



THE REPUBLIC OF UGANDA
Ministry of Education and Sports

Directorate of Industrial Training



**Assessment and Training
Package**

**For a
BRIQUETTE MAKER**

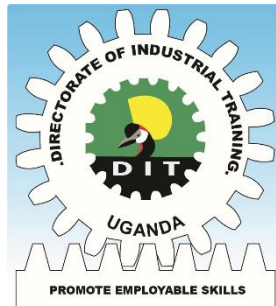
Qualification Level: 1

Occupational Cluster: Technology and Design

September 2020

Developed by:
Directorate of Industrial Training
Qualifications Standards Department

Supported by:
Government of Uganda



Assessment and Training Package

For a

BRIQUETTE MAKER

Qualification Level: 1

Occupational Cluster: Technology and Design

Directorate of Industrial Training
Plot 97/99 Jinja Road/ Corner 3rd Street,
P.O Box 20050, Lugogo, Kampala, Uganda
Tel: +256 414 253 704; +256 312 279 344
E-mail: uvqf.dit@gmail.com
[Web: www.dituganda.org](http://www.dituganda.org)

© Directorate of Industrial Training
2021

ISBN: 978-9913-626-61-3

ISO: 9001:2015 Certificate No.: UG92580A

All rights reserved. No reproduction or copy transmission of this publication may be made without written permission or in accordance with the provisions of the Copyright, Designs and Patents Act or under the terms of licence permitting limited copying issued by the licencing agency in Uganda. Any person who does any unauthorised act in relation to this publication may be liable to criminal prosecution and civil claims for damages.

Under BTVET Act, 2008, the functions of the Directorate of Industrial Training are:

- (a) To identify the needs of the labour market for occupational competencies that fall under the UVQF.
- (b) To regulate apprenticeship schemes.
- (c) To foster and promote entrepreneurial values and skills, as an integral part of the UVQF.
- (d) To secure adequate and sustainable financing for the efficient operations of the Directorate.
- (e) To accredit training institutions or companies as assessment centres.
- (f) To determine fees payable under the Act.
- (g) To develop, apply, expand and improve the purposeful application of Uganda vocational qualifications defined in the UVQF.
- (h) To assess and award Uganda Vocational Qualifications.
- (i) To promote on-the-job training in industry for apprenticeship, traineeship and indenture training and for other training such as further skills training and upgrading.
- (j) To prescribe the procedure for the making of training schemes.

Further to the above provisions, there is an established Uganda Vocational Qualifications Framework (UVQF), under part V of the BTVET Act, 2008. It is stated that:

The purpose of the UVQF is to;

- (a) Define occupational standards in the world of work.
- (b) Define assessment standards.
- (c) Award vocational qualifications of learners who meet the set standards of different studies.
- (d) Provide guidelines for modular training.

The UVQF shall follow principles of Competence Based Education and Training (CBET) which include:

- (a) Flexible training or learning modules.
- (b) Positive assessment and certification.
- (c) Assessment of prior learning.
- (d) Recognition of formal and non-formal training.
- (e) Self-paced or individual learning.
- (f) Work place learning.

For award and recognition of certificates, the BTVET Act, 2008 provides that:

- (1) The Directorate and other examination boards established under the Act shall award certificates and diplomas for Business, Technical or Vocational Education and Training under the UVQF.
- (2) The Certificates and Diplomas to be awarded shall be in the form prescribed by the Minister on the recommendation of the Industrial Training Council.
- (3) The Certificates and Diplomas awarded under the Act shall be recognised in the Uganda education system and by the labour market.

Under the TVET Implementation Standards 2020, the proposed new mandate of the Directorate of Industrial Training shall be restricted to promoting the highest standards in the quality and efficiency of industrial training in the country and ensuring an adequate supply of properly trained manpower at all levels in the industry and the world of work.

The functions shall include:

- (a) Regulating Industrial Training and Trainers.
- (b) Developing Industrial Training Curricula.
- (c) Harmonising Curricula and Certificates of competence.
- (d) Assessing Industrial Training.
- (e) Development of Occupational Standards and Assessment and Training Packages (ATPs) for Trade Testing for the industry and world of work.
- (f) Awarding certificates in that respect.

At operational level in the Directorate, the Qualification Standards Department performs development tasks related to concepts, procedures and instruments for establishment of the UVQF in close collaboration with both public and private stakeholders in vocational training.

In particular, the Department organises and coordinates the development of Assessment and Training Packages for use in competence-based vocational training as well as standards-based assessment and certification.

The Directorate has therefore produced this Assessment and Training Package for use in implementing Competence-Based Education and Training mechanisms.

TABLE OF CONTENTS

Word from Permanent Secretary.....	iv
Executive Summary	vi
Acknowledgement.....	viii
Abbreviations and Acronyms.....	ix
Key Definitions	x
1.0 ATP-PART I.....	1
Occupational Profile for a Briquette Maker	1
2.0 ATP – PART II	9
Training Modules for a Briquette Maker	9
3.0 ATP-PART III	19
Assessment Instruments for a Briquette Maker	19
Written Test Items (Samples)	21
Performance Test Items (Samples).....	28
4.0 ATP- PART IV.....	30
Information on Development Process	30

Word from Permanent Secretary

The Kajubi Report (1989) and the Uganda Government White Paper on Education Review (1992) emphasised that the Uganda Secondary School Education should be vocationalised.

The World Bank Report on education in Uganda 2007 observed that although Uganda was experiencing steady economic growth on one hand, the secondary education curriculum was inadequately addressing the social and economic needs of the country on the other. The Report further noted that it is not the very top academic cadres that contribute most to the growth of the GDP but rather the competent middle level technicians that are flexible and technologically literate that the economy needs in the labour market at all levels.

Correspondingly, the NDP III 2020/21- 2024/5 highlights (i) low labour productivity (ii) high youth unemployment (38%) (iii) low transition rates from training to employment (35%) as some of the key challenges to Human Capital Development in Uganda.

In order to overcome these challenges, NDP III 2020/21- 2024/5, under objective 2 peaks the need to train the learners for the urgently needed skills and mainstream a dual education and training system. This paved way for the development of the lower secondary school vocational curriculum which supports both academic and vocational training.

The afore is in line with the Uganda Vision 2040. Under section 261, it emphasises that learners will be accorded opportunities to excel in the skills areas they are placed into. These will range from sports and cut to technical and vocational training. Hitherto, section 262 clearly states that the entire education system will be changed to emphasise practical skills, attitude and moral values.

Government of Uganda through the Ministry of Education and Sports rolled out the New Lower Secondary Curriculum in secondary schools countrywide during the first term of the academic year 2020. The overall goal of this curriculum is to produce graduates with employable skills and who are competitive in the labour market. It should be emphasised that vocational training will produce graduates who are employable. In the New curriculum, emphasis will be on equipping learners with employable skills and competencies. This will enable learners perform the requisite duties of the specified occupations. This is the reason why the lower secondary school vocational curriculum was tailored to the assessment requirements of the world of work.

Reading from the Curriculum Framework page 12, it is stated that the learners will be assessed by DIT. Upon assessment and certification, the graduates will be employable and competitive in the labour market. It's against this background that DIT, within its mandate vested in the BTVET Act, 2008 comes on board to take the lead in the development of the requisite Assessment and Training Packages (ATPs) for the various occupations that will be assessed under the Lower Secondary Curriculum.

The ATPs can be used by any training provider and/or those who wish to present themselves for Occupational Assessment and Certification.

Herewith, the Directorate of Industrial Training presents the Assessment and Training Package for training, assessment and certification of a **BRIQUETTE MAKER QUALIFICATION LEVEL 1**.

Finally, I thank all individuals, organisations and review partners who have contributed and/or participated in the review of this noble document.



Alex Kakooza
Permanent Secretary

Executive Summary

This Assessment and Training Package is a Competence-Based Education and Training (CBET) tool and consists of three major parts:

- 0.1 **PART I: The Occupational Profile (OP) of a BRIQUETTE MAKER** . This Occupational Profile which was reviewed by Briquette Maker s practicing in the world of work mirrors the duties and tasks that Briquette Maker s are expected to perform.
- 0.2 **PART II: Training Modules** in the form of guidelines to train Briquette Maker s both on the job as well as in training centres (or combinations of both venues of learning). The Training Modules herein have been reviewed basing on the Occupational Profile and hence are directly relevant for employment.
- 0.3 **PART III: Assessment Instruments** in the form of performance (Practical) and written (theory) test items that can and should be used to assess whether a person complies with the requirements of employment as a BRIQUETTE MAKER . These assessment instruments were reviewed jointly by job practitioners (Briquette Maker s) and instructors based on the occupational profile and training modules.
- 0.4 While the Occupational Profile (OP) contained in PART I of this document provides the information on **WHAT a person is expected to do** competently in the world of work, the test items, - including performance criteria- of PART III qualify the **HOW and/or HOW WELL a person must do the job.**
- 0.5 The modular format of the curriculum (PART II) allows learners to acquire job specific skills and knowledge (i.e. competencies) module by module. A single module can be accomplished within a relatively short duration allowing flexibility for learners to move directly into an entry level job, go for further modules or advance to higher levels of training. Modular courses allow more learners to access the training system because training centres as well as companies can accommodate more learners in a given period of time.
- 0.6 In addition to improved access, equity and relevance of BTJET, the UVQF will also enable people who are convinced to have acquired competencies laid down in this ATP through prior training and on-the-job experience to access assessment and certification directly; be it on the basis of a single module, a group of modules or all modules pertaining to the occupation at once. This achievement will facilitate Recognition of Prior Learning (RPL).

0.7 The parts of this Assessment and Training Package were sequentially reviewed as follows:

- i Part 1: Occupational Profile: **August 2020**
- ii Part 2: Training Modules: **August 2020**
- iii Part 3: Assessment Instruments (initial bank): **August 2020**

This ATP (or parts of it) may be periodically revised to match the dynamic trends in the occupation and hence issued in different versions.

DIT takes responsibility of any shortcomings that might be identified in this publication and welcomes suggestions for effectively addressing the inadequacies. The suggestion can be communicated to DIT through P.O. Box 20050, Kampala or through email uvaf.dit@gmail.com.



Patrick Byakatonda
Ag Director

Acknowledgement

The Qualifications Standards Department of DIT wishes to sincerely acknowledge the valuable contributions to the review of this Assessment and Training Package by the following persons, Institutions and organisations:

- Members of the DIT Industrial Training Council,
- The Director and staff of DIT,
- Ministry of Education and Sports,
- The practitioners from the world of work,
- Teachers of Briquette Maker from various Secondary Schools,
- Briquette Maker Curriculum Specialists from NCDC,
- Examination Specialists from UNEB,
- The facilitators involved in guiding the review panel in their activities,
- The Government of Uganda for financing the review of this ATP.

Abbreviations and Acronyms

A&C	Assessment and Certification
ATP	Assessment and Training Packages
CBET	Competency Based Education and Training
DIT	Directorate of Industrial Training
ITC	Industrial Training Council
GoU	Government of Uganda
LWA	Learning-Working Assignment
MC	Modular Curriculum
MoES	Ministry of Education and Sports
OP	Occupational Profile
PEX	Practical Exercise
PTI	Performance (Practical) Test Item
QS	Qualification Standards
RPL	Recognition of Prior Learning
TIB	Test Item Bank
TVET	Technical, Vocational, Education and Training
UVQ	Uganda Vocational Qualification
UVQF	Uganda Vocational Qualifications Framework
WTI	Written (Theory) Test Item

Key Definitions

Assessment	Assessment is the means by which evidence is gathered and judged to decide if an individual has met the stipulated assessment standards or not. Testing is a form of formal assessment.
Certification	Certification is a formal procedure to issue a certificate (qualification) to an individual that has demonstrated during formal assessment that he/she is competent to perform the tasks specified in the occupational profile.
Competence	Integration of skills, knowledge, attitudes, attributes and expertise in doing /performing tasks in the world of work to a set standard.
Competency	(Occupational) competence is understood as the ability to perform tasks common to an occupation at an acceptable level.
CBET	Competence-based education and training means that programs: <ol style="list-style-type: none">1. have content directly related to work2. focus is on 'doing something well'3. assessment is based upon industry work standards, and4. curricula are developed in modular form
Duty	A Duty describes a large area of work in performance terms. A duty serves as a title for a cluster of related Tasks (see also: TASK).
Learning-Working Assignment (LWA)	LWA are simulated or real job situations / assignments that are suitable for learning in a training environment (e.g. "small projects"). In a working environment LWAs are real work situations /assignments.
Modules	Modules are part(s) of a curriculum. Modules can be considered as "self-contained" partial qualifications which are described by learning outcomes or competencies and which can be assessed and certified individually.
Occupational Profile (OP)	<p>An Occupational Profile is an overview of the duties and tasks a job incumbent is expected to perform competently in employment.</p> <p>Occupational Profiles developed by practitioners from the world of work enhance the relevance of training and learning to the requirements of the world of work.</p>

Occupational Profiles define what a person is supposed to do in performance terms. It also contains generic information regarding related knowledge and skills, attitudes/behavior, tools, materials and equipment required to perform as well as trends/ concerns in the occupation.

Occupational profiles are the reference points for developing modular curricular and assessment standards

Qualification A qualification is a formal recognition for demonstrating competence, based on formal assessment against set standards. A qualification is provided to the individual in form of a certificate specifying the nature of the competence.

Task Job tasks represent the smallest unit of job activities with a meaningful outcome. Tasks result in a product, service, or decision. They represent an assignable unit of work and have a definite beginning and ending point. Tasks can be observed and measured. (*Also see: Duty*)

1.0 ATP-PART I

Occupational Profile for a BRIQUETTE MAKER

- 1.1 The OCCUPATIONAL PROFILE (OP) for “Briquette Maker” below defines the **Duties** and **Tasks** a competent Briquette Maker is expected to perform in the world of work (on the job) in Uganda and the East African region today.
- 1.2 Since it reflects the skill requirements of work life, the Occupational Profile is the reference document for the subsequent development of training modules and assessment instruments (test items) which are directly relevant to employment in Ugandan and the East African businesses and industries.
- 1.3 To ensure that the Occupational Profile is relevant for employment in Uganda and East Africa, the DIT used the method of “occupational/job profiling.”¹

This approach involves the brainstorming of a panel of 8 to 12 competent job practitioners guided by trained and experienced facilitators. During a two-day workshop the panelists defined the duties and tasks performed in employment, as well as the prerequisite skills, knowledge, attitudes, tools and equipment, and the future trends and concerns in the occupation/job.

- 1.4 The panelists, facilitators and coordinators who participated in developing this Occupational Profile are listed on the following page.

Expert Panel

Kalette George William
Mengo S S

Kasaato Samuel
Maama Heat

Mulondo Kennedy
Uni-Trust Community
Development Co. Ltd

Aheebwa Moses
Right Hand Vocational Center

Wycliff Edwin Tusiime
Kyambogo University-Bushenyi

Tumuheirwe Aidah
United Innovations
Development Center

Nimanya Abas Kashagire
Right Projects Ltd

Natabi grace
Self-Help Development
Assistant

Ssemanda Taddeo
Raphael Investment Ltd

Facilitators
Noeline Komugisha
Directorate of Industrial Training

Nakisendo Fatuma
Directorate of Industrial Training

Co-ordinator
Mukyala Ruth Elizabeth
Directorate of Industrial Training

Funded by
Government of Uganda



THE REPUBLIC OF UGANDA
Ministry of Education and Sports

Directorate of Industrial Training

Occupational Profile
of a

"BRIQUETTE MAKER"

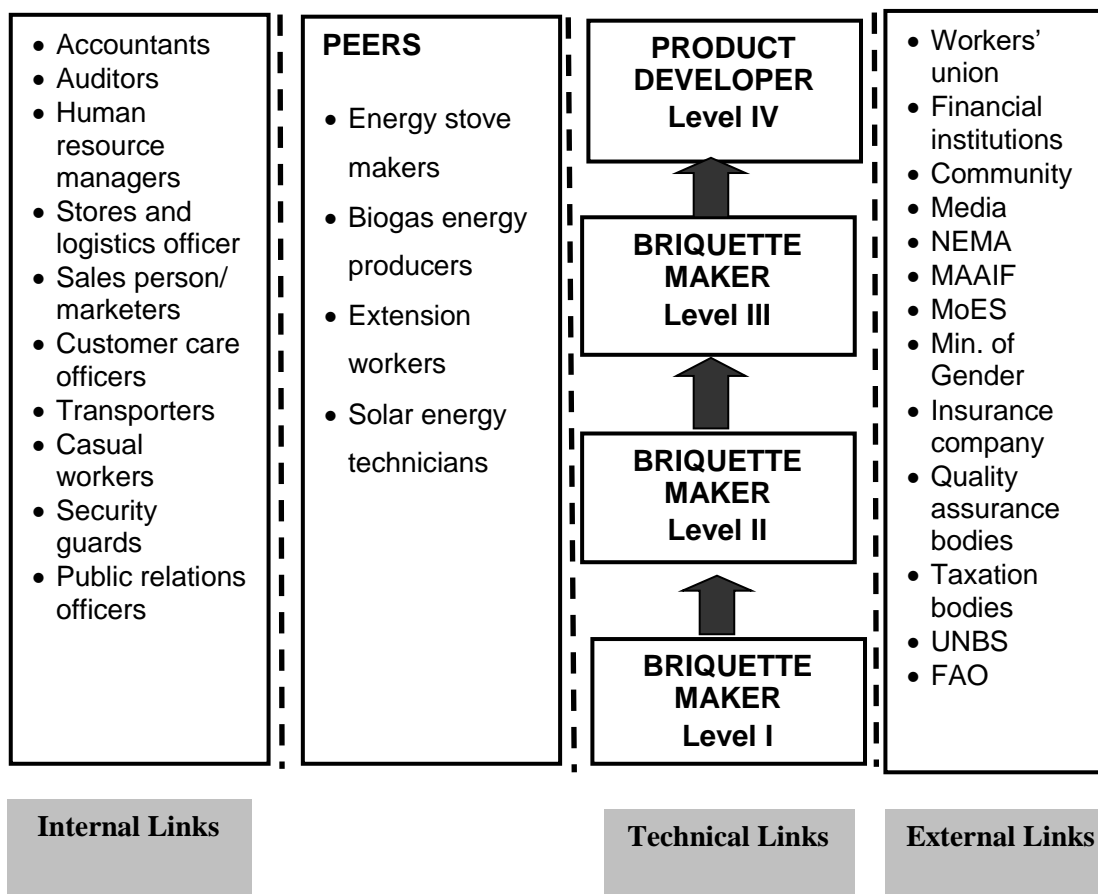
Developed by: Directorate of Industrial Training
(Qualifications Standards)

Dates of workshop: 14th – 18th September 2020

NOMENCLATURE FOR THE OCCUPATION OF BRIQUETTE MAKER

Definition: A Briquette Maker is a person who turns organic materials into solid products of carbon content that can be used as a source of energy.

JOB ORGANISATION CHART FOR A BRIQUETTE MAKER



Level I Briquette Maker: This is a person who follows an already established formula to produce briquettes from organic materials.

Duties and Tasks

A. PLAN BRIQUETTE MAKING WORKS	A1 Develop business idea	A2 Carryout feasibility study	A3 Carryout market analysis
	A4 Determine labour requirements	A5 Determine business location	A6 Determine type of briquettes
	A7 Prepare procurement plan for tools equipment and materials	A8 Prepare production plan	A9 Identify source of funds
	A10 Decide on technology to be used	A11 Provision for record keeping	
B. DEVELOP PRODUCT	B1 Generate ideas	B2 Screen ideas	B3 Develop product features
	B4 Design the product	B5 Test product	B6 Test market performance
	B7 Develop prototype	B8 Commercialise product	
C. ESTABLISH BRIQUETTE MAKING BUSINESS	C1 Reserve business name	C2 Prepare company profile	C3 Recruit workers
	C4 Register business	C5 Secure premises	C6 Source funds
	C7 Acquire operational licenses		
D. MAKE BRIQUETTES	D1 Gather organic material	D2 Assemble technology	D3 Dry material
	D4 Carbonise the material	D5 Crush carbonise material	D6 Sieve carbonised material
	D7 Mix material with binder	D8 Mold mixture	D9 Dry product
	D10 Test quality of product	D11 Store product	

E. PREPARE TOOLS EQUIPMENT AND MATERIALS	E1 Prepare organic waste	E2 Prepare binders	E3 Service tools and equipment
	E4 Select tools, equipment and materials	E5 Operate tools and equipment	E6 Repair tools and equipment
	E7 Procure tools equipment and materials		

F. MARKET PRODUCT	F1 Brand product	F2 Package product	F3 Advertise product
	F4 Promote product	F5 Transport briquettes	F6 Sell product

G. MANAGE BUSINESS RECORDS	G1 Keep production records	G2 Keep sales records	G3 Keep financial records
	G4 Keep quality control records	G5 Keep store records	G6 Keep human resource records
	G7 Store records		

H. PERFORM OCCUPATIONAL HEALTH, SAFETY AND ENVIRONMENTAL PROTECTION PRACTICES	H1 Perform fire fighting	H2 Administer first aid	H3 Manage waste
	H4 Display safety signs	H5 Wear protective gear	H6 Clean work environment
	H7 Sensitise workers on health issues		

I. PERFORM ADMINISTRATIVE TASKS	I1 Recruit workers	I2 Develop training manuals	I3 Assign tasks
	I4 Remunerate workers	I5 Appraise workers	I6 Supervise workers
	I7 Resolve conflicts	I8 Discipline workers	I9 Train workers
	I10 Mentor workers	I11 Attend technical meetings	

Additional Information

Generic Knowledge & Skills	
<ol style="list-style-type: none"> 1. Type of waste materials 2. Type of binders 3. Machines used 4. Security and safety awareness 5. Mode of transport to be used 6. Construction of drying areas 7. Health and safety precautions 8. Types of technology to be used 9. Types of briquettes to produce 10. Boiling and heating 11. Customer relations 12. Market research 13. Tools equipment and materials 14. Sourcing of tools equipment and material 15. Knowledge of compressing the mixture 16. Selling techniques 17. Quality control 18. Drying methods 19. Maintenance of tools and materials 20. Digging clay 21. Methods of crushing 	<ol style="list-style-type: none"> 26. Interpersonal relations 27. Customer care 28. Training skills 29. Good with the hands 30. Problem solving skills 31. Safety, health and environment 32. Public relations 33. Business 34. Time management 35. Good hand-eye co-ordination 36. An eye for detail 37. Planning skills 38. Financial management 39. Communication skills 40. Innovation skills 41. Creativity 42. Packaging 43. Marketing 44. Tool assembling 45. Methods of turning organic waste to carbon 46. Storage facilities

Tools, Materials and Equipment	
<ol style="list-style-type: none"> 1. Carboniser 2. Crushers/sieves 3. Mixer 4. Presser 5. Drying shade/open space exposed to sunshine 6. Plastic drum 7. Spade 8. Plywood 9. Dry banana waste 10. Charcoal dust/papers/maize combs 11. Soil 12. Cassava flour/binder/starch 13. Clay soil/ant hill soil 14. Waste paper 15. Weighing Scale 	<ol style="list-style-type: none"> 16. Agricultural waste 17. Cardboards 18. Water hyacinth 19. Hoes 20. Slashers 21. Knife 22. Jeri can 23. Basin 24. Gloves 25. Gumboots 26. Overall 27. Helmet 28. Nosals mask 29. Molder

Attitudes / Traits / Behavior	
<ol style="list-style-type: none"> 1. Carries out conflict resolution 2. Organised 3. Respectful 4. Trustworthy 5. Team player 6. Dedicated 7. Self-motivated 8. Punctual/time manager 9. Self-driven 10. Innovative and creative 11. Enthusiastic 12. Disciplined 13. Social 14. Realistic 15. God fearing 16. Honest 17. Cooperative 18. Communication skills 19. Humility 	<ol style="list-style-type: none"> 20. Hard working 21. Resourceful 22. Good listener 23. Result oriented 24. Trainable 25. Strategic 26. Empathetic 27. Active 28. Flexible 29. Researcher 30. Risk taker/risk averse 31. Dynamic 32. Leader 33. Patient 34. Tolerant 35. Proactive 36. Interpersonal skills 37. Decision making 38. Assertive

Future Trends and Concerns

1. Expansion of market
2. Growth opportunities
3. Leading market players
4. Competition from other energy sources
5. Variety improvements
6. Internet, website etc.
7. Exportation
8. Price fluctuation
9. Continuous professional development in briquette making
10. Need for better storage facilities
11. Need value addition
12. Environment degradation
13. Climate change
14. Need to visit model enterprises
15. Unfavourable credit facilities/terms and conditions
16. High levels of taxation
17. Need for extension services
18. Advancement in technology
19. Lack of formal curriculum on briquette making
20. Growing markets
21. Land shortages
22. Increasing competition from imported produce
23. Increasing population
24. High set standards on foreign markets
25. Availability of raw materials
26. Research on new technology to be used

2.0 ATP – PART II

Training Modules for a BRIQUETTE MAKER

- 2.1 A curriculum is a “guide /plan for teaching and learning” which provides a guide to teachers, instructors and learners. In the envisaged system of competence-based or outcome-oriented education and training (CBET), Curricula are no longer the benchmark against which assessment is conducted. It is rather the Occupational Profile that provides the benchmark for Curriculum development as well as assessment.
- 2.2 This modular format of the curriculum allows learners of BRIQUETTE MAKER to acquire job specific skills and knowledge (i.e. competencies) module by module. A single module can be accomplished within a relatively short duration allowing learners to move directly into an entry level job, do further modules and advance to higher levels of training. Modular courses allow more learners to access the training system because training centers, as well as companies can accommodate more learners in a given period of time.
- 2.3 The modules were developed jointly by both instructors and job practitioners. They were developed using the Occupational Profile as a reference point and taking into account the specifications of training and learning outcomes.
- 2.4 The modules contain “Learning-Working Assignments” (LWAs) and related “Practical Exercises” (PEXs) as key elements.
- LWAs are simulated or real job situations/assignments that are suitable for learning in a training environment (e.g. “small projects”). In a working environment, LWAs are real work situations.
- PEXs are therefore sub-sets of a LWA.
- 2.5 In principle, and following the philosophy of Competence-Based Education and Training (CBET), the modules can be used as a guide for learning in a training Centre, at the workplace; or a combination of both.

WHO IS A BRIQUETTE MAKER QUALIFICATION LEVEL 1?

A Level I Briquette Maker is a person who follows an already established formula to produce briquettes from organic materials

TRAINING MODULES FOR A BRIQUETTE MAKER UVQ LEVEL 1

Code	Module Title	Average duration	
		Contact hours	Weeks
UE/BM/M1.1	Start and Manage Briquette Making Enterprise	160	4 weeks
UE/BM/M1.2	Prepare Materials for Briquette Making	40	1 week
UE/BM/M1.3	Produce Briquettes	80	2weeks
TOTAL	3 Training Modules	280 hours	7 weeks

Note: Average duration is contact time but NOT calendar duration

It is assumed that:

- 1 day is equivalent to 8 hours of nominal learning and
- 1 month is equivalent to 160 hours of nominal learning.

Information given on the average duration of training should be understood as a guideline. Quick learners may need less time than indicated or vice versa.

At completion of a module, the learner should be able to satisfactorily perform the included Learning Working Assignments, their Practical Exercises and attached theoretical instruction, as the minimum exposure.

Prior to summative assessment by recognised agencies, the users of these Module Guides are encouraged to carefully consider continuous assessment using samples of (or similar) performance (practical) and written test items available in part 3 of this ATP.

TRAINING MODULES FOR BRIQUETTE MAKER

Code	UE/BM/M1.1
Module title	M1.1: Establish and Manage Briquette Making Enterprise
Related Qualification	<u>Part of:</u> Uganda Vocational Qualification (BRIQUETTE MAKER UVQ1)
Qualification Level	1
Module purpose	After completion of this module, a trainee should be able to start and successfully manage a briquette making enterprise.
Learning-Working Assignments (LWAs)	<p>LWA1/1 Perform Administrative Work LWA1/2 Develop Business Plan LWA1/3 Carryout Marketing LWA1/4 Set up a Briquette Workshop LWA1/5 Procure Tools, Materials and Equipment LWA1/6 Manage Business Records LWA1/7 Perform Occupational Health Safety and Environmental Protection Practices</p> <p>Note:</p> <ol style="list-style-type: none"> 1. The learning exercises must be repeated until the trainee acquires a targeted competence. 2. The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.
Related Practical Exercises (PEXs)	<p>LWA1/1 Perform Administrative Tasks PEX1:1. Recruit workers PEX1:2. Train workers PEX1:3. Prepare work schedule PEX1:4. Assign work PEX1:5. Remunerate workers PEX1:6. Supervise works</p> <p>LWA1/2 Develop Business Plan PEX2:1. Develop business idea PEX2:2. Carryout field study PEX2:3. Prepare budget</p> <p>LWA1/3 Market Briquettes PEX3:1. Carryout market survey PEX3:2. Brand products PEX3:3. Package products</p>

	<p>PEX3:4. Advert products PEX3:5. Promote products PEX3:6. Sell products</p> <p>LWA1/4 Set up a Briquette Workshop PEX4.1: Source capital PEX4.2: Determine workshop location PEX4.3: Register business PEX4.4: Acquire operational permit and licenses</p> <p>LWA 1/5: Procure Tools, Equipment and Materials. PEX5:1. Determine tools equipment and materials PEX5:2. Identify source of tools, equipment and materials PEX5:3. Negotiate payment terms PEX5:4. Acquire tools equipment and materials PEX5:5. Transport tools, equipment and materials PEX5:6. Store tools, equipment and materials</p> <p>LWA 1/6 Manage Business Records PEX6:1. Prepare records e.g. sales, inventory, store etc. PEX6:2. Prepare reports PEX6:3. Carryout business audit PEX6.4. Store records</p> <p>LWA 1/7: Perform Occupational Health, Safety and Environmental Protection Practices PEX7:1. Display safety signs PEX7:2. Administer first aid PEX7:3. Perform firefighting PEX7:4. Sensitise workers on pandemics prevention e.g. COVID19 and HIV PEX 7:5. Manage waste</p>
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.
Pre-requisite modules	None
Related knowledge/ theory	<p><i>For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:</i></p> <ul style="list-style-type: none"> • Market prices • Branding • Packaging • Means of advertisements

	<ul style="list-style-type: none"> • Existing competitors • Marketing strategies • Types of businesses • Business planning and management • Benefits of information technology and communication • Forms of communication • Types of business records • Forms of taxes • Developing a business plan • Importance of networking • Qualities of an entrepreneur • Characteristics of a successful business • Customer care • Benefits of research • Means of transport • Price negotiations
Average duration of learning	<p>160 hours (20 Days) of nominal learning suggested to include:</p> <ul style="list-style-type: none"> • <i>5days of occupational theory and</i> • <i>15days of occupational practice</i>
Suggestions on organisation of learning	<p>The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided that all equipment and materials required for this module training are in place.</p>
Assessment	<p>Assessment to be conducted according to established regulations by a recognised assessment body using related practical and written test items from item bank.</p>
Minimum required tools/ equipment/ implements or equivalent	<p>camera, computer, calculator, telephone, data storage device, projector, white/black board, printer, filing cabinets, resource books</p>
Minimum required materials and consumables or equivalent	<p>stationery, airtime, and the Internet</p>
Special notes	

Code	UE/BM/M1.2
Module title	M1.2: Prepare Materials for Briquette Making
Related Qualification	Part of: Uganda Vocational Qualification (BRIQUETTE MAKER UVQ1)
Qualification Level	1
Module purpose	After completion of this module, the trainee shall be able to prepare different types of materials for briquette making.
Learning-Working Assignments (LWAs)	<p>LWA 2/1: Gather Raw Materials LWA 2/2: Carbonise Raw Material LWA 2/3: Pulverise Char LWA 2/4: Prepare Binder LWA 2/5: Perform Occupational Health, Safety and Environmental Protection Practices</p> <p>Note:</p> <ol style="list-style-type: none"> 1. <i>The learning exercises must be repeated until the trainee acquires a targeted competence.</i> 2. <i>The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.</i>
Related Practical Exercises (PEXs)	<p>LWA 2/1: Gather Raw Materials PEX1:1. Sort raw materials PEX1:2. Dry raw materials PEX1:3. Store raw materials</p> <p>LWA 2/2: Carbonise Raw Materials PEX2:1. Prepare carboniser PEX2:2. Make char PEX2:3. Cool carbonised materials</p> <p>LWA 2/3: Pulverise Char PEX3:1. Crush carbonised materials PEX3:2. Sieve carbonised material PEX3:3. Store fine carbonised material</p> <p>LWA 2/4: Prepare binder PEX4:1 Measure the ratios PEX4:2 Prepare starch PEX4:3 Pound clay or ant hill soil PEX4:4 Pulp paper</p>

	<p>LWA 2/5: Perform Occupational Health, Safety and Environmental Protection Practices</p> <p>PEX5:1: Wear protective gear PEX5:2: Administer first aid PEX5:3: Maintain personal hygiene PEX5:4: Mangle waste PEX5:5: Clean tools and equipment PEX5:6: Store tools and equipment PEX5:7: Perform firefighting PEX5:8: Display safety signs PEX5:9: Clean work area</p>
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.
Pre-requisite modules	None
Related knowledge/ theory	<p><i>For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:</i></p> <ul style="list-style-type: none"> • Types of protective gear • Describe different types of materials • How to identify raw materials • How to process mix binder • Describe different types of binders • Describe different types of carbonisers • Tools and equipment usage • First aid kit components and purposes • Crushing methods • sieving processes
Average duration of learning	<p>40 hours (5 Days) of nominal learning suggested to include:</p> <ul style="list-style-type: none"> • 1 day of occupational theory and • 4 days of occupational practice
Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training center or its equivalent provided that all equipment and materials required for this module training are in place.
Assessment	Assessment to be conducted according to established regulations by a recognised assessment body using related practical and written test items from item bank.

Minimum required tools/ equipment/ implements or equivalent	hoes, spade, wheelbarrow, mixing container, water holding facility, plywood, plastic container, drying rake, carbonizer, crusher, sieve, mixer, protective gears-gloves, masks, gumboots, overall, temperature gun
Minimum required materials and consumables or equivalent	wood e.g. saw dust, Agricultural materials e.g. banana stem, peelings, banana dry leaves, maize comb, gnut husks, rice husks, coffee husks, soap, sanitiser, Animal wastes i.e. dung, binders (clay, ant hill soil, molasses, rice flour, wheat flour, sweet potato leaves) and Water
Special notes	<ul style="list-style-type: none"> • Provide all the necessary equipment to the trainee • Theory knowledge should be integrated when carrying out a practical

Code	UE/BM/M1.3
Module title	M1.3: Produce Briquettes
Related Qualification	Part of: Uganda Vocational Qualification (BRIQUETTE MAKER UVQ1)
Qualification Level	1
Module purpose	After completion of this module, the trainee shall be able to blend materials and produce different types of briquettes
Learning-Working Assignments (LWAs)	<p>LWA 3/1: Mix Raw Materials</p> <p>LWA 3/2: Make Non Carbonised Briquettes</p> <p>LWA 3/3: Make Carbonised Briquettes</p> <p>LWA 3/4: Perform Occupational Health, Safety and Environmental Protection Practices</p> <p>Note:</p> <ol style="list-style-type: none"> 1. The learning exercises may be repeated until the trainee acquires targeted competence; 2. The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.
Related Practical Exercises (PEXs)	<p>LWA 3/1: Mix Raw Materials</p> <p>PEX1:1. Prepare mixer</p> <p>PEX1:2. Measure quantities of binder and carbonised material</p> <p>PEX1:3. Pour and blend content in mixer</p>
	<p>LWA 3/2: Make Non Carbonised Briquettes</p> <p>PEX2:1. Make honey comb briquettes</p> <p>PEX2:2. Make saw dust briquettes</p> <p>PEX2:3. Make straw briquettes</p> <p>PEX2:4. Dry briquettes</p>
	<p>LWA 3/3: Make Carbonised Briquettes</p> <p>PEX3:1. Make handmade charcoal dust briquettes</p> <p>PEX3:2. Make honey comb briquettes</p> <p>PEX3:3. Dry carbonised briquettes</p>
	<p>LWA 3/3: Perform Occupational Health Safety and Environmental Protection Practices</p> <p>PEX3:1. Manage waste</p> <p>PEX3:2. Clean tools and equipment</p> <p>PEX3:3. Use personal protective equipment</p> <p>PEX3:4. Store, equipment, tools and material</p> <p>PEX3:5. Perform firefighting</p> <p>PEX3:6. Administer first aid</p>

Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.
Pre-requisite modules	None
Related knowledge/ theory	<p><i>For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate.</i></p> <ul style="list-style-type: none"> • Description the types of briquettes • How to operate tools and equipment used in production • Inquiries and first aid production • Factor affecting the quality of briquettes • Drying briquettes • Types of protective gears • First aid and their uses
Average duration of learning	<p>80 hours (10 Days) of nominal learning suggested to include:</p> <ul style="list-style-type: none"> • <i>2 days of occupational theory and</i> • <i>8 days of occupational practice</i>
Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided that all equipment and materials required for this module training are in place.
Assessment	Assessment to be conducted according to established regulations by a recognised assessment body using related written test items from item bank
Minimum required tools/ equipment/ implements or equivalent	gumboots/ safety shoes, gloves, spanners, extruders, pressing machine, honey comb machine, mixer, masks, panga, hammer, helmet, overall, dryers, charcoal stove, containers e.g. jerrycan, basin, roller Weighing scale
Minimum required materials and consumables or equivalent	binder, water, carbonised and non-carbonised material, vanier caliper
Special notes	<p>Take note of distinction between carbonised and non-carbonised briquettes</p> <p>Incase cassava has to be used as binder, use waste other than cassava flour</p> <p>Use organic waste other than charcoal dust to preserve the environment</p>

3.0 ATP-PART III

Assessment Instruments for a BRIQUETTE MAKER

- 3.1 Assessment of occupational competence is the procedure by which evidence is gathered and judged to decide if an individual (candidate) has met the stipulated assessment standards or not. In this ATP the **standards** to assess occupational competences are reflected in the form of the Occupational Profile and related Test Items.
- 3.2 Assessment of occupational competence should comprise both practical (performance) testing and written (theory/knowledge) testing.
- 3.3 Based on the Occupational Profile, a combined panel of job practitioners and Instructors developed a substantial number of test items for assessing (practical) performance as well as items for assessing occupational knowledge (theory) all stored in an electronic Test Item Bank (TIB) at Directorate of Industrial Training.
- 3.4 Performance (Practical) Test Items (PTI) are closely related to typical work situations in Ugandan business and manufacturing enterprises. They comprise a test assignment for candidates and assessment criteria and/or scoring guides for assessors' use.
- 3.5 Written Test items (WTI) for written testing of occupational theory, (knowledge) are presented in different forms which include:
 - Short answer test items.
 - Multiple choice test items and,
 - Matching test items, These WTIs herein focus on functional understanding as well as trouble-shooting typically synonymous with the world of work.
- 3.6 Composition of assessment / test papers will always require good choices of different types of WTI in order to ensure the assessment of relevant occupational knowledge required of candidates to exhibit competence.
- 3.7 The test items contained in the Test Item Bank may be used for continuous / formative assessment during the process of training as well as for summative assessment of candidates who have acquired their competences non-formally/or informally.
- 3.8 In this document, the following samples of test items for assessing both performance (practical) and occupational knowledge (theory) of **BRIQUETTE MAKER** are included:

3.9 Overview of test item samples included:

No.	Type of Test Item	Numbers included
1	Written (Theory)- short answer	2
2.	Written (Theory)- multiple choice	2
3.	Written (Theory)- matching with generic	1
4.	Written (theory)- matching with cause and effect	1
5.	Written (Theory)- matching with work sequence	1
6.	Performance (Practical) test items	1
	Total	8

WRITTEN TEST ITEMS (SAMPLES)

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 1			
Occupational Title:	Briquette Maker			
Competence level:	1			
Code no.				
Test Item type:	Short answer	√		
	Multiple choice			
	Matching item	Generic	Cause- Effect	Work-sequence
Complexity level:	C1			
Date of OP:	September 2020			
Related module:	M1.3			
Time allocation:	4 minutes			

Test Item	State four equipment used in briquette making
Answer spaces	(i) (ii) (iii) (iv)
Expected key (answers)	(i) Press machine (ii) Crusher (iii) Carboniser (iv) Extruder (v) Honey comb machine

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 2			
Occupational Title:	Briquette Maker			
Competence level:	1			
Code no.				
Test Item type:	Short answer	√		
	Multiple choice			
	Matching item	Generic	Cause-Effect	Work-sequence
Complexity level:	C2			
Date of OP:	September 2020			
Related module:	M1.1			
Time allocation:	5 minutes			

Test Item	State one economic benefit of briquette making
Answer spaces	(i)
Expected key (answers)	(i) Create jobs (ii) Source of income (iii) Source of revenue (iv) Improves standards of living

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 3			
Occupational Title:	Briquette Maker			
Competence level:	1			
Code no.				
Test Item type:	Short answer			
	Multiple choice	√		
	Matching item	Generic	Cause- Effect	Work- sequence
Complexity level:	C1			
Date of OP:	September 2020			
Related module:	M1.2			
Time allocation:	2 minutes			

Test Item	The following is the item involved during sorting of briquette making material
Distractors and correct answer	A. Plastic B. Peelings C. Stoves D. Nails

Key (answer)	B
--------------	---

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 4			
Occupational Title:	Briquette Maker			
Competence level:	1			
Code no.				
Test Item type:	Short answer			
	Multiple choice	√		
	Matching item	Generic	Cause- Effect	Work- sequence
Complexity level:	C1			
Date of OP:	September 2020			
Related module:	M1.2			
Time allocation:	2 minutes			

Test Item	Which item is maintained during sorting of briquette making material
Distractors and correct answer	A. Plastic B. Nails C. Peelings D. Stoves

Key (answer)	C
--------------	---

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 5			
Occupational Title:	Briquette Maker			
Competence level:	1			
Code no.				
Test Item type:	Short answer			
	Multiple choice			
	Matching item	Generic	Cause-Effect	Work-sequence
		√		
Complexity level:	C2			
Date of OP:	September 2020			
Related module:	M1.3			
Time allocation:	5 minutes			

Test item	Match the following machines with their relevant functions
------------------	------------------------------------------------------------

Column (A)	
A	Crusher
B	Mixer
C	Presser
D	Metallic drum

Column (B)	
1	Sorting
2	Carbonising
3	Compressing
4	Grinding
5	Blending
6	Heating
7	Sieving

Key (answer)	A-4, B-5, C-3, D-2
---------------------	--------------------

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 6			
Occupational Title:	Briquette Maker			
Competence level:	1			
Code no.				
Test Item type:	Short answer			
	Multiple choice			
	Matching item	Generic	Cause-Effect	Work-sequence
			√	
Complexity level:	C3			
Date of OP:	September 2020			
Related modules:	M1.3			
Time allocation:	10 minutes			

Test Item	Match the following briquette defects with their possible causes
------------------	------------------------------------------------------------------

Column A (Defect)	
1	Too much water
2	Little binder
3	Poorly sieved material
4	Lack of a hole

Column B (Causes)	
A	Briquette will crack
B	Poor aeration
C	Briquettes take long to dry
D	Burns faster
E	Produces too much ash
F	Poor compaction

Key (answer)	1 –C , 2 –F , 3 –A , 4 – B
---------------------	----------------------------

DIT/ QS	Test Item Database Written (Theory) Test Item- no.7			
Occupational Title:	Briquette Maker			
Competence level:	1			
Code no.				
Test Item type:	Short answer			
	Multiple choice			
	Matching item	Generic	Cause- Effect	Work- sequence
				√
Complexity level:	C3			
Date of OP:	September 2020			
Related modules:	M1.3			
Time allocation:	10 minutes			

Test Item	Arrange the following steps involved in production of carbonated briquettes
------------------	-----------------------------------------------------------------------------

Column A (Chronology)	Column B (work steps) in wrong chronological order	
1	A	Binder mixing
2	B	Briquette storage
3	C	Raw material preparation
4	D	Drying briquettes
5	E	Packaging of briquettes
6	F	Pressing using pressing machine
7	G	Crushing
8	H	Briquette sorting and weighing
9	I	Sieving
10	J	Carbonising using charring drum

Key (answer)	1-C, 2-J, 3-G, 4-I, 5-A, 6-F, 7-D, 8-B, 9-H, 10-E
---------------------	---------------------------------------------------

PERFORMANCE TEST ITEMS (SAMPLES)

DIT/ QS	Test Item Database Performance Test Item No.8
Occupational Title:	Briquette Maker
Competence level:	Level 1
Code no.	
Test Item:	Use charcoal dust material and molasses as binder to make 1kg of carbonized ball briquettes.
Complexity level:	P2
Date of OP:	September 2020
Related module:	M1.3
Related skills and knowledge:	<ul style="list-style-type: none"> • Safety precautions • Equipment use • Calculation of ratios • Measuring • Weighing • Briquette shapes • Different types of binders and their characteristics
Required tools, Equipment, and Materials:	Vanier calliper, weighing scale, measuring cylinder, charcoal dust, Molasses, water, spade, mangling stick, mixing container, binding wire, calculator, stationery,
Time allocation:	3 Hours
Preferred venue:	workshop
Remarks for candidates	Candidates must have personal protective equipment
Remarks for assessors	Provide all the required resources for assessment

#	Assessment criteria	Scoring guide	Max. Score	
			Process	Result
1.	Preparation for the task	Wore protective gears (over all, gloves, masks, boots)		4
		Cleaned work area	2	
		Clean workplace observed		1
		Prepared tools	2	
2.	Preparation of materials/ingre	Collected sawdust	1	
		Sorted saw dust	2	

	redients	Impurity free saw dust observed		2
		Collected molasses	1	
		Measured ingredients	3	
		Ingredients in ratios of 100mls molasses 300mls water 1000g charcoal dust verified		4
3.	Mixing of ingredients	Mixed water and molasses	2	
		Yellowish mixture observed		2
		Mixed charcoal dust to the yellowish mixture	2	
		Hard and sticky mixture observed		3
4.	Moulding of briquettes	Shaped the briquettes	3	
		Round ball like shaped briquettes observed		3
		Non sticky round ball briquettes observed		2
		Put hole in the briquettes	2	
		Hole of approximately 3mm verified		3
5.	Demobilization of resources	Cleaned tools	1	
		Cleaned work place	1	
		Stored remaining materials	1	
		Clean work place observed		3
	Total		23	27
	Maximum score (Y)	X/Y		

4.0 ATP- PART IV

INFORMATION ON DEVELOPMENT PROCESS

4.1 Occupational Profile Development (September 2020)

The Occupational Profile was exclusively developed by job practitioners who were working in the Briquette Maker occupation. The job expert panel, guided by UVQF Facilitators defined duties and tasks performed and provided additional generic information regarding the occupation.

4.2 Training Module development (September 2020)

Based on the Occupational Profile for Briquette Maker of September 2020, Training Modules were developed by job practitioners, guided by UVQF Facilitators.

4.3 Test Item Development (September 2020)

Based on the Occupational Profile for Briquette Maker of September 2020, and Training Modules, Test Items were developed by combined panels of instructors and job practitioners, guided by UVQF Facilitators.

4.4 Methodology

The rationale for the Assessment and Training Package development was to link Vocational Education and Training to the real world of work by bridging Occupational Standards to Training Standards through industry-led Standards-Based Assessment.

Active participation of both instructors and job practitioners' panels consolidated the review philosophy.

The panelists worked as teams in workshop settings complemented by off-workshop field research and literature review activities including international benchmarking.

4.5 Development Panel

The participating panel of Job Practitioners required for different stages of the Assessment and Training Package i.e. occupational profile, training modules, assessment instruments were constituted by members from the following organisations;

No.	Name	Institution/ Organisation
1.	Kalette George William	Mengo Senior School
2.	Kasaato Samuel	MAAMA Heat
3.	Mulondo Kennedy	Uni-Trust Community Development Co Ltd
4.	Aheebwa Moses	Right Hand Vocational Center
5.	Wycliffe Edwin Tusiime	Kyambogo University – Bushenyi Campus
6.	Tumuheirwe Aidah	United Innovations Development Centre
7.	Nimanya Abas	Right Projects Ltd
8.	Natabi Grace	Self Help Development Association
9.	Ssemanda Taddeo	Raphael Investments Ltd

4.6 Facilitator team

This Assessment and Training Package was developed by a Facilitator team listed below:

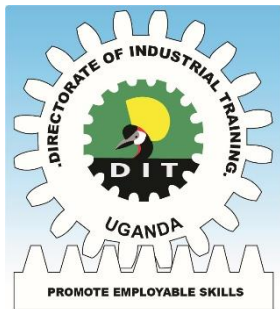
1. **Team Leader:** Ms. Mukyala Ruth, Ag Deputy Director, DIT
2. **Facilitators:** Komugisha Noeline QO, DIT Nakisendo Fatuma DIT
3. **DIT Data Entrant:** by Ms. Mutonyi Sharon, Komakech Joseph, Kasadha Joel
4. **Compiled by:** Ms. Mutonyi Sharon, DIT, Komakech Joseph DIT, Kasadha Joel DIT
5. **Edited by:** Ms. Mukyala Ruth, Ag Deputy Director, DIT Qualification Standards Dept.
6. **Coordinated by:** Mr. Byakatonda Patrick, Ag. Director, DIT;

4.7 Reference:

This Assessment and Training Package was compiled in September 2020 and may be periodically revised to match the dynamic trends in the occupation and hence issued in different versions

References

1. Ambulkar, A.R, and A.V (2014). Prospect of biomethanation technology in the Indian context; Resources, Conservation and Recycling (40)2
2. Annepu, R.K (2012). Sustainable solid waste management in India. Dissertation, Columbia University
3. Atuheire, G.K (2014). Briquette making from Biomass: A demonstration Guide for small scale entrepreneurs, Kampala: JG Publishers.
4. Banzaert, A (2013). Viability of waste based cooking fuels for feasibility. Dissertation, Massachusetts institute of technology
5. Byaruhagaba G.W, Van Rens and kyamuhangire W (2008). Characteristics of enzyme-treated banana juice from three cultivars of tropical and subtropical Africa. Thesis, online 2009, Stellenbosch, South Africa.
6. Emrich, Walter. Handbook of charcoal making. The Traditional and industrial methods. Hingham, MA: Kiruwer Academic publisher, 1985.
7. Jumba Godfrey (2010). Business Entrepreneurship education for secondary schools and tertiary institutions; Edition one
8. Mark ssempija (2012). Entrepreneurship education for advanced level; Edition one.
9. Moscowitz, C M. Source assessment. Charcoal manufacturing: state of the art. Cincimati, Ohio
10. Nairobi city west project (2010). Ministry of economic affairs, agriculture and innovation of the Netherlands (Bio 10-011-104)
11. Njege, M (2014). Charcoal briquette production: A practical training manual. Nairobi: UN-Habitat
12. Scharabok, Ken (1997). Amaze your friends and neighbors: " Make your own charcoal" countryside and small stock journal (May 1997): 27-28
13. Zeier, Charles D (1987). Historic charcoal production near Eureka, Nevada: An archaeological perspective. 'Historical Archaeology; 81-101.



ISBN 978-9913-626-61-3



9 789913 626613
