	**TASK NO.**	5022
PERFORMANCE CRITERIA	The person performing this task must be able to manage fingerling transportation in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Live water transport vehicles; 2. Spoon nets; 3. Dissolved oxygen meters; 4. Thermometers.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Inspect tools and equipment; 2. Place the fingerlings in appropriate packaging materials; 3. Add appropriate transportation media, such as water, wet wood chips and wet sponges to keep the fingerlings moist and breathable; 4. Control environmental parameters; 5. Check the fingerling conditions regularly; 6. Transport safely.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Ensure the health of fingerlings; 1.2 Ensure the transportation density, water temperature and time. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The principle of biosafety; 2.2 The principle of temperature control; 2.3 The principle of water quality control. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Oxygen demand during live transportation; 3.2 Temperature fluctuation range during live transportation. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills; 4.5 Knowledge of disease prevention and control;

	4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The fingerling transportation management is carried out in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Biological characteristics of transported fingerlings; 2. Functions of transport equipment.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	FINGERLING STOCKING	**DUTY NO.**	504
TASK TITLE	PREPARATION OF COMMONLY-USED FINGERLING DISINFECTANTS	**TASK NO.**	5041
PERFORMANCE CRITERIA	The person performing this task must be able to prepare commonly-used fingerling disinfectants in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Water quality testing tools; 2. Feedstuff feeding equipment; 3. Measuring tools of aquaculture facilities; 4. Aquaculture recording software or tables; 5. Computers and calculators; 6. References and databases.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Choose proper disinfectants; 2. Prepare disinfectants correctly according to the instructions and recommended proportions; 3. Adjust the concentration of disinfectants; 4. Determine the appropriate soaking time based on the characteristics of the fingerlings and suggestions for disinfectants; 5. Take appropriate safety measures during the preparation and operation of disinfectants.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Prepare fingerling disinfectants; 1.2 Choose the appropriate disinfectant according to specific situations and the characteristics of the fingerlings; 1.3 Add an appropriate amount of disinfectant into the water as needed according to the concentration requirements of the disinfectant, and mix thoroughly; 1.4 Leave sufficient contact time to kill pathogens according to the instructions of disinfectants and the resistance of fingerlings. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Basic principles of fingerling disinfectants; 2.2 The principle of safety; 2.3 Applicable principles; 2.4 Effect principles. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Biological characteristics of main aquaculture

	fingerling species; 3.2 Fingerling disinfectants and the usage methods. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills; 4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The commonly-used fingerling disinfectants are prepared in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Biological characteristics of main aquaculture fingerling species; 2. Common fingerling disinfectants.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	FINGERLING STOCKING	**DUTY NO.**	504
TASK TITLE	FINGERLING DISINFECTION	**TASK NO.**	5042
PERFORMANCE CRITERIA	The person performing this task must be able to disinfect the fingerlings in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Water quality testing tools; 2. Feedstuff feeding equipment; 3. Measuring tools of aquaculture facilities; 4. Aquaculture recording software or tables; 5. Computers and calculators; 6. References and databases.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Understand the characteristics and applicable scopes of different disinfectants; 2. Prepare for the preparation of disinfectants; 3. Clean and prepare fingerling containers or equipment that need to be disinfected; 4. Soak the fingerlings into disinfectants; 5. Carry out the work after washing and disposal; 6. Record the parameters and results of the disinfection.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: The person performing this task must be able to explain how to: 1.1 Disinfect fingerlings; 1.2 Detect fingerlings; 1.3 Prepare disinfectants; 1.4 Operate in accordance with safety specifications. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Determination of fingerling disinfection methods; 2.2 The principle of safety; 2.3 Applicable principles; 2.4 Effect principles. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Biological characteristics of aquaculture fingerlings; 3.2 Correct use of fingerling disinfectants; 3.3 Safe use and specifications. **4.0 Essential Skills** 4.1 Communication skills;

	4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills; 4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Fingerlings are disinfected in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Basic knowledge of fingerling disinfection; 2. Commonly-used fingerling disinfectants; 3. Fingerling detection.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	FINGERLING STOCKING	**DUTY NO.**	504
TASK TITLE	CALCULATION OF THE STOCKING FINGERLING QUANTITY	**TASK NO.**	5043
PERFORMANCE CRITERIA	The person performing this task must be able to use various water quality detection kits in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Water quality testing tools; 2. Feedstuff feeding equipment; 3. Measuring tools of aquaculture facilities; 4. Aquaculture recording software or tables; 5. Computers and calculators; 6. References and databases.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Be familiar with the growth characteristics of aquaculture animals; 2. Calculate the stocking fingerling quantity; 3. Consider the capacity of the aquaculture facility; 4. Understand the needs of fingerlings; 5. Design the discharge specifications and unit output of aquaculture species; 6. Consider the ecosystem balance of the aquaculture water body comprehensively; 7. Monitor the water quality of stocking water body regularly.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Determine the discharge specifications of aquaculture species; 1.2 Determine the unit output of aquaculture species; 1.3 Determine the mode and level of stocking. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The principle of environmental capacity; 2.2 The principle of growth rate; 2.3 The principle of aquaculture density; 2.4 The principle of ecological balance. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The discharge specifications of aquaculture species; 3.2 The unit output of aquaculture species. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills;

	4.3 Report writing skills; 4.4 Operation skills; 4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The stocking fingerling quantity is calculated in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Aquaculture modes; 2. Fingerling stocking.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	FINGERLING STOCKING	**DUTY NO.**	504
TASK TITLE	FINGERLING STOCKING	**TASK NO.**	5044
PERFORMANCE CRITERIA	The person performing this task must be able to carry out the fingerling stocking in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Water quality testing tools; 2. Feedstuff feeding equipment; 3. Measuring tools of aquaculture facilities; 4. Aquaculture recording software or tables; 5. Computers and calculators; 6. References and databases.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Calculate the stocking fingerling quantity according to the pond area and output; 2. Measure and record the temperature of the aquaculture water body; 3. Measure and record the size, water depth, and aquaculture area of aquaculture ponds or cages; 4. Use aquaculture record software or tables to record information such as the type, quantity, and stocking time of fingerlings; 5. Consult reference materials and databases to obtain relevant theoretical knowledge and practical experience in calculating the aquaculture fingerling quantity; 6. Use computers and calculators for calculations and data processing to obtain accurate results on the stocking fingerling quantity.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Calculate the stocking fingerling quantity; 1.2 Carry out the fingerling stocking; 1.3 Calculate the economic input and expected benefits corresponding to the aquaculture fingerling quantity. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principles of health and quality control; 2.2 Principles of the prevention and control of epidemic diseases; 2.3 Monitoring and recording; 2.4 Principles of environmental protection. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Calculation methods for pond area and output; 3.2 The importance of determining the stocking density of fingerlings. **4.0 Essential Skills** 4.1 Communication skills;

	4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills; 4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The fingerling stocking is carried out in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Calculation of the pond area; 2. Fingerling stocking.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	ADULT AQUACULTURE	**DUTY NO.**	505
TASK TITLE	PREPARATION FOR THE IMPLEMENTATION OF RICE-FISH COMPREHENSIVE PLANTING AND BREEDING	**TASK NO.**	5051
PERFORMANCE CRITERIA	The person performing this task must be able to prepare for the implementation of rice-fish comprehensive planting and breeding in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Water quality testing tools; 2. Feedstuff feeding equipment; 3. Measuring tools of aquaculture facilities; 4. Aquaculture recording software or tables; 5. Computers and calculators; 6. References and databases.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Evaluate the suitability of land and aquaculture methods; 2. Ensure that the water quality meets the needs of aquaculture, including water purification, water circulation, water level regulation and other operations; 3. Plant and breed; 4. Implement epidemic disease monitoring and prevention and control measures; 5. Observe relevant environmental laws and regulations, and make reasonable use of aquaculture resources.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Determine reasonable aquaculture modes and methods; 1.2 Develop aquaculture techniques; 1.3 Master the basic planting techniques. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principles of monoculture, polyculture, and intensification aquaculture of varieties; 2.2 Principles of planting techniques; 2.3 Principles of water quality detection. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Determination of reasonable aquaculture modes and methods; 3.2 The importance of aquaculture techniques.

	4.0 Essential Skills 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills; 4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The implementation of rice-fish comprehensive planting and breeding is prepared in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of various aquaculture models for adult aquaculture; 2. Aquaculture techniques of main aquaculture varieties.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	ADULT AQUACULTURE	**DUTY NO.**	505
TASK TITLE	PREPARATION FOR ECOLOGICAL CIRCULATION OF AQUACULTURE TAIL WATER	**TASK NO.**	5052
PERFORMANCE CRITERIA	The person performing this task must be able to prepare for ecological circulation of aquaculture tail water in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Water quality testing tools; 2. Feedstuff feeding equipment; 3. Measuring tools of aquaculture facilities; 4. Aquaculture recording software or tables; 5. Computers and calculators; 6. References and databases; 7. Water pumps.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Monitor the water quality; 2. Take corresponding measures to adjust the pH value, ammonia nitrogen, nitrite and other indicators of the water body according to the water quality monitoring results; 3. Maintain the aquaculture equipment; 4. Select an appropriate amount of microorganism preparations reasonably based on the organic waste in the aquaculture tail water; 5. Ensure good circulation and disposal of aquaculture tail water ; 6. Ensure that the disposal and discharge of aquaculture tail water conform to the regulations; 7. Control the amount of feedstuff used for aquaculture animals reasonably; 8. Monitor and record the	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Comprehend the process flow of tail water disposal; 1.2 Comprehend the structure of tail water disposal facilities; 1.3 Comprehend the purification function of tail water disposal. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The principle of recycling; 2.2 The principle of ecological balance; 2.3 The principle of water quality optimization. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The process flow of tail water disposal; 3.2 The disposal mode of aquaculture tail water. **4.0 Essential Skills**

temperature and water quality of aquaculture water bodies regularly.	4.1 Communication skills; 4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills; 4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The ecological circulation of aquaculture tail water is prepared in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. The disposal mode of aquaculture tail water; 2. The disposal process flow of aquaculture tail water.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	AQUACULTURE PROCESS MANAGEMENT	**DUTY NO.**	506
TASK TITLE	EVALUATION OF THE QUALITY OF ARTIFICIAL FORMULA FEEDSTUFF AND NATURAL BAITS	**TASK NO.**	5061
PERFORMANCE CRITERIA	The person performing this task must be able to evaluate the quality of artificial feedstuff and natural baits in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Tweezers; 2. Microscopes; 3. Alcohol burners; 4. Glass slides; 5. Coverslips.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Observe the appearance; 2. Inspect the ingredient: Check the ingredient list on the feedstuff packaging to ensure that the artificial feedstuff contains an appropriate amount of nutrients such as protein, fat, carbohydrates, and vitamins to meet the nutritional needs of aquaculture animals; 3. Conduct the assay: Use appropriate testing methods to analyse the nutritional composition of feedstuff samples; 4. Conduct feedstuff experiments; 5. Refer to experience and expert advices.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Determine the quality of artificial formula feedstuff; 1.2 Determine the quality of natural baits. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The principle of nutritional balance; 2.2 The principle of health and safety; 2.3 The principle of digestible utilization. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Nutrient requirements of aquaculture species; 3.2 Feeding methods for formula feedstuff and natural bait. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Report writing skills;

	4.4 Operation skills; 4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The quality of artificial formula feedstuff and natural baits is evaluated in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of artificial formula feedstuff and natural bait; 2. Basic knowledge of nutritional requirements for aquaculture species; 3. Knowledge of feedstuff feeding.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	AQUACULTURE PROCESS MANAGEMENT	**DUTY NO.**	506
TASK TITLE	WATER QUALITY ADJUSTMENT	**TASK NO.**	5062
PERFORMANCE CRITERIA	The person performing this task must be able to adjust the water quality in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Buckets; 2. Shovels; 3. Bailers; 4. Dissolved oxygen meters; 5. pH meters; 6. Black-and-white transparent scales.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE
The person performing this task must be able to do the following: 1. Perform detection of common water quality indicators such as water temperature, dissolved oxygen, pH, and transparency with commonly-used instrument such as oxygen meters and pH meters; 2. Carry out water quality identification and adjustment; 3. Carry out aquaculture inlet and drainage disposal; 4. Monitor the water quality; 5. Analyse and evaluate water quality based on monitoring data; 6. Adjust the water quality parameters of aquaculture water bodies reasonably based on the analysis result of water quality.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Perform detection of common water quality indicators such as water temperature, dissolved oxygen, pH, and transparency with commonly-used instrument such as oxygen meters and pH meters; 1.2 Determine the water quality; 1.3 Adjust the water quality. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The principle of water quality suitability; 2.2 The principle of relative stability; 2.3 The principle of economic feasibility. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Detection of conventional water quality indicators such as water temperature, dissolved oxygen, pH, and transparency; 3.2 Methods of water quality determination. **4.0 Essential Skills**

	4.1 Communication skills; 4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills; 4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The water quality is adjusted in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Methods of using commonly-used instrument such as oxygen meters and pH meters; 2. Detection and control of water quality; 3. Physical and chemical characteristics of aquaculture water bodies; 4. Use of microorganism preparations.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	AQUACULTURE PROCESS MANAGEMENT	**DUTY NO.**	506
TASK TITLE	DISEASE PREVENTION AND CONTROL	**TASK NO.**	5063
PERFORMANCE CRITERIA	The person performing this task must be able to prevent and treat diseases in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Dissecting microscopes; 2. Microscopes; 3. Tweezers; 4. Glass slides; 5. Coverslips; 6. Straws.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Carry out the treatment of common parasitic diseases of aquaculture objects; 2. Carry out water exchange and oxygen supplement according to water quality; 3. Determine the type of medication based on conditions; 4. Carry out harmless treatment of infected water areas; 5. Carry out pollution-free treatment of infected organisms.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Master the treatment of common parasitic diseases; 1.2 Follow the guidelines for drug use; 1.3 Carry out the method of drug use; 1.4 Carry out harmless treatment of infected water areas, places, and organisms. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The principle of water quality suitability; 2.2 The principle of relative stability; 2.3 The principle of economic feasibility; 2.4 Basic principle of drug use determination. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Disease prevention and disinfection of aquaculture ponds; 3.2 The performance and use of main prevention and control drugs; 3.3 Biological knowledge of aquaculture species.

	4.0 Essential Skills 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills; 4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Diseases are prevented and controlled in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. The use of dissecting microscopes and microscopes; 2. Morphological characteristics of common parasitic diseases; 3. The usage, dosage, and precautions of fish medicines.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	AQUACULTURE PROCESS MANAGEMENT	**DUTY NO.**	506
TASK TITLE	POND PATROL AND OBSERVATION	**TASK NO.**	5064
PERFORMANCE CRITERIA	The person performing this task must be able to carry out pond patrol and observation in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Aquaculture files; 2. Flashlights; 3. Measuring tools of aquaculture facilities; 4. Aquaculture recording software or tables; 5. Computers and calculators; 6. References and databases; 7. Water pumps.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE
The person performing this task must be able to do the following: 1. Observe whether the fish is acting normally; 2. Observe the pond water level; 3. Observe the color change of pond water; 4. Observe whether the inlet and outlet ports are intact; 5. Conduct regular patrol and observation, and timely record and report all kinds of data and abnormal situations; 6. Judge and deal with the pond patrol and observation based on the scientific basis.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Determine the feeding situation of fish; 1.2 Recognize water color; 1.3 Possess good observation skills and be able to observe pond mouths, ponds, and fish schools in detail; 1.4 Possess relevant aquaculture knowledge, and understand the growth environment, feeding requirements, and disease prevention and treatment measures of different aquaculture species. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The principle of prevention; 2.2 The principle of timeliness; 2.3 The principle of substantiality; 2.4 The principle of standardization. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Basic knowledge aquaculture files;

	3.2 Determination of the feeding situation of aquaculture fish; 3.3 Growth and development of aquaculture fish. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills; 4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The pond patrol and observation are carried out in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Judgment of the living habits and abnormal phenomena of aquaculture objects; 2. Methods for determining water color and transparency.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	FISHING	**DUTY NO.**	507
TASK TITLE	IMPLEMENTATION OF FISHING	**TASK NO.**	5071
PERFORMANCE CRITERIA	The person performing this task must be able to implement fishing in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Purse seines; 2. Spoon nets; 3. Buckets.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE
The person performing this task must be able to do the following: 1. Use fishing tools; 2. Sail and operate ships; 3. Perform fishing plans; 4. Be familiar with fishing areas; 5. Understand the ecological habits of aquatic organisms; 6. Protect the ecological environment.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Develop fishing plans for the following items; a. Prepare fishing nets; b. Prepare fishing tools; c. Determine fishing methods; 1.2 Implement fishing operation. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The principle of sustainability; 2.2 The principle of selectivity; 2.3 The principle of staggered fishing; 2.4 The principle of safe and environment-friendly fishing. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The specification and size of fishing nets; 3.2 Types of fishing tools. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills;

	4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Fishing is implemented in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Determination of fishing nets and tools; 2. Methods of fishing operation.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	LIVE TRANSPORTATION	**DUTY NO.**	508
TASK TITLE	CONTROL OF WATER QUALITY DURING LIVE TRANSPORTATION	**TASK NO.**	5081
PERFORMANCE CRITERIA	The person performing this task must be able to control the water quality during live transportation in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Live water transport vehicles (with functions such as refrigeration, insulation, oxygenation, sterilization, water quality circulation and purification, and self power supply); 2. Spoon nets; 3. Dissolved oxygen meters; 4. Thermometers.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Disinfect and clean transport vehicles; 2. Open and close on-board oxygen storage tanks; 3. Open and close on-board temperature control equipment; 4. Regulate the amount of dissolved oxygen in water; 5. Adjust the pH value of the water body; 6. Increase nutrients in the water body.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Comply with the requirements of the supporting equipment of live fish transport vehicles; 1.2 Comply with the sanitation requirements of live fish transport vehicles; 1.3 Follow the methods and procedures for using storage tanks. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Maintenance of a stable water quality environment; 2.2 Sufficient oxygen supply; 2.3 Regular monitoring and adjustment; 2.4 Proper management of nutrients. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The refrigeration range of transport vehicles; 3.2 The insulation range of transport vehicles; 3.3 The retention range of dissolved oxygen in water bodies; 3.4 Water recycling and purification capacity.

	4.0 Essential Skills 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills; 4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The water quality during live transportation is controlled in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Testing of dissolved oxygen in water bodies; 2. Determination of turbidity in water bodies.

OCCUPATION	AQUACULTURE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	LIVE TRANSPORTATION	**DUTY NO.**	508
TASK TITLE	MANAGEMENT DURING LIVE TRANSPORTATION	**TASK NO.**	5082
PERFORMANCE CRITERIA	The person performing this task must be able to carry out the management during live transportation in accordance with technical requirements.		
RANGE STATEMENT	The task can be performed under the supervision of aquaculture technicians - NTA 6. The tools and equipment to be used include: 1. Live water transport vehicles (with functions such as refrigeration, insulation, oxygenation, sterilization, water quality circulation and purification, and self power supply); 2. Spoon nets; 3. Dissolved oxygen meters; 4. Thermometers.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE
The person performing this task must be able to do the following: 1. Select appropriate containers and equipment to accommodate and transport living organisms; 2. Adjust and control water quality parameters in transport containers based on the living environment needs of different fish species; 3. Control transportation time and distance; 4. Monitor water quality and fish status; 5. Provide appropriate feedstuff and maintenance; 6. Properly handle problems on the way. In case of abnormal water quality, fish diseases or other problems during transportation, timely measures should be taken, such as replacing or adjusting water quality and separating sick fish, so as to protect the health and survival of fish.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Develop live transportation plans based on the following items; a. Stop feeding before fish transportation; b. Pull the net to gather fish for exercise; 1.2 Check the health of fish; 1.3 Ensure the transportation density, water temperature and time. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Biological characteristics of transported fish; 2.2 The principle of adjusting water quality; 2.3 The principle of diet and nutrition; 2.4 The principle of observation and monitoring; 2.5 The principle of prevention and response. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Oxygen demand during live transportation; 3.2 Temperature fluctuation range during live transportation;

	3.3 Selection and preparation of live transportation containers; 3.4 Diet management during transportation; 3.5 Preparation for emergency situations. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Operation skills; 4.5 Knowledge of disease prevention and control; 4.6 Safety consciousness; 4.7 Problem-solving skills; 4.8 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The management during live transportation is carried out in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Biological characteristics of transported fish; 2. Functions of transport equipment.

TABLE 1: DACUM CHARTS FOR AQUACULTURE TECHNICIAN - NTA 5

DUTIES	TASKS	ENABLERS
1.0 Aquaculture pond preparation	1.1 Pond renovation, cleaning and disinfection. 1.2 Renovation and maintenance of inlets and drainage channels. 1.3 Selection of mechanical equipment for excavation and renovation of ponds.	**General skills and knowledge** · Drainage of the pond · Removal of the grass · Bulldozing of the bottom of the pond and the repair of gaps and landslides · Quicklime sprinkling · Knowledge of fish proliferation and aquaculture · Repair of gaps and landslides · Dredging of inlets and drainage channels · Opening and closing of inlet and drainage pumps · Level gauge selection · Measurement operation · Knowledge of pond construction · Methods of using level gauges **Tools and equipment** · Hoes · Spades · Wooden rakes · Plastic bailers · Water pumps · Long arm excavators · Bulldozers · Carry scrapers · Dump trucks · Shovels (pointed and flat) · Handcarts · Level gauges · Steel tapes **Materials** · Bleach powder **Requirements for employees** · Communication skills · Teamwork skills · Report writing skills.
2.0 Cultivation of water quality	2.1 Cultivation of pond water. 2.2 Use of various water	**General skills and knowledge** · Installation of impeller aerator

DUTIES	TASKS	ENABLERS
	quality detection kits.	· Installation of impeller aerator switches · Installation of dissolved oxygen controllers · Fermentation of the organic fertilizer · Opening and closing of inlet pumps · Knowledge of biological bait cultivation · Fundamentals and identification knowledge of aquatic organisms · Water collection by hydrophores · Use of pH meters · Detection of ammonia nitrogen by ammonia nitrogen kits · Detection of hardness by hardness kits · Detection of total alkalinity by total alkalinity kits · Detection of ammonia nitrogen by dissolved oxygen kits · Detection of nitrite by nitrite kits · Knowledge of water quality detection · Knowledge of rapid determination of commonly-used water quality factors **Tools and equipment** · Bolting silks · Impeller aerators · Automatic dissolved oxygen controllers · Aerator switches · Cables · Nylon ropes · Shovels · Hydrophores · Reference cards · pH meters · Black-and-white transparent scales · Mercury thermometers · Water quality kits for ammonia nitrogen, hardness, total alkalinity, dissolved oxygen and nitrite **Materials**

DUTIES	TASKS	ENABLERS
		· Water quality detection kits **Requirements for employees** · Communication skills · Teamwork skills · Report writing skills
3.0 Fingerling transportation	3.1 Preparation of equipment and methods of fingerling transportation. 3.2 Fingerling transportation management.	**General skills and knowledge** · Identification of special nylon bags and special transport vehicles for fingerling transportation · Identification of oxygen cylinders, oxygen meters and inflation tubes for fingerling transportation · Methods for selecting fingerling transportation · Knowledge of fingerling transportation equipment · Determination of the health of fingerlings · Calculation of transportation density · Calculation of transportation time · Biological knowledge of fingerlings · Knowledge of transportation equipment **Tools and equipment** · Special nylon bags · Special transport vehicles · Oxygen cylinders · Oxygen gauges · Inflation tubes · Spoon nets · Dissolved oxygen meters · Thermometers **Materials** · Aquaculture varieties **Requirements for employees** · Communication skills · Teamwork skills · Report writing skills
4.0 Fingerling	4.1 Preparation of commonly-used fingerling	**General skills and knowledge**

DUTIES	TASKS	ENABLERS
stocking	disinfectants. 4.2 Fingerling disinfection. 4.3 Calculation of the stocked fingerling quantity. 4.4 Fingerling stocking.	· Weighing of potassium permanganate · Dissolution of potassium permanganate · Biological knowledge of aquaculture varieties · Knowledge of common fingerling disinfectants · Operations of disinfecting fingerlings by potassium permanganate · Examination of the external morphology of fingerlings · Examination of the swimming behaviors of fingerlings · Basic knowledge of fingerling disinfection · Knowledge of commonly-used fingerling disinfectants · Measurement of the length and width of aquaculture ponds · Calculation of the aquaculture pond area · Calculation of the stocked fingerling quantity · Design of the discharge specifications of aquaculture varieties · Design of the unit output of aquaculture varieties · Knowledge of pond aquaculture modes · Fingerling stocking · Knowledge of the feeding and living habits of fish **Tools and equipment** · Potassium permanganate · Meshes · Drums · Electronic scales (with pallets) · Pens · Calculators · Laptops · Measuring tapes · Bolting silks

DUTIES	TASKS	ENABLERS
		Materials · Aquaculture varieties **Requirements for employees** · Communication skills · Teamwork skills · Report writing skills
5.0 Adult aquaculture	5.1 Fish cultivation preparation. 5.2 Preparation for ecological circulation of aquaculture tail water.	**General skills and knowledge** · Formulation of fish aquaculture modes · Formulation of fish aquaculture techniques · Knowledge of fish aquaculture modes · Mechanical filtration of aquaculture tail water · Aquaculture tail water membrane separation · Knowledge of the disposal mode of aquaculture tail water **Tools and equipment** · Aquaculture ponds · Automatic aerators · Water pumps · Vertical flow precipitators **Materials** · Aquaculture varieties **Requirements for employees** · Communication skills · Teamwork skills · Report writing skills
6.0 Aquaculture process management	6.1 Evaluation of the quality of artificial formula feedstuff and natural baits. 6.2 Water quality adjustment. 6.3 Disease prevention and control of aquaculture varieties. 6.4 Pond patrol and observation.	**General skills and knowledge** · Determination of the quality of artificial formula feedstuff · Determination of the quality of natural baits · Knowledge of artificial formula feedstuff and natural bait · Basic knowledge of nutritional requirements for aquaculture species

DUTIES	TASKS	ENABLERS
		· Knowledge of feedstuff feeding · Extraction of water samples · Detection of common water quality indicators such as water temperature, dissolved oxygen, pH, and transparency with commonly-used instrument such as oxygen meters and pH meters · Water quality identification and adjustment · Aquaculture inlet and drainage disposal · Methods of using commonly-used instrument such as oxygen meters and pH meters · Knowledge of adjusting water quality · Physical and chemical characteristics of aquaculture water bodies · The treatment of common parasitic diseases of aquaculture objects · Water exchange and oxygen supplement according to water quality · Determination of the type of medication based on the condition · Harmless treatment of infected water areas · Pollution-free treatment of infected organisms · The use of dissecting microscopes and microscopes · Morphological characteristics of common parasitic diseases · The usage, dosage, and precautions of fish medicines · Observation of whether the fish is acting normally; · Observation of the pond water level · Observation of the color change of pond water · Observation of whether the inlet and outlet ports are intact · Judgment of the living habits and abnormal phenomena of aquaculture objects · Methods for determining water color

DUTIES	TASKS	ENABLERS
		and transparency **Tools and equipment** · Alcohol burners · Glass slides · Coverslips · Buckets · Shovels · Bailers · Dissolved oxygen meters · pH meters · Black-and-white transparent scales · Dissecting microscopes · Microscopes · Tweezers · Straws · Aquaculture files · Flashlights **Materials** · Aquaculture varieties **Requirements for employees** · Communication skills · Teamwork skills · Report writing skills
7.0 Fishing	7.1 Implementation of fishing.	**General skills and knowledge** · Preparation of fishing nets · Fishing operation · Fishing knowledge **Tools and equipment** · Purse seines · Spoon nets · Buckets **Materials** · Aquaculture varieties **Requirements for employees** · Communication skills · Teamwork skills · Report writing skills

DUTIES	TASKS	ENABLERS
8.0 Live transportation	8.1 Control of water quality during live transportation. 8.2 Management during live transportation.	**General skills and knowledge** · Disinfection and cleaning of transport vehicles · Opening of on-board oxygen storage tanks · Opening of on-board temperature control equipment · Knowledge of water quality detection and monitoring · Determination of the health of fish · Calculation of transportation density · Calculation of transportation time · Knowledge of fish biology · Knowledge of using transportation equipment **Tools and equipment** · Live water transport vehicles (with functions such as refrigeration, insulation, oxygenation, sterilization, water quality circulation and purification, and self power supply) · Spoon nets · Dissolved oxygen meters · Thermometers **Materials** · Aquaculture varieties **Requirements for employees** · Communication skills · Teamwork skills · Report writing skills