Zambia Qualifications Authority

You Learn, We Standardize

NATIONAL OCCUPATIONAL STANDARD FOR A DAIRY SCIENTIST

NOS. DS.01
FIRST EDITION

APPROVING AUTHORITY

This National Occupational Standard has been prepared and published under the authority of the Zambia Qualifications Authority Board on 19th May 2022.

ZAMBIA QUALIFICATIONS AUTHORITY

The Zambia Qualifications Authority Act No. 13 of 2011 was enacted by the Government of the Republic of Zambia to ***"provide for the development and implementation of a national qualifications framework; establish the Zambia Qualifications Authority; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing".*** Among other functions, ZAQA is responsible for ***determining national standards for any occupation***, through various sector specific National Occupational Standards Development Teams (NOSDTs).

REVISION OF NATIONAL OCCUPATIONAL STANDARDS

National Occupational Standards shall be revised after every **5 years**, or whenever necessary, by the issue of either amendments or of revised editions. It is important that users of National Occupational Standards (NOS) ascertain that they are in possession of the latest amendments or editions.

NOS DEVELOPMENT TEAM RESPONSIBLE

This National Occupational Standard was prepared by the Agriculture National Occupational Standards Development Team, upon which the following organisations were represented:

1. Agricultural Institution of Zambia (AIZ)
2. Aquaculture Development Association of Zambia
3. CropLife Zambia
4. Ministry of Fisheries and Livestock (Department of Fisheries)
5. Golden Valley Agriculture Research Trust (GART)
6. Katete College of Agricultural Marketing
7. Ministry of Agriculture (Department of Agriculture)
8. Mulungushi University (MU)
9. Natural Resources Development College (NRDC)
10. University of Zambia (UNZA)
11. Veterinary Council of Zambia
12. Zambia Agriculture Research Institute (ZARI)
13. Zambia National Farmers Union (ZNFU)
14. Zambia Seed Trade Association (ZASTA)
15. Zambia Qualifications Authority (ZAQA)

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FOREWORD

The Zambia Qualifications Authority (ZAQA) is a statutory body under the Ministry of Education established by ZAQA Act No. 13 of 2011 to "***provide for the development and implementation of a national qualifications framework; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing****".*

Among other functions, ZAQA is responsible for ***"determining national standards for any occupation"***, through various sector specific National Occupational Standards Development Teams (NOSDTs) of experts composed of representation from appropriate authorities, government departments, industry, academia, regulators, consumer associations and non-governmental organizations, etc.

This National Occupational Standard (NOS) has been developed by the Agriculture National Occupational Standards Development Team in accordance with the procedures and guidelines of ZAQA. All users should ensure that they have the latest edition of this publication as National Occupational Standards are revised from time to time.

This NOS shall be used by, among others, industry, employers, quality assurance bodies, awarding and professional bodies and education and training institutions, as a benchmark to identify training needs, develop job profiles/descriptions, develop curricula and learning programmes, in various sectors where the occupation exists. In the Dairy sector, demonstration of competence against this NOS may be required in order to run a business or practice a craft or profession.

JUSTIFICATION

A Dairy Scientist focuses on how to enhance efficient production and processing of milk. Much of his/her role is concerned with nutrition, reproduction, growth, and the genetics of dairy animals, and how to ensure that the results of dairy research are applied to the industry. In addition, they are also concerned with research into milk and milk products, and the applicable food safety standards which are required.

ACRONYMS AND ABBREVIATIONS

CS	Core Skill
DS	Dairy Scientist
NOS	National Occupational Standard
NOSDT	National Occupational Standards Development Team
OK	Organizational Knowledge
PC	Performance Criteria
PS	Professional Skill
RK	Regulatory Knowledge
RPL	Recognition of Prior Learning
TK	Technical Knowledge
ZAQA	Zambia Qualifications Authority
ZQF	Zambia Qualifications Framework

GLOSSARY OF TERMS

For the purposes of this NOS, the following terms and definitions shall apply:

Core Skills/Generic Skills: are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the NOS, these include communication related skills that are applicable to most job roles.

Function: is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of NOS.

Job Title: defines a unique set of functions that together form a unique employment opportunity in an organisation.

Knowledge and Understanding: are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.

National Occupational Standards (NOS): are statements of the standards of performance individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding. They are precise descriptions of what an individual is expected to be able to do in his/her work role.

National Occupational Standards (NOS) Code: is a unique reference code that identifies a NOS.

National Occupational Standards Development Team (NOSDT): means an established group of national stakeholders/experts responsible for the development of National Occupational Standards within a specific economic sector or occupation.

Occupation: is a set of job roles, which perform similar/related set of functions in an industry.

Organisational Context: includes the way the organisation is structured and how it operates, including the extent of operative knowledge that managers have in their relevant areas of responsibility.

Performance Criteria: are statements that together specify the standard of performance required when carrying out a task.

Scope: is the set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on the quality of performance required.

Sector: is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.

Sub Sector: is derived from a further breakdown based on the characteristics and interests of its components.

Technical Knowledge: is the specific knowledge needed to accomplish specific designated responsibilities.

Unit Title: gives a clear overall statement about what the incumbent should be able to do.

1. OVERVIEW

This is an introductory section providing a summary and specific information or commentary about the content of the NOS and the targeted sector and occupation to help the user judge whether it is relevant to them

This overview outlines the job description, job purpose and educational requirements for a Dairy Scientist.

NOS Code	NOS. DS.01
Occupation	Dairy Scientist
Job Title	Dairy Scientist
Job Description	Oversees field research on nutrition, dairy production, genetics and reproduction of dairy animals and transfer of the new technology, knowledge and information to dairy stakeholders.
Job Purpose	The DS works with the research and management teams to ensure proper nutrition for dairy animals, superior breeding programs, milk processing procedures in order to optimize production and productivity of dairy animals.
ZQF Level	9
Sector	Agriculture
Sub sector	Livestock (Dairy)
Other Economic Sector(s) in which the Occupation is Practiced	Education Sector (Academia, Research industry), Health Sector (investigation of sources of public health outbreaks), Agriculture (Goat Dairy Farms), Manufacturing (Commercial Milk Processing plants).
Other Similar Jobs that can be performed by a Dairy Scientist	Animal Biotechnologist, Breeding Manager, Ecologist
Minimum Educational Job Entry Qualification(s)	Master's degree in Dairy Science
Practicing License Requirements (if any)	Veterinary Council of Zambia, or Agriculture Institute of Zambia (depending on chosen career path).
Training/RPL	Bachelor's degree in Agricultural Sciences and /or biological sciences or equivalent
Minimum Job Entry Age	24 Years
Prior Experience	Minimum 2 years
Performance Criteria	As described in the Units under Section 4.

2. SCOPE

This National Occupational Standard specifies the fundamental knowledge and understanding, skills and competencies that a Dairy Scientist must possess to be successful in his/her job role. It is applicable to Senior Management working on Dairy programs or businesses in both private and public sectors or non-governmental organizations or self-employed.

3. PERSONAL ATTRIBUTES (VALUES, ETHICS AND ATTITUDES)

This job requires an individual to possess:

- Creativity, Courageousness and Curiosity
- Problem-solving skills
- Analytical skills
- Patience and Integrity
- Critical thinking, with meticulous attention to detail and accuracy
- Flexibility
- Commercial Awareness
- Ability to communicate effectively and clearly
- Self-motivated and team worker
- Scientific and numerical skills,
- Quality consciousness
- Determination and decisiveness
- Open-mindedness and free from bias

4. UNITS AND ELEMENTS

This National Occupational Standard is divided into six (06) Units representing the tasks that a job holder is expected to undertake in his/her day-to-day work. Each unit is further broken down into elements depicting the number of activities to be carried out for the successful execution of a particular task.

UNIT 1 [This unit is about health, safety and environment].

Unit No.	**01**
Unit Title	**Health, Safety and Environmental Management**
Description	This unit is about maintaining safety, health and environmental protection for the individual and the work place.
Scope	This unit covers the following: • Health & safety regulations, including laboratory safety • Environmental protection, and disposal of waste materials
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria (PC)**
Health & safety regulations, including laboratory safety	To be competent, the individual must be able to: PC1.Read, interpret and implement national and organizational safety and health policies and regulations. PC 2. Assess risks and possible safety hazards of all aspects of scientific and research operations.
Environmental protection, and disposal of waste materials	To be competent, the individual must be able to: PC3. Read, interpret and implement the environmental policies for the organisation. PC4. Read, interpret and implement environmental standard operating procedures and policies of the organisation. PC5. Read, interpret and implement national and international environmental regulations.
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1.Company Quality, health, and safety policies OK2.Company environmental policies OK3.Company regulations and global best practices
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. Safety and health risk assessment. TK2. Environmental risk assessment. TK3. Principles of laboratory safety. TK4. Principles of on-farm Safety, especially for highly mechanised dairies.
C. Regulatory context (Knowledge of Rules and Regulations)	The individual on the job must demonstrate knowledge and understanding of: RK1. Regulatory requirements for health & safety under the Occupational Health and Safety Act No. 36 of 2010. RK2. Regulatory requirements for environmental protection, including Environmental Management Act No 12 of 2011 (and associated regulations).

	RK3. Regulatory requirements for research, including The National Council for Scientific Research Act Chapter 140 of the Laws of Zambia.
Skills (S)	
A. Core Skills/ Generic Skills	**Writing Skills**
	The individual on the job must be able to: CS1.Write in complex English, and write scientific articles to an international standard.
	Reading Skills
	The individual on the job must be able to: CS2.Read and interpret complex internal/external documents. CS3. Read and understand complex manuals, health and safety instructions, memos, other company documents. CS4. Read from different sources - books, screens in machines and signage. CS5. Understand the various colour codes, nomenclature and acronyms related to the profession.
	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS6. Express statements or information clearly so that others can hear and understand. CS7. Participate in and understand the main points of both simple and complex discussions. CS8. Respond appropriately to any queries.
B. Professional Skills	**Decision Making**
	The individual on the job must be able to: PS1. Follow organization rule-based decision-making process. PS2. Take decision with systematic course of actions and/or response. PS3. Make decisions to chart new paths, where required, especially with regard to new research
	Plan and Organise
	The individual on the job must be able to: PS4. Plan and organise research and work to meet deadlines. PS5. Work constructively and collaboratively with others.
	Customer Centricity
	The individual on the job must be able to: PS6. Follow an organisations code of conduct. PS7. Manage relationships with co-workers and other stakeholders with intent on satisfying its requirements for service delivery.
	Problem Solving and Decision Making
	The individual on the job must be able to: PS8. Recognize problems and search for solutions. PS9. Choose best methods to complete assigned tasks.

	PS10. Approach other stakeholders for contributions and advise when required. PS11. Judiciously use common sense in day-to-day activities
	Analytical Thinking
	The individual on the job must be able to: PS12. Apply domain knowledge, observations and data to select course of action to perform tasks
	Critical Thinking
	The individual on the job must be able to: PS13. Critically evaluate information obtained from customers, supervisors and co-workers to perform day to day activities PS14. Ask relevant questions for better understanding.

UNIT 2 [This unit is about conducting research within the dairy sector].

Unit No.	**02**
Unit Title	**Research within the dairy sector**
Description	This unit is about research within the sector, focused on the optimisation of the productivity of dairy animals, with the goal of producing a high-quality milk product.
Scope	This unit covers the following: • Supervising and managing dairy research, (into different aspects of the dairy, including dairy breeding programs, and milk quality) and collection of research samples • Supervision of the management processes with regard to research • Analysis of stakeholder needs with regards to dairy production and productivity • Analysis of challenges faced by milk processors, with regard to milk quality, and research into how these can be resolved.
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria (PC)**
Supervising and managing dairy research, (into different aspects of the dairy, including dairy breeding programs, and milk quality) and collection of research samples	To be competent, the individual must be able to: PC1. Identify problems in the dairy sector, and establish problem statements for further investigation. PC2. Read, interpret and implement research and dairy policies and regulations. PC3. Collect necessary samples for submission to the laboratory. PC4.Analyse results of the research, and draw appropriate conclusions. PC5. Write up scientific articles to present the results of research in an internationally-acceptable format. PC6. Present the findings to interested groups of stakeholders and other scientists.

Supervision of the management processes with regard to research	To be competent, the individual must be able to: PC7. Conduct management meetings for management of research. PC8. Coordinate effectively human and research material resources in order to attain set objectives for the research program PC9. Analyse risks and possible safety hazards of all aspects of the dairy research. PC10. Use and implement standard operating procedures and policies of the organisation PC11. Read, interpret and implement national and international regulations pertaining to the sector.
Analysis of stakeholder needs with regards to dairy production and productivity	To be competent, the individual must be able to: PC12.Assess the needs and interests of stakeholders with regard to dairy management. PC13.Analyse the challenges the stakeholders and farmers face in their dairy management practices, and assist to find solutions through research and technology adaptation and development.
Analysis of challenges faced by milk processors, with regard to milk quality, and research into how these can be resolved	To be competent, the individual must be able to: PC14.Assess the needs and interests of milk processors, with regard to the processing of milk into other products such as yogurt, cheese, whey, and cream. PC15.Analyse the challenges that milk processors face in their day-to-day work, and assist to find solutions through research and technology adaptation and development.
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. Relevant legislation, standards, policies and procedures pertaining to the job. OK2.Synergies for support to easily obtain information, and clarification pertaining to the prescribed work. OK3. Understanding of the Standard Operating Procedures of any organisations for whom the scientists consult.
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. Collection of the relevant samples, and how to handle and transport them. TK2. Laboratory procedures and safety in order to oversee the research process. TK3. Statistical Analysis software. TK4. Writing a scientific article, for publication in a scientific journal.

	TK5: The latest technologies that have the potential to increase production and productivity in the dairy and milk processing sector, and how to use them. TK6: The various scientific methods and procedures for increasing dairy farmer and milk processor productivity and efficient resource use, with the view to producing a high-quality, safe, sound, and wholesome milk product.
C. Regulatory context (Knowledge of Rules and Regulations)	The individual on the job must demonstrate knowledge and understanding of: RK1. Regulatory requirements for Animal health, animal welfare, animal breeding, animal production and food safety.
Skills (S)	
A. Core Skills/ Generic Skills	**Writing Skills**
	The individual on the job must be able to: CS1.Write in complex English, in order to write up scientific articles of an international standard. CS2. Write in simple English in order to give clear instructions to co-workers and subordinates.
	Reading Skills
	The individual on the job must be able to: CS3. Read and interpret internal/external scientific documents. CS4. Read and understand manuals, research articles, attend workshops, conferences and seminars CS5. Read from different sources- books, screens in machines and signage. CS6. Understand the various colour codes, nomenclature and acronyms related to the profession.
	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS7. Communicate clearly and effectively with all levels of human personnel and various stakeholders CS8. Exhibit etiquette befitting the job and respond appropriately to queries.
B. Professional Skills	**Decision Making**
	The individual on the job must be able to: PS1. Follow organization rule-based decision-making process. PS2. Take decision with systematic course of actions and/or response. PS3: Identify dairy farmer challenges that may arise in course of duty and take preventative action following laid down procedures
	Plan and Organise
	The individual on the job must be able to: PS4. Plan and organise work to meet deadlines.

	PS5. Plan and organise farmer visits to analyse their needs PS6. Organise meetings with breeding line managers and other relevant authorities
	Customer Centricity
	The individual on the job must be able to: PS7. Develop a rapport with senior personnel, specialists, and stake holders PS8: Discuss possible solutions PS9. Manage relationships with dairy farmers with intent on satisfying requirements for appropriate service delivery.
	Problem Solving and Decision Making
	The individual on the job must be able to: PS10 Think through problems, evaluate the possible solutions and take up the optimum/best solution PS11. Choose best methods to complete assigned tasks. PS12. Approach relevant and competent authorities where necessary
	Analytical Thinking
	The individual on the job must be able to: PS13. Analyse information from research and think analytically to come up with solutions PS14. Use results from analytical thinking to improve/adapt the technologies.
	Critical Thinking
	The individual on the job must be able to: PS15. Critically evaluate information obtained from research to find innovative solutions to promote dairy farming

UNIT 3 [This unit is about promoting technology and knowledge transfer to dairy stakeholders].

Unit No.	**03**
Unit Title	**Promotion of dairy technology and knowledge transfer to dairy stakeholders**
Description	This unit is about the transfer of technology, knowledge and information to the farmers and dairy stakeholders
Scope	This unit covers the following: • Mastering and understanding new technology offerings • Selecting appropriate new technologies and training • Facilitating farmer/stakeholder training and documenting the training delivered • Following up on the practices of the farmer/stakeholder post training
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria (PC)**
Mastering and understanding new technology offerings	To be competent, the individual must be able to: PC1.Examine a wide range of production technologies that can be offered to farmers/stakeholders PC2. Demonstrate knowledge of the technology to be transferred PC3. Demonstrate knowledge of the technology, and its feasibility, before transferring it to farmers/stakeholders PC4. Prepare and rehearse demonstrations prior to technology transfer PC5. Develop new skills and knowledge about modern technologies.
Selecting appropriate new technologies and training	To be competent, the individual must be able to: PC6.Plan on the topics for which practical demonstrations will be based PC7. Arrange inputs necessary for the practical demonstrations
Facilitating farmer/stakeholder training and documenting the training delivered	To be competent, the individual must be able to: PC8. Select the farmer/stakeholder groups to be trained and the place for training PC9: Hold detailed discussions with them to attend to their needs PC10:Find the suitability of the technology by involving the farmer/stakeholder groups in investigations PC11.Attend to farmer/stakeholder groups and listen to their queries and concerns PC12.Conduct technology transfer training with farmers/stakeholders on regular basis in the areas in which they operate. PC13.Demonstrate practices and technologies in dairy farming

	PC14.Use various strategies and programs of change by applying the latest scientific and technological innovations PC15: Deliver information in clear and concise manner PC16: Use both theory and practical as part of the training method to ensure clarity PC17: Maintain records of the training delivered and actions taken for various doubts from the groups PC18: Document the benefits and challenges the group faced during training
Following up on the practices of the farmer/stakeholder post training	To be competent, the individual must be able to: PC19. Note the feedback from groups when the practical demonstration is over. PC20. Make follow ups to ensure the benefits of the new technologies have trickled down to the targeted groups. PC21. Use change in behaviour of the groups to create new knowledge for them
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. Relevant legislation, standards, policies and procedures pertaining to the job OK2.Synergies for support to easily obtain information, clarifications pertinent to the prescribed work OK3: Importance of nutrition, genetics and reproduction in dairy farming OK4:Documentation and related procedures applicable in the context of this job
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. Topics to be discussed for training programs TK2. Management of dairy animals TK3: Tools, machinery and equipment to be used for providing training TK4. Effective methods of delivering training TK5: Latest technologies with potential to increase production and productivity in Dairy farming TK6: Various scientific methods and procedures for increasing dairy farmer productivity and efficient resource use.
C. Regulatory context (Knowledge of Rules and Regulations)	The individual on the job must demonstrate knowledge and understanding of: RK1. Regulatory requirements for animal health, animal welfare, animal breeding, animal production and food safety.

Skills (S)	
A. Core Skills/ Generic Skills	**Writing Skills**
	The individual on the job must be able to: CS1.Document the findings in a clear and concise manner written in English easier to understand CS2: Document the feedback received during training
	Reading Skills
	The individual on the job must be able to: CS3.Update and upgrade his/her knowledge base on latest technologies by reading research articles, brochures, pamphlets, product information, attending seminars, conferences and workshops. CS4. Read from different sources- books, screens in machines and signage.
	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS5. Communicate clearly and effectively with all levels of human personnel and various stakeholders CS6. Maintain effective communication with farmer/stakeholder groups CS7. Seek further advise from other experts and seniors CS8. Educate and inform farmers/stakeholder groups on matters different but relevant to dairy farming CS9.Exhibit etiquette befitting the job and respond appropriately to queries.
B. Professional Skills	**Decision Making**
	The individual on the job must be able to: PS1. Make decisions pertaining to training methods to be followed. PS2. Take decision with systematic course of actions and/or response. PS3: Identify dairy farmer challenges that may arise in course of duty and take preventative action following laid down procedures
	Plan and Organise
	The individual on the job must be able to: PS4. Plan and organise training programs. PS5. Plan and organise farmer/stakeholder meetings and training PS6. Organise farmers/stakeholder groups and lead them towards solution-based approaches to their problems
	Customer Centricity
	The individual on the job must be able to: PS7. Develop a rapport with senior personnel, specialists and stake holders PS8. Discuss possible solutions PS9. Manage relationships with dairy farmers with intent of satisfying requirements for appropriate service delivery.

	Problem Solving and Decision Making
	The individual on the job must be able to: PS10. Think through problems, evaluate the possible solutions and take up the optimum/best solution PS11.Identify viable and operationally feasible solutions which meet the target groups.
	Analytical Thinking
	The individual on the job must be able to: PS12. Think analytically to solve target group PS13. Apply, analyse and evaluate information obtained from observation, demonstrations, experience, reasoning, discussions with farmer/stakeholder groups
	Critical Thinking
	The individual on the job must be able to: PS14. Critically evaluate information obtained from research to find innovative solutions to promote dairy farming

UNIT 4 [This unit is about consulting for dairy stakeholders, on the management of dairy animals, and optimisation of dairy productivity].

Unit No.	**04**
Unit Title	**Consultation for dairy stakeholders on the management of dairy animals, and optimization of productivity.**
Description	This unit is about the role of the Dairy Scientist in engaging with the industry, in order to advise on current practices, new technologies, and how to improve production, in terms of both quantity and quality of the milk product, as well as breeding of animals, with the view to improving vital traits in the offspring.
Scope	This unit covers the following: • Identifying challenges, and selecting appropriate solutions • Training stakeholders in dairy animal management • Optimisation of Production procedures and processing
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria (PC)**
Identifying challenges, and selecting appropriate solutions	To be competent, the individual must be able to: PC1. Identify the stakeholder's key challenges. PC2. Select appropriate solutions in the form of advice or technologies, which is to be provided

Training stakeholders in dairy animal management	To be competent, the individual must be able to: PC3. Select the farmers/stakeholder groups to be trained, in the new technology, where relevant, and arrange the logistics for training. PC4. Conduct training through practical demonstration of the practices and technologies in dairy animal production. PC5. Ensure delivery of information in a clear and concise manner PC6: Attend to the group's concerns, making the training sessions interactive and meaningful PC7: Approach the training methods from both a practical as well as theoretical aspects
Optimisation of Production procedures and processing	To be competent, the individual must be able to: PC8. Assess the needs and interests of stakeholders for dairy management. PC9. Analyse the challenges the stakeholders face in their dairy management practices and assist to find solutions through technology adaptation. PC10: Conduct training on the use of improved breeds, methods of management and care of animals, to improve the productivity of dairy animals, as well the milk processing.
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. Relevant legislation, standards, policies, and procedures pertaining to the job. OK2.Synergies for support to easily obtain information, and clarifications pertinent to the prescribed work. OK3.Documentation and related procedures applicable in the context of this job. OK4. Farmers organisations and structures (e.g. ZNFU, DAZ)
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. The topics and tools necessary for conducting a training program TK2. Latest technologies that have the potential to increase production and productivity of dairy animals TK3: The safe methods of handling animals TK4. The feasibility to carry out action plans working with research and research line management TK5: The latest technologies with potential to increase production and productivity in dairy farming and milk processing
C. Regulatory context (Knowledge of Rules and Regulations)	The individual on the job must demonstrate knowledge and understanding of: RK1. Regulatory requirements for Animal health, Animal breeding, Animal production and food safety RK2. Relevant Legislation

Skills (S)	
A. Core Skills/ Generic Skills	**Writing Skills**
	The individual on the job must be able to: CS1. Document the feedback received during the trainings in English CS2: Document the findings in a clear and concise manner which is easier to understand CS3: Maintain training records.
	Reading Skills
	The individual on the job must be able to: CS4. Update oneself about latest technologies on dairy by reading scientific documents such as research articles, manuals and attending seminars, workshops and conferences. CS5. Read relevant brochures, pamphlets, product information sheets, newspapers/booklets. CS6. Read from different sources- books, screens in machines and signage.
	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS7. Communicate clearly and effectively with all levels of dairy farmers and various stakeholders CS8: Educate and inform farmers about different dairy issues CS9. Exhibit etiquette befitting the job and respond appropriately to queries.
B. Professional Skills	**Decision Making**
	The individual on the job must be able to: PS1. Make decisions pertaining to training methods to be followed. PS2. Identify problems that may arise in dairy management and take preventative action following appropriate procedures PS3: Identify dairy farmer challenges that may arise in course of duty and take preventative action following laid down procedures
	Plan and Organise
	The individual on the job must be able to: PS4. Plan and organise training programs PS5. Plan and organise farmer visits to analyse their needs PS6. Plan and organise meetings with farmer/stakeholder groups for trainings PS7: Plan and organise farmer/stakeholder groups and lead them towards solutions to their problems
	Customer Centricity
	The individual on the job must be able to: PS8. Develop a rapport with farmers and stakeholders PS9: Discuss possible solutions PS10. Manage relationships with dairy farmers to satisfy requirements for appropriate service delivery.

	PS11: Manage relationships with farmers and stakeholders
	Problem Solving and Decision Making
	The individual on the job must be able to: PS12. Think through problems, evaluate the possible solutions and take up the best solution PS13. Choose best methods to complete assigned tasks. PS14. Approach relevant and competent authorities where necessary
	Analytical Thinking
	The individual on the job must be able to: PS15. Analyse information from research and think analytically to come up with solutions PS16. Use results from analytical thinking to improve/adapt the technologies.
	Critical Thinking
	The individual on the job must be able to: PS17. Critically evaluate information obtained from research to find innovative solutions to promote dairy farming PS18: Take up his/her own working and learning

UNIT 5 [This unit is about consulting for milk processors, to help them optimise the production of high-quality, processed milk products].

Unit No.	**05**
Unit Title	**Consultation for milk processors, to optimize the production of high-quality, processed milk products.**
Description	This unit is about the role of the Dairy Scientist in engaging with milk processors, in order to advise on current practices, new technologies and how to improve production, in terms of both quantity and quality of the final milk product. This task requires a knowledge of the quality specifications of received milk and how variations in these specifications will affect the processing into other products such as cheese, yogurt and cream.
Scope	This unit covers the following: • Identifying challenges, and selecting appropriate solutions • Training stakeholders in dairy animal management • Optimisation of productivity and production, Production procedures and processing
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria (PC)**
Identifying challenges, and selecting appropriate solutions	To be competent, the individual must be able to: PC1. Identify the processor's key challenges. PC2. Select appropriate solutions in the form of advice or technologies, which is to be provided

Training stakeholders in dairy animal management	To be competent, the individual must be able to: PC3. Select the stakeholder groups to be trained, in the new technology, where relevant, and arrange logistics for training. PC4. Conduct training through practical demonstration of the practices and technologies in milk processing. PC5. Ensure delivery of information in a clear and concise manner PC6. Attend to the group's concerns, making the training sessions interactive and meaningful PC7. Approach the training methods from both a practical as well as theoretical aspects
Optimisation of productivity and production, Production procedures and processing	To be competent, the individual must be able to: PC8. Assess the needs and interests of milk processors, in each of the main milk products (yogurt, cream, butter, cheese, and pasteurised milk) PC9. Analyse the challenges the stakeholders face in milk processing, and assist to find solutions through technology adaptation.
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. Relevant legislation, food safety standards and procedures pertaining to the job OK2. Synergies for support to easily obtain information, clarifications pertinent to the prescribed work OK3. Own job role and responsibilities and sources for information pertaining to work OK4. Documentation and related procedures applicable in the context of this job
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. Food safety standards set by the regulators of sector or organisation. TK2. Work flow involved in the sector processes. TK3: Strategies for improvement in milk quality, all the way from farm level through to production of the end product. TK4. The feasibility of the stakeholder to carry out action plans TK5: The latest technologies with potential to increase compliance with food safety standards TK6: The various scientific methods and procedures for improving the processing of milk products, from raw milk.
C. Regulatory context (Knowledge of Rules and Regulations)	The individual on the job must demonstrate knowledge and understanding of: RK1. Regulatory requirements for Animal health, Animal breeding, Animal production and Food Safety

Skills (S)	
A. Core Skills/ Generic Skills	**Writing Skills**
	The individual on the job must be able to: CS1. Fill in documents in English relating to one's roles in being food safety compliant
	Reading Skills
	The individual on the job must be able to: CS2. Read and understand manuals, research articles, attend workshops, conferences and seminars on food safety CS3. Update oneself and keep abreast with latest compliance issues by reading from different sources-books, screens in machines and signage.
	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS4. Communicate clearly and effectively with farmer/stakeholders and breeding management CS5. Communicate precisely and maintain effective relationships
B. Professional Skills	**Decision Making**
	The individual on the job must be able to: PS1. Follow organization rule-based decision-making process. PS2. Take decision with systematic course of actions and/or response. PS3: Investigate dairy stakeholder challenges, and identify possible solutions, following laid-down procedures
	Plan and Organise
	The individual on the job must be able to: PS4. Plan and organise work to meet deadlines. PS5. Plan and organise farmer visits to analyse their needs PS6. Organise meetings with breeding line managers and other relevant authorities
	Customer Centricity
	The individual on the job must be able to: PS7. Develop a rapport with senior personnel, specialists and stake holders PS8: Discuss possible solutions PS9. Manage relationships with dairy farmers with intent on satisfying requirements for appropriate service delivery.
	Problem Solving and Decision Making
	The individual on the job must be able to: PS10.Think through problems, evaluate the possible solutions and take up the optimum/best solution PS11. Identify economically viable and operationally feasible solutions which can enhance compliance of farmers/stakeholders on food safety
	Analytical Thinking
	The individual on the job must be able to:

	PS12.Analyse feedback received from farmers/stakeholders and think analytically to come up with solutions PS13.Apply, analyse and evaluate the information gathered from trainings PS14.Use results from analytical thinking to improve/adapt the technologies.
	Critical Thinking
	The individual on the job must be able to: PS15. Critically evaluate information obtained from research and trainings to find innovative solutions to promote dairy farming

UNIT 6 [This unit is about contributing to policy formulation with regard to Milk Production and Milk Processing].

Unit No.	**06**
Unit Title	**Contribution to policy formulation on Milk Production and Food Safety.**
Description	This unit is about contributing to policy formulation with regard to milk production on the dairy farm, as well as milk processing, which may either be on the farm, or in a milk processing factory.
Scope	This unit covers the following: • Analysis of industry needs, particularly with regards to food safety standards • Presenting research findings to group gatherings with farmers/stakeholders/colleagues/policy-makers. • Helping to ensure policy implementation through inspection of farms, milking parlours and processing plants
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria (PC)**
Analysis of industry needs, particularly with regards to food safety standards	To be competent, the individual must be able to: PC1.Assess the needs of farmer/stakeholders with regards to them being compliant with food safety standards PC2.Use analytical tool to study the findings of the inspection PC3: Rank the problems by priority, identify causes and list possible solutions PC4: Analyse the reaction and opinions of the stakeholders, and give necessary clarifications and suggestions PC5. Analyse risks and possible safety hazards of all aspects of the dairy production by involving the stakeholder groups in the investigations.
Presenting research findings to group gatherings with farmers/stakehold	To be competent, the individual must be able to: PC6.Identify deficient areas with regard to food safety standards PC7: Assess the scientific data, technology or information required to correct the deficiency.

ers/colleagues/policy-makers.	PC8. Select stakeholder groups to be involved in presentation of research findings with regard to improving food safety. PC9. Work with stakeholders to inform on the strategies to use achieve acceptable food safety standards, such as producing efficiently at the right time and in the right way.
Helping to ensure policy implementation through inspection of farms, milking parlours and processing plants	To be competent, the individual must be able to: PC10.Help policy-makers, and other stakeholders to ensure that policy and standards are implemented. PC11. Ensure that correct information is updated to the farmers based on their locations. PC12.Read and interpret the food safety standards and their implications for the different stakeholders. PC13. Indicate to them, in writing, regarding areas of improvements, based on the inspection findings. PC14. Propose corrective actions that can be implemented on the farm, milking parlours and processing plants. PC15. Design an action plan which is feasible and would match their needs based on the site visits
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. Relevant legislation, food safety standards and procedures pertaining to the job OK2.Synergies for support to easily obtain information, clarifications pertinent to the prescribed work OK3. Own job role and responsibilities and sources for information pertaining to work OK4.Documentation and related procedures applicable in the context of this job
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. Policy Analysis with regard to the dairy and milk sectors. TK2. The best methods to have input into policy formulation.
C. Regulatory context (Knowledge of Rules and Regulations)	The individual on the job must demonstrate knowledge and understanding of: RK1. Regulatory requirements for Animal health, Animal breeding, Animal production and Food Safety
Skills (S)	
A. Core Skills/ Generic Skills	**Writing Skills**
	The individual on the job must be able to: CS1.Fill in documents in English relating to one's roles in being food safety compliant
	Reading Skills
	The individual on the job must be able to: CS2. Read and understand manuals, research articles, attend workshops, conferences and seminars on food safety

	CS3. Update oneself and keep abreast with latest compliance issues by reading from different sources- books, screens in machines and signage.
	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS4. Communicate clearly and effectively with farmer/stakeholders and breeding management CS5. Communicate precisely and maintain effective relationships
B. Professional Skills	**Decision Making**
	The individual on the job must be able to: PS1. Follow organization rule-based decision-making process. PS2. Take decision with systematic course of actions and/or response. PS3: Identify dairy farmer challenges, and identify possible solutions following laid down procedures
	Plan and Organise
	The individual on the job must be able to: PS4. Plan and organise work to meet deadlines. PS5. Plan and organise farmer visits to analyse their needs PS6. Organise meetings with breeding line managers and other relevant authorities
	Customer Centricity
	The individual on the job must be able to: PS7. Develop a rapport with senior personnel, specialists and stake holders PS8: Discuss possible solutions PS9. Manage relationships with dairy farmers with intent on satisfying requirements for appropriate service delivery.
	Problem Solving and Decision Making
	The individual on the job must be able to: PS10.Think through problems, evaluate the possible solutions and take up the optimum/best solution PS11.Identify economically viable and operationally feasible solutions which can enhance compliance of farmers/stakeholders on food safety
	Analytical Thinking
	The individual on the job must be able to: PS12. Analyse feedback received from farmers/stakeholders and think analytically to come up with solutions PS13. Apply, analyse and evaluate the information gathered from trainings PS14. Use results from analytical thinking to improve/adapt the technologies.
	Critical Thinking
	The individual on the job must be able to: PS15. Critically evaluate information obtained from research and trainings to find innovative solutions to promote dairy farming

5. EQUIPMENT, TOOLS AND CONSUMABLE MATERIALS

These include, but not limited to; Computer, Printer and relevant Software programs, including for statistical analysis, weighing scales, Personal protective equipment (PPE), sample collection equipment (depending on availability of other technicians to collect under supervision).

6. DILEMMAS/CHALLENGES AND COMPLEXITIES FOR A JOB HOLDER

Dilemmas associated with the job of a Dairy Scientist include long working hours when in the field, exposure to chemical, physical and biological hazards, time pressure to complete tasks, working in extreme weather such as hot and cold conditions, working in noisy, wet and dusty environments, dealing with unrealistic stake holders.

6.1 Alternative Choices (Solutions) to Dilemmas and Complexities

Solutions to dilemmas include carrying out risk assessment and implementing appropriate control measures, ensuring good time management and planning, participating in workplace safety sensitization and awareness, supporting capacity building through training, managing work stress, adhering to company's safety and standard operating procedures at all times, paying attention to detail, consulting extensively within and outside one's department/team on safety and other issues.

7. WORKING CONDITIONS/ENVIRONMENT

Working conditions include working in cold, hot and wet conditions, working at heights when in the dairy environment, stand/walk and sometimes drive for long hours, working in laboratory environment, areas that are noisy and dusty, areas with limited lighting and ventilation. Working in confined spaces.

8. PARTIES INVOLVED/INTERACTING WITH THE JOB HOLDER OR TRAINEE

8.1 Internal/Within the Organization

Parties involved/interacting with the job holder who are internal to the organization include supervisors, laboratory technicians and supporting staff.

8.2 External/Outside the Organization

Parties involved/interacting with the job holder who are external include farmer/stakeholders, government regulators, trainers, suppliers of equipment/tools/consumables, occupational health and safety associations, Academia etc.

9. PHYSICAL DEMANDS ON THE BODY

- Mental Analysis of scientific data – long hours of thought process.
- Physique to sustain on farm analyses.
- Be able to walk and stand for long periods of time, while on farms;
- Be able to lift relatively heavy materials, tools and equipment;
- Be able to use fingers, hands and feet with ease to complete the assigned task (dexterity), including usage of keyboard/mouse;
- Sound mental health.

ANNEX A
Criteria for Assessments based on this NOS

A.1 Guidelines for Assessment

A.1.1 Criteria for assessment for curricula and learning programmes based on this NOS will be created by curricula and programmes developers. Each Performance Criteria (PC) will be assigned marks proportional to its importance in the NOS. Curricula and programmes developers will also lay down proportion of marks for theory and practical skills for each performance criteria, giving more weight to practical skills.

There shall be allocated the 'Total Mark', which will be the sum of all marks in each Unit, distributed across the number of PCs in that particular Unit. The 'out of' mark will be the mark allocated to each PC, which will be shared between theory and skills practical assessments.

A.1.2 Awarding/assessment bodies or institutions and other users of the NOS will create unique question papers for the theory part and evaluations for skill practical part for their respective candidates.

ANNEX B
NOS Version Control

This Annex gives details necessary for the tracking of the NOS versions based on the number of revisions.

NOS Code	NOS.DS.01		
ZQF Level	9	**Version Number**	01
Sector	Agriculture	**Date of Approval**	19th May 2022
Sub Sector	Livestock (Dairy)	**Date of Last Review**	N/A
Occupation	Dairy Sector Applied Researcher	**Date of Next Review**	May 2027

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