BQA NCQF Qualification Template

DNCQF.FDMD.GD04 **Issue No.: 01**

QUALIFICATION SPECIFICATION								**SECTION A**
QUALIFICATION DEVELOPER	BOTSWANA UNIVERSITY OF AGRICULTURE AND NATURAL RESOURCES							
TITLE	BACHELOR OF SCIENCE IN PLANT HEALTH				**NCQF LEVEL**		7	
FIELD	AGRICULTURE AND NATURE CONSERVATION		**SUB-FIELD**	PLANT HEALTH				
New qualification	X	Review of existing qualification						
SUB-FRAMEWORK	General Education		TVET		Higher Education	X		
QUALIFICATION TYPE	Certificate		Diploma		Bachelor	X		
	Bachelor Honours		Master		Doctor			
CREDIT VALUE	520							

RATIONALE AND PURPOSE OF THE QUALIFICATION

Rationale

At independence in 1966, the contribution of the agriculture sector to Botswana's GDP was 42.7%. However, over the past 42 years, this contribution has declined to 1.9% due to rapid growth in other sectors such as mining and in decline in performance of the sector itself. Crop production in Botswana is severely hampered by a number of factors which include low and erratic rainfall, endemic droughts, high summer temperatures, low soil fertility and high incidence of insect pests, diseases and weeds, lack of technology adoption by farmers, poor research-extension linkages, poor infrastructure and limited skilled human resources (NDP 11). These factors contributed to the poor performance of the crop sector during NDP 10 and other past NDPs. In the past, the Government has launched both production and market oriented programmes such as the Arable Land Development Programme (ALDEP), Financial Assistance Policy (FAP) and National Master Plan for Arable Agriculture and Dairy Development (NAMPAADD) which were intended to transform the agricultural sector from its subsistence state to a commercial level. Currently the Integrated Support Program for Arable Agriculture Development (ISPAAD) is supporting the arable sub-sector by fencing fields, establishing Agricultural Service Centers as well as assisting arable subsistence, emerging and commercial farmers to acquire requisite inputs and draught power (Ministry of Agriculture 2013). The Zambezi Integrated Agro-Commercial Development (ZIACD) Project is the Government's ambitious plan to increase food security as well as to create jobs in the agricultural sector by 2020 and beyond. The ZIACD Project will involve drawing 495 million cubic meters of water annually from the Zambezi River for irrigation of about 35,000 ha of commercial agricultural land. Thus, two-thirds of the Government's new emphasis is aimed at revamping the crop based agricultural sector of the economy.

The Human Resources Development Council (HRDC) Draft Agriculture Sector HRD Plan Final (HRDC 2016) has listed the projected numbers of High Level Skills for administrators, legislators, senior managers, skilled technicians and associated professionals in areas of agriculture. The country requires skilled plant health and protection practitioners as follows: plant pathologists (100), weed scientists (60), entomologists (60) and soil scientists (60). In addition, the needs assessment conducted by the CSS department indicated that over 80% of respondents showed interest BSc qualification in Plant Health and Soil Science. The survey also showed that there are few organisations offering components of plant health and soil science The proposed BSc in Plant Health qualification will produce relevant skilled graduates ready to enter the job market and for further training at postgraduate level. The qualification is aligned to Vision 2036 Pillars 1: Sustainable Economic Development and 2: Human and Social Development. It is

envisioned that the agricultural sector if well supported, will have a positive impact on the livelihoods of the majority of the population which lives in rural areas. Hence the Vision states "Our country will have a sustainable, technology-driven and commercially viable agriculture sector" (Vision 2036). The country envisions developing a disease-free agriculture sector that optimizes use of land, utilizing technologies and modern farming methods to improve productivity and fostering development of private sector-led value chain activities in production, processing, marketing and distribution. To achieve this, there is need for new and visionary scientists and agripreneurs able to embrace new agricultural technologies and capable of innovation at the farm level. The BSc in Plant Health graduate will be a key part of the solution. For Pillar 2 the Nation envisions that "Botswana society will be knowledgeable with relevant quality education that is outcome-based with an emphasis on technical, vocational skills as well as academic competencies (education with production)". The BSc in Plant Health qualification will contribute towards a knowledge economy and the graduates will be "internationally competitive, productive and creative with international exposure" which, should the need arise, emigrate and work regionally and internationally. The ZIACID project when fully implemented will require plant health specialists to assist farmers with the management of various pests and other adverse abiotic factors.

Purpose

The purpose of this qualification is to:

(i) Develop graduates with experiential learning skills for identification of biotic and abiotic threats to plant health

ii) Equip graduates with skills to plan and execute research on plant health, critically evaluate the results and disseminate findings to stakeholders through various channels such publications and conferences

(iii) Train graduates in the planning, formulation and application of economic and environmental-friendly pest management interventions

(iv) Develop graduates with critical skills and competencies for agribusiness and entrepreneurship plant health and related agricultural sectors

(v) Impart the knowledge, skills and attributes needed by graduates for to develop plant health communication and extension packages for farmers and other stakeholder

(vi) Equip graduates to operate at a substantial level of responsibility and accountability in implementing appropriate government policies and other instruments related to plant health and protection.

ENTRY REQUIREMENTS (including access and inclusion)

Entry to this qualification is through any of the following:

- NCQF Level IV, or its equivalent, with passes in Biology, Chemistry, Physics, Mathematics and English Language and other subjects deemed appropriate by the ETP
- Recognition of Prior Learning (RPL) policy shall apply for candidates with Certificate V at NCQF Level 5 qualification or equivalent in agriculture and related field
- RPL policy shall apply for candidates with relevant Diploma Level 6 qualification in Agriculture and related field.
- Mature age candidates with minimum of two years' relevant experience in Agriculture and related will be considered for enrolment.

QUALIFICATION SPECIFICATION	SECTION B
GRADUATE PROFILE (LEARNING OUTCOMES) **At the end of the programme students will be able to:**	**ASSESSMENT CRITERIA**
1. Assess crop protection resources and identify those suitable for application in various cropping systems and environments	1.1 Determine crop protection priorities for small-scale and commercial farms for various agro-ecological zones 1.2 Assess and recommend appropriate crop protection packages suitable for various agro-ecological zones of Botswana
2. Recommend environment-friendly management measures for crop health constraints to enhance productivity	2.1. Recommend appropriate soil management technologies to farmers 2.2. Identify common pests and diseases of crops on the farm 2.3. Recommend appropriate control measures for crop health constraints
3. Establish and manage an agribusiness profitably	3.1. Conduct a market survey for establishment of a viable small-scale or commercial crop protection enterprise 3.2. Apply knowledge and skills to establish and profitably run a small-scale or commercial enterprises related to plant health 3.3. Demonstrate leadership capabilities and organization of appropriate staff development activities in an institution or business
4. Execute government policies related to the agriculture sector	4.1. Apply appropriate legislation and government policies in decision making at the workplace 4.2. Apply and implement appropriate policies and guidelines in execution of duties
5. Demonstrate knowledge of best crop health practices when advising small-scale and commercial farmers and other stakeholders	5.1. Package plant health extension materials or technologies for farmers 5.2. Communicate extension messages to small-scale, commercial farmers and other stakeholders 5.3. Apply appropriate extension methods and establish demonstrations to support farmer practices of protecting crops sustainably
6. Demonstrate ICT skills in accessing scientific knowledge in order to advance all aspects of sustainable commercial agriculture	6.1. Demonstrate knowledge and skills to acquire information from the internet and other ICT resources for use in crop protection

	6.2. Utilize ICT resources in preparation and presentation of reports and other official documents

QUALIFICATION STRUCTURE		SECTION C	
FUNDAMENTAL COMPONENT Subjects / Units / Modules /Courses	**Title**	**Level**	**Credits**
	Mathematics	5	24
	Chemistry	5	24
	Physics	5	24
	Biology	5	24
	Basic computing	6	24
	Communication skills	6	16
CORE COMPONENT Subjects / Units / Modules /Courses	Introduction to Agricultural economics	6	8
	Agricultural finance and entrepreneurial skills development	7	24
	Human Resource Development	7	12
	Agricultural Extension	7	12
	Genetics	6	8
	Biochemistry	7	8
	Statistics, data analysis and presentation	7	28
	Soil Science	6	24
	Crop Physiology and production	7	28
	Biology of major crop pests	6	36
	Plant disease diagnostics and Emerging plant health technologies	7	24
	Industrial experiential training	7	24
	Research project	7	16
	Agricultural biosafety	7	24
	Climate change	7	12
	Pre- and post- harvest crop pest management	7	60
	General Education	6	12
ELECTIVE COMPONENT Subjects / Units / Modules /Courses	Elective Group 1. Emerging crop production techniques (Choose 12)	7	12
	CSP301 Agroforestry (12 Credits)		
	CSP303 Controlled Environment Horticulture (12 Credits)		
	CSP307 Plant Propagation (12 Credits)		
	Elective Group 2. Crop production engineering technologies (Choose 12)	7	12
	Irrigation Technology (12 Credits)		
	Tractor and Implement Technology (12 Credits)		
	Crop Harvesting Technologies (12 Credits)		

Rules of combinations, Credit distribution (where applicable):

To be awarded the qualification, candidates are required to do 136 credits, 360 credits and 24 credits of Subjects / Units / Modules /Courses from Fundamental, Core and Elective components, respectively. To make up the 24 elective credits, candidates are required to choose one Subjects / Units / Modules /Courses from each of the two Elective groups.

The qualification credit distribution will be as follows:

	Credit Value				
Level	Core	Fundamental	Elective	Total	Percentage (%)
5	0	96	0	96	18.4
6	88	40	0	128	24.7
7	272	0	24	296	56.9
Total	360	136	24	520	100
Percentage	69	26	5	100	

ASSESSMENT AND MODERATION ARRANGEMENTS

ASSESSMENT ARRANGEMENTS

Assessment will include both formative and summative modes. The summative and formative assessments will each contribute 50% of the overall grade

MODERATION ARRANGEMENTS

The sole purpose of moderation is to make sure that assessment and marking across all courses is fair, valid and reliable. It also aligns the assessment tool to the outlined learning outcomes, that it is set an appropriate level of study and, that the process or marking is consistently done.

Internal Moderation

Summative and formative assessments tools will be internally moderated by BQA registered moderators

External Moderation (Verification)

The University Senate will appoint, as deemed qualified, experts from accredited institutions for external moderation purposes. External moderation shall be conducted on final year qualification modules. The purpose of external moderation is to monitor the standards of assessment, assessors 'decisions, credibility of assessment methods and question papers, check the internal moderation processes and provide feedback accordingly. The feedback reports from internal moderators, question papers, marking keys and scripts will be availed to the external examiner for moderation. The decisions of the external examiner are final and supersede those of the internal moderator.

RECOGNITION OF PRIOR LEARNING (if applicable)

Recognition of prior learning (RPL) shall be used to augment entry into the qualification for candidates who do not have formal entry requirement into the qualification. Assessment shall be done to determine whether the candidate has an abundance of relevant knowledge and skills acquired through formal or informal methods, workplace learning or work experience gained from a related field. The relevant experience will be in Agriculture, Crop Production, Crop protection, Horticulture, Forestry and other related training. Candidates will be expected to

provide evidence of learning such as references from employers to support their applications. Such evidence should meet the criteria of being relevant, sufficient, valid, verifiable and authentic. This knowledge shall be awarded credits based on developed criteria for such.

RPL will also be assessed to determine whether it can awarded credits to contribute to the exit learning outcomes.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Learning progression Pathways

This BSc qualification is for Plant Health, but enrolled candidates may horizontally opt for any of the following:

i. BSc Crop Science at NCQF Level 7
ii. BSc Agriculture at NCQF Level 7
iii. BSc Wildlife Management at NCQF Level 7
iv. BSc Range Sciences at NCQF Level 7
v. BSc Biological Sciences at NCQF Level 7
vi. Any of the BSc qualifications in Agricultural Sciences and Natural Resources at NCQF 7

Holders of this qualification can progress vertically as follows:
Vertical:

i. Post-Graduate Certificate at NCQF Level 8
ii. BSc Plant Health (Honours), or equivalent at NCQF Level 8
iii. Post Graduate Diploma in Plant Health or equivalent at NCQF Level 8
iv. MSc in Plant health or equivalent at NCQF Level 9

Employment Pathways

BSc Plant Health graduates can be employed as:

i. Crop Protection Research Officers
ii. Plant Health Research scientists
iii. Lecturer in tertiary institutions
iv. Charity administrators (e.g. in National Trusts)
v. Extension Officers
vi. Secondary School Agriculture teachers
vii. Plant health field technician
viii. Biosecurity officer

The graduates can set up their own enterprises in plant health and other related fields.

QUALIFICATION AWARD AND CERTIFICATION

Graduates shall be awarded a Bachelor of Science in Plant Health upon obtaining a minimum of 520 credits

On attainment of the qualification and certification the graduates should be able to demonstrate knowledge, skills and attitudes required to perform effectively in plant health and related fields. All the learning outcomes should be met for the award of the qualification.

REGIONAL AND INTERNATIONAL COMPARABILITY

This generic Bachelor of Science Degree Qualification is comparable to other similar Bachelor's degree qualifications nationally, regionally and from around the world with regards to outcomes, assessment criteria,

degree of difficulty and notional learning time. There is no national ETP that offers BSc in Plant Health qualification and hence, for purpose of comparability on rationale, purpose and subject structure, only regional and international bench marking was done.

Regionally, there is no BSc in Plant Health or Crop protection qualification within the SADC region covering the effects of insects, diseases, weeds and abiotic factors on plant health and how to manage them. The closest qualifications are: Bachelor of Science in Crop and Horticultural Science (University of KwaZulu-Natal); Bachelor of Science in Entomology and Bachelor of Science in Plant Pathology (University of Pretoria); Bachelor of Science in Agriculture (North West University, University of Limpopo and University of Pretoria, RSA; Lilongwe University of Agriculture and Natural Resources, Malawi; and Sokoine University of Agriculture, Tanzania). The above regional qualifications are either too general or specific to insect pests or plant disease alone. The qualification is, however comparable to:
1.BSc Crop Protection qualification offered by the Jomo Kenyatta University of Agriculture and Technology,
2. BSc Agriculture (Crop Protection Major) offered by the University of Embu in Kenya,
3. BSc Plant Science (Plant Health and Protection) offered by the University of Florida
4. Bachelor of Science in Crop protection offered by Ondokuz Mayis University in Turkey and
5. Bachelor of Horticulture Science Plant Health Major offered by Kwantlen Polytechnic University, Canada.

The comparison will only involve qualifications 1 to 4 to represent Africa, Europe and North America regions.

Jomo Kenyatta University of Agriculture and technology (JKUAT)

The BSc Crop Protection offered by JKUAT is a four-year qualification which aims at “equipping our young scientists with relevant modern skills for research and crop protection from pests, diseases, weeds and other non-pathogenic related problems. The acquired knowledge and skills will be utilized in our endeavours to improve and increase the amount of food production and food sustainability for our ever increasing human population”. To be eligible for the award of Bachelor of Science in Crop Protection students must satisfy the rules of module/course/unit combination worth a minimum of 480 credits.

Upon successful completion of the qualification students will be able to:
1. Demonstrate knowledge and modern skills for conducting
2. Apply knowledge and skills in the identification and management of insect pests, diseases, weeds and other non-pathogenic related problems.
3. Contribute toward food security by sustainable prevention of crop losses from crop pests

Each module/course/unit, except project and field attachment is assessed by formative and summative modes where each contributes 50% to the final grade.

The University of Embu (UE)

The UE offers a four-year Bachelor of Agriculture Crop Protection Major which comprises of general modules up to second year and specializations from 3rd to 4th year. The aim of qualification to produce graduates with the knowledge and skills to effectively address all aspects of crop management, crop improvement and postharvest handling

Upon successful completion of the general component students will be able to:
1. Demonstrate an understanding of fundamental agricultural principles.
2. Acquire proficiency in production, value addition and marketing of agricultural products
3. Set up and run sustainable agricultural enterprises,
4. Apply and effectively communicate scientific reasoning and data analysis in both written and oral forums.

Upon successful completion of the general component students will be able to:

The objective of this major is to produce graduates with the knowledge and skills to effectively address all aspects of crop management, crop improvement and postharvest handling. On completion, the Crop Science Major graduates will have the competence to:
5. Contribute to enhanced crop productivity through good husbandry, research and extension
6. Enhance promotion of technology application and advancement in agricultural production
7. Contribute to setting up and running of crop production and value addition enterprises.

To be eligible for the award of Bachelor of Agriculture (Crop Protection Major) students must satisfy the rules of module/course/unit combination with a minimum 58 units worth 480 credits. However, a candidate may be allowed, on requisition, to graduate with a maximum of one non-core failed unit.

Each module/course/unit, except project and field attachment is assessed by formative and summative modes where each contributes 50% to the final grade.

University of Florida

The University Florida offers a four-year BSc Plant Science (Plant Health and Protection Major) designed for students who want to pursue careers related to plant health management in the public or private sector. It will prepare students for entry into the workplace in insect and disease control, plant diagnostics, crop production management, plant pathology and entomology research, plant growth consulting, integrated pest management, cooperative extension or to pursue advanced degrees in plant pathology, entomology, plant medicine, or other related disciplines.

Upon successful completion of the qualification students will be able to:
Content
1. Describe plant growth and development in terms of plant morphology and physiology and evaluate the abiotic and biotic factors that impact plant growth and management.
2. Recommend practices that growers and managers can implement to address the abiotic and biotic components of their cropping system.
Critical Thinking
3. Analyze and apply science-based data to solve problems in plant production, distribution and/or utilization.
4. Design and evaluate a project that addresses a problem or challenge related to their area of interest.
Communication
5. Create, interpret and analyze written text and multimedia presentations.
6. Communicate effectively through oral and multimedia presentations.

To be eligible for the award of Bachelor of Plant Science (Plant health and Protection Major) Crop students must satisfy the rules of module/course/unit combination as dictated by Critical tracking worth a minimum of 120.

Each module/course/unit, except project and field attachment is assessed by formative and summative modes where each contributes 50% to the final grade.

Ondokuz Mayis University in Turkey

Ondokuz Mayis University offers a four-year BSc Crop Protection whose aim is to give students basic and required skills to be able to recognize and identify pests, disease and weeds, which are harmful in agricultural areas, to give knowledge about their biological and morphological features, damage types, to protect cultivated crops by considering the most applicable basic and innovative approaches, and to graduate them with also knowledge and experience on urban pests.

Upon successful completion of the qualification students will be able to:
1.Have information on law and regulations in relation to plant protection

2. Behave according to scientific, cultural and ethical issues during Professional work.
3.Differentiate symptoms of abiotic factors which threat plant health and give recommendations to solve problems.
4. Plant Protection in disciplines relevant issues and concepts, principles and events comprehend.
5. Collect data in relation to plant protection problems and analyse them.
6. Understand the importance of life-long learning in their career, improve professional knowledge and skills by utilizing information and communication technologies efficiently.

7. In the field of information and ideas in oral and written presentation techniques are passed on to the relevant institutions and individuals.
8. Recognize plant diseases, pest and weeds and identify urban pests, and know their biology and damage, and apply basic and innovative approaches for their management and control.
9. Understand the issues, principles and concepts in plant protection and relevant disciplines.
10. Follow universal information in its field and can communicate with people in the field.

Students are awarded the Bachelor's Degree in "Plant Protection" after completing a range of compulsory and elective courses of 135 credits, as well as 45 working days of summer occupational training during the second and third years

Each module/course/unit, except project and field attachment is assessed by formative and summative modes which contribute 40% and 60% to the final grade, respectively.

Conclusion

Our BSc in Plant Health qualification is comparable to both regional and international qualifications. The qualifications above are similar in their emphasis on identification and management of biotic and abiotic factors that adversely affect crop health and eventual yield. All qualifications are of 4year duration including industrial experience or attachment as part of the training. The only difference is in total credits where the Africa region qualifications are 480 credits while the North American one is 120 credits and the European one is 137 credits. This could be due to the difference in the credit values as stipulated in the National Qualification Frameworks.

REVIEW PERIOD

The qualification will be reviewed every 5 years

Other information – please add any supplementary information to help the application for this qualification for NCQF Registration.

Qualifications, experience and accreditation status of teachers, assessors and moderators

Minimum qualification(s) required for Teachers:

- MSc in relevant Science and Agriculture fields with University teaching and research and publications as an added advantage.
- Professional registration and accreditation from a relevant institution

Minimum qualification(s) required for Assessors and Moderators:

• MSc in relevant Science and Agriculture fields with University teaching and research and publications as an added advantage Professional registration and accreditation from a relevant institution, where applicable

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REGISTRATION STATUS	**BQA DECISION NO.**	**REGISTRATION START DATE**	**REGISTRATION END DATE**
LAST DATE FOR ENROLMENT		**LAST DATE FOR ACHIEVEMENT**	