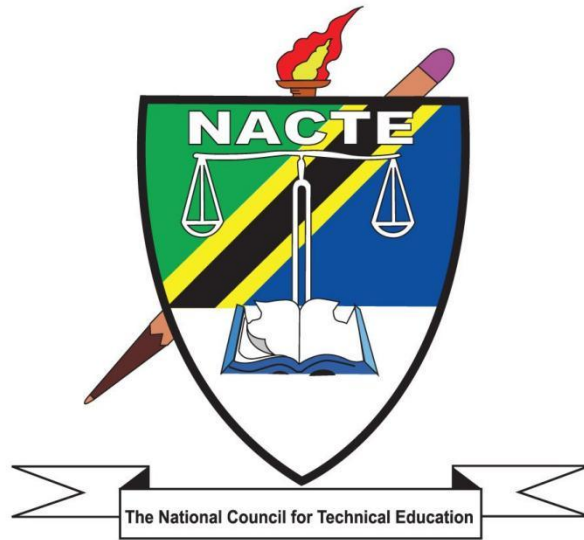


NATIONAL COUNCIL FOR TECHNICAL EDUCATION



NOVEMBER 2022

PROPOSED OCCUPATIONAL STANDARDS

FOR BIOPROCESS AND POST HARVEST ENGINEERING

OCCUPATION: BIOPROCESS AND POSTHARVEST ENGINEER

LEVEL: NTA 8

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FOREWORD

The National Council for Technical Education (NACTE) is a corporate body established by the National Council for Technical Education Act, Cap.129. The Act provides a legal framework for the Council to coordinate the provision of technical education and training in Tanzania. The mandate of NACTE is three-fold, namely; Regulatory, Quality Assurance and Policy Advisory.

In discharging its mandate, the Council has been charged with the responsibilities, among others, to:

- (a) assist technical institutions in the transmission of knowledge, principles and training in the field of technical education and training for the benefit of the people of Tanzania;
- (b) assist technical institutions in the overall development of the quality of education they provide and to promote and to maintain approved academic standards;
- (c) establish and make awards in technical education which are consistent in standard and comparable to related awards in Tanzania and internationally; and
- (d) ensure that the quality of education required for the awards is met and maintained throughout the duration of the delivery of the course.

In the course of execution of these responsibilities, the Council has been instituting various measures aiming at advancing the quality of training provided in technical institutions in respect of the changing demands of the labour market, both local and international.

To achieve the above obligation, NACTE, under the Ministry of Education, Science and Technology implemented the East Africa Skills for Transformation and Regional Integration Project (EASTRIP), a project aiming at promoting regional integration through supporting the regional corridors and sector markets, developing common standards and qualifications, and promoting mobility of students, faculty, and graduates. The project supports the Government of Tanzania to address shortage of skills in five sectors namely:

- (a) Energy;
- (b) Construction;
- (c) Information and Communication Technology (ICT);
- (d) Transportation; and
- (e) Agribusiness.

To address the skills, miss-match and shortage in the five (5) sectors in the country, the project funded, among others, a component of Development of Occupational Standards for Technical and Vocational Education and Training (TVET). In this regard, NACTE endeavoured to identify qualified and highly experienced experts in the five sectors from both the industry and training institutions to carry out the development of Occupational Standards. The exercise was carried out at Morogoro Teachers College – Morogoro from 27th August to 24th September, 2021. The output of the exercise is Occupational Standards for 14 occupations. Occupational standards for Bioprocess and Post-Harvest Engineer are among the occupational standards for 26 occupations which have been developed.

Since Occupational Standards are statements of work performance reflecting the ability to successfully complete the functions required in an occupation, as well as the application of knowledge, skills, attitudes and understanding in an occupation, it is the Council's expectations that the developed standards will form a robust base for decision making and provide explicit guidance to policy makers, curriculum developers, educators, employers and other stakeholders in matters related to manpower planning as well as execution of Technical and Vocational Education and Training undertakings.

Prof. J. W. Kondoro

CHAIRMAN

Dar es Salaam

NOVEMBER 2022

ACKNOWLEDGEMENT

The National Council for Technical Education (NACTE) is charged with the mandate to be the Quality Assurance organ of the Government in matters related to Technical and Vocational Education and Training (TVET) and production of qualified manpower for both local and international labour markets. In order to realize this obligation, NACTE endeavours to institute policies, guidelines and standards and to set the quality benchmarks for training institutions.

However, this is only possible if there is a strong base, linking the training institutions on one hand and the demands of the industry/labour market for relevant manpower on the other hand. Therefore, the Council undertook a step to develop Occupational Standards in sectors considered to be the engine to steer the country's desire to achieve an industrial economy. This exercise would not be a success without the input and support from our stakeholders. I am indebted to acknowledge some of them here.

I wish to acknowledge and appreciate the support from the Ministry of Education, Science and Technology through the East Africa Skills for Transformation and Regional Integration Project (EASTRIP) for the financial support which facilitated the preparation of this document. I wish also to appreciate Mrs Leah Lukindo and Eng. Dr. Simon Baregu for the tireless efforts and commitment in facilitating and guiding the standards development process, Ms. Eileen Tzamburakis, Ms. Chausiku Yakweli Ibrahim and Ms. Nuru Shirima for compiling and typesetting the final document; and the NACTE Secretariat for coordinating the whole activity.

In a very special way, I wish further to extend my sincere gratitude to this team of wonderful experts who tirelessly dedicated their time and availed their invaluable intellect in the preparation of this document. I would like to recognize the colossal inputs of the following experts:

S/N	Name	Designation	Organization
1.	Eng. Kimweri G. Baguma	Head Miller	CPB
2.	Eng. Sharif Mwangi	Head of Unit Leather Processing (TA)	Dar es Institute of Technology (DIT) - Mwanza
3.	Eng. Mahmoud Bashemela	Supervisor	Pyxus Agriculture Tanzania
4.	Eng. Susan A. Mbacho	Tutorial Assistant	Sokoine University of Agriculture (SUA)

In addition, NACTE hopes to further enhance the internationalization of occupational standards and promote the modernization and internationalization of industries, facilitating Tanzania's integration into the international market and exploiting its development potential. Therefore, NACTE has invited China-Africa Vocational Education Alliance and China-Africa (Chongqing) Vocational Education Alliance to participate in the development, revision and review of occupational standards documents in collaboration with Chinese vocational institutions, so as to make use of their rich experience in vocational education efforts and rely on China's advanced and complete industrial chain and its position in the international market to contribute to the development of vocational education and related industries in Tanzania. Therefore, I would like to express my sincere gratitude to this specialized team of Chinese institutions and experts. I thank them for their hard work and dedication, and for contributing their wisdom and experience to the preparation of this document. I would like to thank the following institutions and experts for their support:

<u>S/N</u>	Institute	Name	Title/ Professional Field
1	Ningbo Polytechnic	Liu Xingyan	Associate Professor/Drug Biotransformation
2		Shi Meixia	Associate Professor/Environmental Science and Engineering
3		Chen Lele	Lecturer/Food Microorganism

Dr. A. B. Rutayuga
EXECUTIVE SECRETARY

Dar es Salaam
NOVEMBER 2022

ABBREVIATIONS

AP	Agricultural Produce
FIFO	First In First Out
GMP	Good Manufacturing Practices
HACCP	Hazard Analysis and Critical Control Point
KPIs	Key Performance Indicators
NACTE	National Council for Technical Education
NOS	National Occupational Standards
OS	Occupational Standards
OSHA	Occupational Safety and Health Agency
SOPs	Standard Operating Procedures
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 program 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 analysis:	A process used to identify the tasks that are important to employees in any given occupation
Occupational area:	This is a broad grouping of related jobs. Example: food service
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 performance tool of assessment of the pre – scribed outcomes.
Performance criteria:	Indicate the expected end results or outcome in 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:	it is a set of statement, 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, related knowledge, attitudes, performance standards, tools and materials needed, and safety concerns required of employees performing it.
Task:	A work activity that has a definite beginning and ending, is observable or measurable, consists of two or more definite steps, and leads to a product, service, or decision.
Underpinning Knowledge:	This is 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 conform 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.
Occupational Competence:	The application of knowledge and skills to perform consistently to the standards required in the work context.

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 Education 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 Occupation 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 wiring circuits, performs trouble shooting 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 Competence-based Education and Training (CBET) programs. 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 Bioprocess and Post-Harvest Engineer 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 expert workers 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 workshop thereafter continued with the development of occupational standards. Experts in Occupational Analysis and Occupational Standards Development 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 Bioprocess and Post-Harvest experts were key informants in the survey to establish occupational trends. This information was used to gain insight from the workplaces regarding trends and changes in the profession, including how well graduates are equipped 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 served to engage a wide cross-section of experts in the occupation. 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 BIOPROCESS AND POSTHARVEST ENGINEER

The Bioprocess and Post-Harvest Engineer plays an important role in areas like agricultural produce collection, transport, storage and processing. The standard covers the main duties of Bioprocess and Post-Harvest Engineer as follows:

- a) Control losses of agricultural produce (AP) from harvesting to storage;
- b) Develop equipment for processing and handling of agricultural produce (AP);
- c) Maintain key performance indicators (KPIs) for production process of Agricultural Produce (AP);
- d) Confirm losses in production line for agricultural produce;
- e) Develop packaging for agricultural produce (AP) and processed products;
- f) Develop budget for production, maintenance and marketing of finished product;
- g) Manage production process of agricultural product;
- h) Prepare maintenance plan for the processing plant; and
- i) Manage waste in production line.

The standards have been clustered into NTA qualification levels i.e. NTA level 7 and 8

4.0. VALIDITY PERIOD

The occupational standards will be valid for 3-5 years due to the fast-changing nature of technology. The review will proceed in the same manner as the previous one, with new occupational standards being developed based on current labour market information.

5.0. OCCUPATIONAL STANDARDS

5.1 OCCUPATIONAL STANDARDS FOR BIOPROCESS AND POSTHARVEST ENGINEER – NTA 8

OCCUPATION	BIOPROCESS AND POST HARVEST ENGINEER	OCCUPATION CODE	
DUTY TITLE	DEVELOP BUDGET FOR PRODUCTION, MAINTENANCE AND MARKETING OF FINISHED PRODUCT	DUTY NO.	801
TASK TITLE	PREPARE BUDGET FOR PRODUCTION PROCESSES	TASK NO.	8011
PERFORMANCE CRITERIA	The person performing this task must be able to prepare budget for production processes as per approved standards and procedures.		
RANGE STATEMENT	The task will be performed in the office. The Engineer shall work independently. The following equipment, tools and materials will be needed in performing the task: Computer, Printers, Calculator, stationery, previous budget documents.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Review previous processing budget for each section in production line; 2. Obtain requirements for each section in production line; 3. Determine the capacity level of the primary production; 4. Determine amount of funding that will be available during the budget period; 5. Determine the costs for each activity in every section; 6. Allocate cost for each activity; 7. Create budget package; 8. Compile a budget document for official documentation; 9. Complete forms, records and others documentation for budgeting; 10. Observe safety and health rules and regulations when performing the task.		Detailed knowledge about: 1.0. Methods The person performing this task must be able to explain how to: 1.1. Analyse budget; 1.2. Carry out statistics. 2.0. Principles The person must be able to explain the principles of: 2.1. Continuity; 2.2. Rules of Lapsee; 2.3. Fiscal Discipline; 2.4. Inclusiveness; 2.5. Accuracy; 2.6. Transparency and accountability. 3.0. Theories The person must be able to explain: 3.1. Business management; 3.2. Types of budgets; 3.3. Basic accounting; 3.4. Linear programming; 3.5. Formula-based calculation; 3.6. Statistics.	

	4.0. Essential skills 4.1. Teamwork skills; 4.2. Communication skills; 4.3. Entrepreneurship skills; 4.4. Budgeting skills; 4.5. Self-awareness; 4.6. Self-discipline; 4.7. Critical thinking; 4.8. Integrity; 4.9. Problem solving; 4.10. Time management; 4.11. Commitment.
DESCRIPTION OF THE END PRODUCTS / SERVICE	Budget for production processes is prepared as per approved standard and procedures.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about 1. Safe handling of equipment and tools; 2. Financial rules and regulations; 3. Extent of responsibility; 4. Occupational safety and health.

OCCUPATION	BIOPROCESS AND POST HARVEST ENGINEER	OCCUPATION CODE	
DUTY TITLE	DEVELOP BUDGET FOR PRODUCTION, MAINTENANCE AND MARKETING OF FINISHED PRODUCT	DUTY NO.	801
TASK TITLE	PREPARE BUDGET FOR MAINTENANCE IN PRODUCTION LINE	TASK NO.	8012
PERFORMANCE CRITERIA	The person performing this task must be able to prepare a budget for maintenance in production line as per approved standards and procedures.		
RANGE STATEMENT	The task will be performed in the office. The Engineer shall work independently. The following equipment, tools and materials will be needed in performing the task: computer, printers, calculator, stationery, previous maintenance budget.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Review previous maintenance budget for each section in production line; 2. Identify maintenance activities in each section of production line; 3. Identify materials and tools required for maintenance; 4. Establish costs for each spare part that will be required; 5. Determine machine costs; 6. Determine labour costs; 7. Forecast costs of the materials required for maintenance; 8. Determine amount of funding that will be available during the budget period; 9. Identify priorities; 10. Determine the costs for each activity in every section; 11. Create budget package; 12. Compile a budget document for official documentation;		Detailed knowledge about: 1.0. Methods The person performing this task must be able to explain how to: 1.1. Analyse budget; 1.2. Carry out Statistics. 2.0. Principles The person must be able to explain the principles of: 2.1.Continuity; 2.2.Rules of Lapse; 2.3.Fiscal Discipline; 2.4.Inclusiveness; 2.5.Accuracy; 2.6.Transparency and accountability. 1.0. Theories The person must be able to explain: 3.1. Business management; 3.2. Types of budgets; 3.3. Basic accounting; 3.4. Linear programming; 3.5. Algebra skills. 3.6. Statistics.	

13. Complete forms, records and others documentation for budgeting; 14. Observe safety and health rules and regulations when performing the task.	4.0. Essential skills 4.1. Teamwork skills; 4.2. Communication skills; 4.3. Entrepreneurship skills; 4.4. Budgeting skills; 4.5. Self-awareness; 4.6. Self-discipline; 4.7. Critical thinking skills; 4.8. Integrity; 4.9. Problem solving; 4.10. Time management; 4.11. Commitment.
DESCRIPTION OF THE END PRODUCTS / SERVICE	Budget for maintenance in production line is prepared as per approved standards and procedures.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about 1. Safe handling of equipment and tools; 2. Financial rules and regulations; 3. Extent of responsibility; 4. Occupational safety and health.

OCCUPATION	BIOPROCESS AND POST HARVEST ENGINEER	OCCUPATION CODE	
DUTY TITLE	DEVELOP BUDGET FOR PRODUCTION, MAINTENANCE AND MARKETING OF FINISHED PRODUCT	DUTY NO.	801
TASK TITLE	CREATE BUDGET FOR MARKETING OF FINISHED PRODUCT	TASK NO.	8013
PERFORMANCE CRITERIA	The person carrying out this task must be able to apply knowledge and skills to create a business strategy for the processed AP as per given terms of reference.		
RANGE STATEMENT	The task will be performed in office. The Engineer shall work independently. The following equipment, tools and materials will be needed in performing the task: computer, printers, calculator, stationery social media accounts, mass media, stationery, flyers, tablet, smartphone, business card, website, logo, questionnaire statistical software package, brochures.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Define market problem to be addressed; 2. Carryout a desk review; 3. Identify market gap/opportunity; 4. Prepare market research plan; 5. Identify research tools (e;g; questionnaire); 6. Determine research sample size; 7. Collect data; 8. Analyse data; 9. Produce a market research report; 10. Disseminate the market research findings; 11. Create business plan executive summary; 12. Obtain a company profile, goals and objectives; 13. Obtain a marketing plan; 14. Describe a product;		Detailed knowledge about: 1.0. Methods The person performing this task must be able to explain how to: 1.1. Carry out market research; 1.2. Analyse data using statistical package software 1.3. Write a research report; 1.4. Present research findings; 1.5. Select representative research sample; 1.6. Describe a product; 1.7. Carry out cost-benefit analysis; 1.8. Develop business plan; 1.9. Promote a product; 1.10. Brand a product; 1.11. Design advertisement tools e.g. flyers. 2.0. Principles The person must be able to explain the principles of: 2.1. Market research/intelligence; 2.2. Data analysis; 2.3. Management; 2.4. Sales and marketing;	

15. Determine a marketing and sales; Strategy; 16. Create business financial plan; 17. Explain funding sources; 18. Compile a business plan document for official documentation; 19. Determine market; segments/audience; 20. Determine value proposition of a product; 21. Obtain product business brand; 22. Analyse your competitors; 23. Establish SMART marketing goals; 24. Prepare a budget; 25. Determine marketing and promotional strategies; 26. Advertise product to different media; 27. Attend business exhibitions; 28. Observe daily records of market respond; 29. Observe safety and health rules and regulations when performing the task; 30. Complete forms, records and other documentation.	2.5. Finance; 2.6. Production cost; 2.7. Marketing strategies; 2.8. Product branding 3.0. Theories The person must be able to explain: 3.1. Research methodology; 3.2. Market analysis; 3.3. Customer's behaviour; 3.4. Business competition; 3.5. Entrepreneurship; 3.6. Research ethics; 3.7. Competitive analysis; 3.8. Financial analysis; 3.9. Loan management; 3.10. E-marketing/e-commerce; 3.11. Product marketing; 3.12. Entrepreneurship; 3.13. Mass media; 3.14. Social media; 3.15. Marketing ethics; 3.16. Research ethics. 4.0. Essential skills 4.1. Communication skills; 4.2. Teamwork skills; 4.3. Time management; 4.4. Work Interpersonal skills; 4.5. Customer care; 4.6. Computer skills; 4.7. Report writing skills; 4.8. Problem solving skills; 4.9. Critical thinking skills; 4.10. Data analysis skills; 4.11. Product snapshot; 4.12. Product pitching skills; 4.13. Statistics; 4.14. Linear regression; 4.15. Basic mathematics.
DESCRIPTION OF THE END PRODUCTS/ SERVICE	Budget for marketing of the finished product is created as per approved standards and procedures.

CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about 1. Safe handling of equipment and tools; 2. Financial rules and regulation; 3. Extent of responsibility; 4. Occupational safety and health; 5. Observing safety rules and procedures; 6. Observing good codes of conducts; 7. Considering cultural diversity and respecting other's cultures; 8. Applying laws, regulations and policy governing the agriculture sector.
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OCCUPATION	BIOPROCESS AND POST HARVEST ENGINEER	OCCUPATION CODE	
DUTY TITLE	MANAGE PRODUCTION PROCESS OF AGRICULTURAL PRODUCE (AP)	DUTY NO.	802
TASK TITLE	MONITOR QUALITY TEST OF RECEIVED AP FROM FARMERS/AGRO DEALERS	TASK NO.	8021
PERFORMANCE CRITERIA	The person carrying out this task must be able to apply knowledge and skills to monitor quality test of received AP from farmers/agro dealers as per latest approved standards and regulations.		
RANGE STATEMENT	The task will be performed in the factory under the. The engineer shall work independently. The following equipment, tools and materials will be needed in performing the task: Probes, weigh balance, computer, stationery, PPE’s, Thermometer, pressure meter, tape measure, coveralls.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Obtain the required materials, tools and equipment needed for performing the task; 2. Take sample of AP for quality test; 3. Determine moisture content of AP; 4. Identify foreign matters in the AP; 5. Identify inorganic matters in AP; 6. Identify pest damaged AP; 7. Identify rotten and diseased AP; 8. Identify discoloured AP; 9. Identify immature and shrivelled AP; 10. Identify broken kernels; 11. Record weight of each parameter; 12. Calculate the percentage of each parameter; 13. Verify the obtained percentage with the standards;		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Take sample of AP; 1.2 Record weight; 1.3 Record or calculate percentage; 1.4 Obtain MC of AP. 2.0 Principles The person must be able to explain the principles of: 2.1 Sampling; 2.2 GMPs; 2.3 HACCP. 3.0 Theories The person must be able to explain: 3.1 Sampling procedures; 3.2 Characteristics of AP; 3.3 Quality control; 3.4 Quality assurance. 4.0. Essential skills: 4.1 Teamwork skills;	

14. Document and archive inventory material and record all QC activities; 15. Observe safety and health when performing the task; 16. Clean tools, equipment and working environment; 17. Store tools and equipment after completing the task.	4.2 Computer skills; 4.3 Exploration skills; 4.4 Communication skills; 4.5 Integrity; 4.6 Basic mathematics skills; 4.7 Measurements and units.
DESCRIPTION OF THE END PRODUCTS / SERVICE	Quality test of the received AP from farmers/agro dealers is monitored as per approved standards and procedures.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about 1. Safe handling of equipment and tools; 2. ISO standard; 3. National standard; 4. Extent of responsibility; 5. Occupational safety and health.

OCCUPATION	BIOPROCESS AND POST-HARVEST ENGINEER	OCCUPATION CODE	
DUTY TITLE	MANAGE PRODUCTION PROCESS OF AGRICULTURAL PRODUCE (AP)	DUTY NO.	802
TASK TITLE	MONITOR HANDLING OF AP IN PRODUCTION LINE	TASK NO	8022
PERFORMANCE CRITERIA	The person performing this task must be able to monitor handling of AP in production line as per approved standards and procedures.		
RANGE STATEMENT	The task will be performed during production process. The Engineer shall work independently. The following equipment, tools and materials will be needed in performing the task: PPEs, computers, stationery, conveyor, forklifts, carts, sorters, picking system, pallets, elevators, trays.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Prepare tools, equipment and materials to be used; 2. Identify and categorize characteristics of AP to be handled; 3. Establish condition of AP to be handled; 4. Determine methods to handle a particular AP; 5. Select an environment-friendly method to handle AP; 6. Identify machine and equipment for handling of AP; 7. Apply the proper method and machine to handle the AP; 8. Observe handling of AP at each production stage; 9. Observe operators’ performance on handling of AP at each production stage; 10. Solve the problems encountered during handling of AP;		Detailed knowledge about: 1.0. Methods The person performing this task must be able to explain how to: 1.1. Operate machines and equipment; 1.2. Categorize AP; 1.3. Select handling machines and equipment; 1.4. Handle AP; 1.5. Operate records; 1.6. Refer to literature, data, manuals and industry standards. 2.0. Principles The person must be able to explain the principles of: 2.1. GMP; 2.2. HACCP; 2.3. SOPs; 2.4. Place utilization; 2.5. Awareness of environmental protection; 2.6. Unit load; 2.7. Automation; 2.8. Awareness of efficiency 3.0. Theories The person must be able to explain:	

11. Prepare to complete forms, records and other documentation for handling AP; 12. Learn new skills closely related to handling of AP; 13. Observe health and safety when performing the task; 14. Clean working tools and equipment; 15. Store tools, equipment and safety gear appropriately; 16. Keep the production line clean and organized.	3.1. Properties of Agricultural produce; 3.2. Warehousing; 3.3. Weighted utility additive theory; 3.4. Material handling; 3.5. Good Handling Practices (GHP); Principles of mechanical engineering 4.0. Essential skills 4.1. Team work skills; 4.2. Basic mathematics; 4.3. Measurements and units; 4.4. Communication skills; 4.5. Integrity; 4.6. Computer skills; 4.7. Problem solving skills; 4.8. Analytical skills; 4.9. Communication and coordination; 4.10. Learning skills.
DESCRIPTION OF THE END PRODUCTS / SERVICE	Handling of AP in production line is monitored as per standards and procedures.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about 1. Safe handling of equipment and tools; 2. Extent of responsibility; 3. Good manufacturing Practices; 4. Occupational safety and health; 5. House Keeping in production line.

OCCUPATION	BIOPROCESS AND POSTHARVEST ENGINEER	OCCUPATION CODE	
DUTY TITLE	MANAGE PRODUCTION PROCESS OF AGRICULTURAL PRODUCE (AP)	DUTY NO.	802
TASK TITLE	MONITOR AP PRODUCTION PROCESS	TASK NO	8023
PERFORMANCE CRITERIA	The person performing this task must be able to apply knowledge and skills to monitor procedures for accomplishing production process as per given standards and procedures.		
RANGE STATEMENT	The task will be performed at production line. The Engineer shall work independently. The following tools, equipment and safety gear will be needed to accomplish this task: package testing machine, operation manuals gloves, masks, computer, stationery, printer.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Prepare tools, equipment and materials to be used; 2. Perform hazard analysis (HA) in production line; 3. Determine critical control points (CCPs); 4. Set control limits; 5. Establish a monitoring system; 6. Establish a corrective action; 7. Establish verification procedures 8. Establish record-keeping procedure; 9. Supervise operators of AP processing machines; 10. Provide technical support to AP processing machine operators; 11. Observe standard operating procedures of production process; 12. Evaluate performance of the operators; Complete forms, records and other documentation for accomplishing production process;		Detailed knowledge about: 1.0. Methods The person performing this task must be able to explain how to: 1.1 Analyse hazards; 1.2 Determine critical control limits; 1.3 Execute a Standard Operating Procedure; 1.4 Solve common problems; 1.5 Keep records. 2.0. Principles The person must be able to explain the principles of: 2.1 HACCP; 2.2 GMPs; 2.3 SOPs. 3.0. Theories The person must be able to explain: 1.1 Quality Control (QC); 1.2 Quality Assurance (QA); 1.3 Manufacturing KPIs; 1.4 Good handling practices (GHP). 4.0. Essential skills 4.1 Teamwork; 4.2 Communication skills; 4.3 Result oriented way of working;	

13. Observe health and safety when performing the task; 14. Clean working tools and equipment; 15. Store tools, equipment and safety gear appropriately; 16. Keep the production line clean and organized.	4.4 Report writing skills; 4.5 Analytical skills; 4.6 Curiosity; 4.7 Commitment ; 4.8 Leadership skills; 4.9 Interpersonal skills; 4.10 Problem solving skills; 4.11 Practicality.
DESCRIPTION OF THE END PRODUCTS / SERVICE	AP production process is monitored as per approved standards and procedures.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about 1. Standard Operation Procedures.; 2. ISO standards. ; 3. National Standards (TBS).; 4. Standard handling of equipment and tools.; 5. Occupational safety and health.

OCCUPATION	BIOPROCESS AND POST-HARVEST ENGINEER	OCCUPATION CODE	
DUTY TITLE	PREPARE MAINTENANCE PLAN FOR THE PROCESSING PLANT	DUTY NO.	803
TASK TITLE	DEVELOP MAINTENANCE SCHEDULE FOR THE PLANT	TASK NO	8031
PERFORMANCE CRITERIA	The person performing this task must be able to develop a maintenance schedule for the plant as per approved standards and procedures.		
RANGE STATEMENT	The task will be performed in the factory. The engineer shall work independently. The following equipment, tools and materials will be needed in performing the task: stationery, printers, manuals.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Be familiar with and master the post skills and processes; 2. Master safety management regulations, and organize inspection frequently; 3. Prepare and revise maintenance methods; 4. Establish planned shutdowns and work backward; 5. Establish standards for drafting, reviewing and approving maintenance tasks; 6. Specify person/team to accomplish the task; 7. Specify time to accomplish maintenance; 8. Create maintenance procedures 9. Document maintenance procedures; 10. Determine maintenance costs; 11. Establish maintenance schedule for the plant; 12. Maintain detailed maintenance records; 13. Summarize and review maintenance records;		Detailed knowledge about: 1.0. Methods The person performing this task must be able to explain how to: 1.1. Plan for corrective maintenance 1.2. Plan for preventative maintenance; 1.3. Plan for predictive maintenance; 1.4. Identify responsibility and division of work. 2.0. Principles The person must be able to explain the principles of: 2.1. Preventive Maintenance; 2.2. GMPs; 2.3. Operation standards. 3.0. Theories The person must be able to explain: 3.1. Spare parts inventory program; 3.2. Procedures for temporary repairs; 3.3. Procedures for emergency repairs; 3.4. Tool reconciliation procedures; 3.5. Lubrication procedures; 3.6. Human Resource management; 3.7. Sense of responsibility; 3.8. Occupational safety and health. 4.0. Essential skills 4.1 Team work skills;	

14. Feedback common problems 15. Clean working tools; 16. Store working tools appropriately; 17. Keep working area clean and organized; 18. Observe safety and health rules and regulations when performing the task.	4.2 Communication; 4.3 Integrity; 4.4 Commitment; 4.5 Computer skills; 4.6 Measurement and units; 4.7 Readiness to implement knowledge; 4.8 Time management skills; 4.9 Linear programming; 4.10 Algebra.
DESCRIPTION OF THE END PRODUCTS / SERVICE	Maintenance schedule for the processing plant is developed as per approved standard and procedures.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about 1. Occupational safety and health; 2. Safe handling of equipment and tools; 3. Extent of responsibility; 4. Good manufacturing practice.

OCCUPATION	BIOPROCESS AND POST-HARVEST ENGINEER	OCCUPATION CODE	
DUTY TITLE	PREPARE MAINTENANCE PLAN FOR THE PROCESSING PLANT	DUTY NO.	803
TASK TITLE	ORGANIZE RESOURCES TO PERFORM MAINTENANCE	TASK NO.	8032
PERFORMANCE CRITERIA	The person performing this task must be able to organize resources to perform maintenance as per approved standards and procedures.		
RANGE STATEMENT	The task will be performed in the factory. The engineer shall work independently. The following equipment, tools and materials will be needed in performing the task: stationaries, printers, manuals, spare parts inventory, PPE’s (mask, mechanical gloves, safe booty).		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Identify tools and equipment required for maintenance; 2. Obtain clear details of materials required for maintenance; 3. Select materials required for maintenance; 4. Choose the right machine to perform task; 5. Provide specifications for required spare parts; 6. Make follow-up to procure spare parts; (Check on proforma invoice); 7. Perform cost management; 8. Identify labour requirements; 9. Observe safety and health rules and regulations when performing the task; 10. Provide maintenance schedule; 11. Provide maintenance checklists; 12. Complete Records and documents for all required resources.		Detailed knowledge about: 1.0. Methods The person performing this task must be able to explain how to: 1.1. Select maintenance materials; 1.2. Organizing labour; 1.3. Gather data; 1.4. Handle standards. 2.0. Principles The person must be able to explain the principles of: 2.1. Maintenance planning; 2.2. GMPs. 3.0. Theories The person must be able to explain: 3.1. Properties of materials 3.2. Specifications of machines; 3.3. Specifications of spare parts; 3.4. Material science; 3.5. Human resource management; 3.6. Histology 4.0. Essential skills 4.1. Teamwork skills; 4.2. Communication skills; 4.3. Integrity;	

	4.4. Computer skills; 4.5. Measurement and units; 4.6. Good data gathering skills; 4.7. Readiness to implement knowledge; 4.8. Time management skills; 4.9. Linear programming; 4.10. Communication ability; 4.11. Leadership skills; 4.12. Knowledge explanation and dissemination; 4.13. Production organization and coordination; 4.14. Work planning and assignment.
DESCRIPTION OF THE END PRODUCTS / SERVICE	Resources to perform maintenance are organized as per approved standards and procedures.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of equipment and tools; 2. Extent of responsibility; 3. Occupational safety and health; 4. Standard operating procedures; 5. Good Manufacturing Practices.

OCCUPATION	BIOPROCESS AND POST-HARVEST ENGINEER	OCCUPATION CODE	
DUTY TITLE	PREPARE MAINTENANCE PLAN FOR THE PROCESSING PLANT	DUTY NO.	803
TASK TITLE	EXECUTE THE MAINTENANCE PLAN.	TASK NO	8033
PERFORMANCE CRITERIA	The person performing this task must be able to execute the maintenance plan as per approved standards and procedures.		
RANGE STATEMENT	The task will be performed in the factory. The engineer shall work independently. The following equipment, tools and materials will be needed in performing the task: cutter, plier, adjustable wrench, stationery, printers, manuals, mask, hair nets, reflectors, timer, helmet, safety boot, industrial coat, measuring tapes, engineering toolkit.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Identity the maintenance to be carried out, and perform regular inspection; 2. Provide clear details on maintenance to be carried out; 3. Renew and update any non-conforming equipment as planned; 4. Select proper maintenance methods; 5. Identify required materials for maintenance; 6. Identify tools and equipment required; 7. Identify, report timely and rectify activities with risk; 8. Observe safety and health rules and regulations when performing the task; 9. Provide duration/time to complete the task; 10. Oversee execution of maintenance schedule; 11. Provide technical support;		Detailed knowledge about: 1.0. Methods The person performing this task must be able to explain how to: 1.1. Select maintenance materials; 1.2. Carry out corrective maintenance; 1.3. Carry out preventative maintenance; 1.4. Carry out predictive maintenance; 1.5. Perform standard operation; 1.6. Carry out work safely. 2.0. Principles The person must be able to explain the principles of: 2.1. Performing Preventive Maintenance; 2.2. GMP's; 2.3. Standard operation. 3.0. Theories The person must be able to explain: 3.1. Lubrication procedures; 3.2. Spare parts inventory program 3.3. Procedures for temporary repairs; 3.4. Procedures for emergency repairs; 3.5. Tool reconciliation procedures; 3.6. Assembling and disassembling of equipment; 3.7. Overloaded operation.	

12. Check every static machine has been installed properly and is stable; 13. Clean tools and equipment used; 14. Store tools and equipment appropriately; 15. Keep working area clean and organized; 16. Check/Inspect maintenance carried out; 17. Verify maintenance checklists; 18. Keep records and documents.	4.0. Essential skills 4.1. Team work skills; 4.2. Communication skills; 4.3. Integrity; 4.4. Commitment; 4.5. Computer skills; 4.6. Measurement and units; 4.7. Readiness to implement knowledge; 4.8. Time management skills; 4.9. Problem solving technique; 4.10. Leadership skills; 4.11. Work specification implementation skills; 4.12. Work progress coordination skills; 4.13. Ability to solve problems during production; 4.14. Learning skills
DESCRIPTION OF THE END PRODUCTS / SERVICE	Maintenance plan is executed as per approved standards and procedures.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about 1. Occupational safety and health; 2. Safe handling of equipment and tools; 3. Extent of responsibility; 4. Good manufacturing practice.

OCCUPATION	BIOPROCESS AND POSTHARVEST ENGINEER	OCCUPATION CODE	
DUTY TITLE	MANAGE WASTE IN PRODUCTION LINE	DUTY NO.	804
TASK TITLE	COLLECT WASTE FROM PRODUCTION LINE	TASK NO	8041
PERFORMANCE CRITERIA	The person performing this task must be able to apply knowledge and skills to collect waste from production line as per given standards and procedures.		
RANGE STATEMENT	The task will be performed in the production line. The Engineer shall work independently. The following tools, equipment and safety gear will be needed to accomplish this task: Personal Protective Elements (masks, gloves, glasses, safety boots, coveralls), cleaning aids (brooms, dust pans, mopper, squeezer, dust wipers, shovels, rakes, pitchforks), containers, loaders and bins, detergents, compactors, computer, weigh balance.		
EVIDENCEREQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Wear PPE properly; 2. Prepare right tools, equipment and materials to be used; 3. Determine characteristics of waste produced; 4. Identify types of waste; 5. Collect waste by characteristics and types; 6. Establish method of waste collection; 7. Estimate the amount of waste collected; 8. Establish waste collection points; 9. Place waste containers properly; 10. Identify when and how often to collect waste; 11. Establish waste collection routes/systems; 12. Identify means of waste transport; 13. Transport wastes; 14. Clean working area for any residue;		Detailed knowledge about: 1.0. Methods The person performing this task must be able to explain how to: 1.1 Categorize waste; 1.2 Collect waste and calculate frequency; 1.3 Transport waste. 2.0. Principles The person must be able to explain the principles of: 2.1 Proximity; 2.2 Waste management; 2.3 Wastewater treatment. 3.0 Theories The person must be able to explain: 3.1 Types of waste; 3.2 Characteristics of wastes; 3.3 Types of waste containers; 3.4 Collection techniques; 3.5 Environmental Impact Assessment. 4.0 Essential skills 4.1 Time management;	

15. Clean and sanitize equipment and tools; 16. Observe safety and health rules and regulations when performing the task; 17. Store tools, equipment and safety gear appropriately; 18. Keep forms, records and other documentation for waste collected.	4.2 Self-motivation; 4.3 Commitment; 4.4 Teamwork; 4.5 Measurement Units; 4.6 Communication skills; 4.7 Interpersonal skills; 4.8 Computer skills; 4.9 Problem solving skills.
DESCRIPTION OF THE END PRODUCTS / SERVICE	Collection of waste from production line is performed as per approved standards and procedures.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about 1. NEMC Regulations; 2. Environmental Management Act; 3. Environmental Impact Assessment Regulation and guidelines; 4. National Solid Waste Management Strategy (NSWMS); 5. Extent of Responsibility; 6. Occupational Safety and health; 7. Safe handling of equipment and tools; 8. Guidelines for Framework Legislation for Integrated Waste Management.

OCCUPATION	BIOPROCESS AND POST HARVEST ENGINEER	OCCUPATION CODE	
DUTY TITLE	MANAGE WASTE IN PRODUCTION LINE	DUTY NO.	804
TASK TITLE	TREAT WASTE COLLECTED FROM PRODUCTION LINE	TASK NO	8042
PERFORMANCE CRITERIA	The person performing this task must be able to treat waste collected from production line as per approved guidelines and standards.		
RANGE STATEMENT	The task will be performed in the waste treatment plant. The Engineer shall work independently. The following equipment, tools and materials will be needed in performing the task: Personal protective elements (masks, gloves, safety boots, coveralls), Cleaning aids (brooms, scrapers), cutters, shredders, crushers and grinders, loaders, agitators, stirrers and mixers, aerators, separators, dehydrators, incinerators, and renderers (e.g., boiler), Laboratory supplies (treatment reagents), detergents.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Wear PPE properly; 2. Prepare tools, equipment and materials to be used; 3. Obtain waste to be collected; 4. Identify types of waste to be treated; 5. Separate waste according to physical state; 6. Identify waste that can be recycled; 7. Take sample of waste for laboratory test; 8. Identify proper treatment methods; 9. Apply suitable treatment method 10. Take sample of treated waste for laboratory test; 11. Obtain test results; 12. Validate treated waste against legislation, standards and procedures;		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Treat waste; 1.2 Take sample of waste; 1.3 Conduct laboratory test. 2.0 Principles The person must be able to explain the principles of: 2.1 Waste management; 2.2 Wastewater treatment. 3.0 Theories The person must be able to explain: 3.1 Waste treatment techniques; 3.2 Waste treatment processes; 3.3 Waste management; 3.4 Waste sorting techniques; 3.5 Waste types, state and characteristics; 3.6 Waste contaminants; 3.7 Basic Chemistry. 4.0. Essential skills	

13. Complete forms, records and other documentation for waste treatment; 14. Clean tools and equipment; 15. Store tools and equipment as per standards and procedures; 16. Observe safety and health rules and regulations when performing the task.	4.1 Interpersonal skills; 4.2 Teamwork skills; 4.3 Communication skills; 4.4 Problem solving skills; 4.5 Computer skills; 4.6 Waste processing technical skills; 4.7 Self-management skills; 4.8 Integrity.
DESCRIPTION OF THE END PRODUCTS / SERVICE	Treatment of waste is performed as per regulations and standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about 1. NEMC Regulations; 2. Environmental Management Act; 3. Environmental Impact Assessment Regulation and guidelines; 4. National Solid Waste Management Strategy (NSWMS); 5. Extent of Responsibility; 6. Occupational Safety and health; 7. Safe handling of equipment and tools; 8. Guidelines for Framework Legislation for Integrated Waste Management; 9. Wastewater treatment regulations.

OCCUPATION	BIOPROCESS AND POST-HARVEST ENGINEER	OCCUPATION CODE	
DUTY TITLE	MANAGE WASTE IN PRODUCTION LINE	DUTY NO.	804
TASK TITLE	DISPOSE TREATED WASTE FROM PRODUCTION LINE	TASK NO.	8043
PERFORMANCE CRITERIA	The person performing this task must be able to dispose treated waste from production line as per approved standards and procedures.		
RANGE STATEMENT	The task will be performed at the disposal site. The Engineer shall work independently. The following equipment, tools and materials will be needed in performing the task: Personal protective elements (masks, gloves, safety boots, coveralls), Cleaning aids (brooms, scrapers), cutters, shredders, crushers and grinders, incinerators, renderer (e.g., boiler), balers, compactors.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Identify types of waste to be disposed; 2. Identify waste disposal methods; 3. Select proper method for waste disposal; 4. Prepare site for disposing; 5. Apply suitable waste disposal method; 6. Observe standard operating procedures; 7. Clean tools and equipment; 8. Sanitize tools and equipment; 9. Store tools and equipment as per specifications; 10. Observe health and safety rules and regulation.		Detailed knowledge about: 1.0. Methods The person performing this task must be able to explain how to dispose waste. 2.0. Principles The person must be able to explain the principles of: 2.1. Waste management; 2.2. Wastewater treatment. 3.0. Theories The person must be able to explain: 3.1. Waste disposal methods; 3.2. Types of waste disposal; 3.3. Solid-waste management; 3.4. Hazardous-waste management; 3.5. Waste site management; 3.6. Waste minimization hierarchy. 4.0. Essential skills 4.1 Interpersonal skills; 4.2 Teamwork skills; 4.3 Communication skills; 4.4 Waste processing technical skills; 4.5 Self-management skills; 4.6 Integrity.	

DESCRIPTION OF THE END PRODUCTS / SERVICE	Disposal of treated waste from production line is performed as per standards and procedures.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about 1. NEMC Regulations; 2. Environmental Management Act; 3. Environmental Impact Assessment Regulation and guidelines; 4. National Solid Waste Management Strategy (NSWMS); 5. Extent of Responsibility; 6. Occupational Safety and health; 7. Safe handling of equipment and tools; 8. Guidelines for Framework Legislation for Integrated Waste Management; 9. Rules and regulations for waste disposal.

**TABLE 1: DACUM CHART FOR BIOPROCESS AND POST HARVEST ENGINEER
– LEVEL 8**

DUTIES	TASK	ENABLERS
1.0. Develop budget for production process, maintenance and marketing of finished product	1.1. Prepare budget for production processes. 1.2. Prepare budget for maintenance in production line. 1.3. Create budget for marketing of finished product.	General skills and knowledge • Skills and knowledge on budgeting • Communication skills • Knowledge on mathematics • Linear Programming (minimize cost maximize profit) • Basic business Management Tools and Equipment • Computer • Printers • Calculator • stationery previous budget documents Materials • Stationery (Papers, pen etc.) Worker behaviours • Commitment • Trustworthy • Time management • Team Work
2.0. Manage production line for Agricultural Produce (AP)	2.1. Conduct quality tests of the received AP from farmers/ago-dealers. 2.2. Handle APs according to standard operating procedures (SOPs) for AP. 2.3. Perform preventive maintenance of the AP processing machine. 2.4. Monitor procedures to accomplish the whole process.	General skills and knowledge • Management skills • Communication skills • Skills and knowledge on taking measurement and measuring units • Interpretation of procedure manuals and Engineering Drawings • Leadership skills • Knowledge on maximizing output and minimizing cost • Judgement on quality control results • Preparation of operation specifications

DUTIES	TASK	ENABLERS
		• Ability to manage standard production Tools and Equipment • Moisture meter, weigh balance, colorimeter/spectrophotometer • Laboratory supplies • Office software Materials • Lubricants • Mechanical equipment Worker behaviours • Demonstrate team work skills • Commitment • Time management • Trustworthy • Integrity
3.0. Prepare maintenance plan for the Plant	3.1. Develop maintenance schedule for the plant. 3.2. Organize the required resources to perform maintenance. 3.3. Execute the maintenance plan.	General Skills and knowledge • Knowledge in using computerized management system (e.g., Pronto, SAP) • Read and understand mechanical drawings • Communication skills • Knowledge in Computer Software • Solid understanding of maintenance planning and scheduling concepts • Linear Programming • Knowledge in division of work and responsibility • Knowledge in relevant laws and regulations • Knowledge in production technology and product quality • Knowledge in management safety and cost

DUTIES	TASK	ENABLERS
		Tools and Equipment • Engineering Toolbox • Computer, hard hat, gloves, safety boots, coveralls, etc. • Office software Materials • Lubricant • Gaskets • Cleaning materials • Computer Worker behaviours • Effective use of working time • Team work • Commitment • Organization, communication and expression skills
4.0. Manage waste in production line	4.1. Collect waste from the production line. 4.2. Treat waste collected from production line. 4.3. Dispose treated waste from production line.	General Skills and knowledge • Waste Management • Communication skills • Chemistry knowledge Tools and Equipment • PPEs (masks, gloves, glasses, safety boots, coveralls etc.) • Cleaning aids (brooms, mopper, squeezer, dust wipers etc.) Materials • Laboratory supplies (reagents for treatment) • Detergents Worker behaviours • Team work • Commitment • Time management

DUTIES	TASK	ENABLERS
		• Self-motivation