SECTION A:	***QUALIFICATION DETAILS***																
QUALIFICATION DEVELOPER (S)	Botswana University of Agriculture and Natural Resources																
TITLE	Master of Science in Agronomy													***NCQF LEVEL***		*9*	
FIELD	Agriculture and Nature Conservation			**SUB-FIELD**	Agronomy									***CREDIT VALUE***		*260*	
New Qualification			✓	*Review of Existing Qualification*													
SUB-FRAMEWORK	*General Education*			*TVET*								*Higher Education*				✓	
QUALIFICATION TYPE	*Certificate*	*I*		*II*		*III*		*IV*		*V*		*Diploma*		*Bachelor*			
	Bachelor Honours			*Post Graduate Certificate*								*Post Graduate Diploma*					
	Masters			✓	*Doctorate/ PhD*												

RATIONALE AND PURPOSE OF THE QUALIFICATION

RATIONALE:

The agricultural sector in Botswana continues to perform poorly.

The need for Crop Scientist with advanced knowledge and demonstrate high level of mastery, innovation, autonomy, scholarly and professional integrity in the crop sub-sector of Botswana's agricultural sector cannot be over emphasized. The need to develop human resources in agronomy crop for research, extension and managerial positions in the Ministry of Agricultural Development and Food Security, and other related ministries and non-governmental organizations is great. For a long time, the agricultural sector, especially the arable part has not performed well. Besides the bad weather, production systems constraints have been cited as challenging (NDP 10, 11). To turn this scenario around it is important to have qualified personnel who can go into farming themselves and those that can provide top class extension services to increase production. Furthermore, the HRDC has identified skills that are in high demand for agriculture sector by level. In the crops sub-sector the skills in demand per annum are Agronomists (40), Crop Scientists (20), Soil Scientists (20), Research Scientists (20), Molecular Biotechnologists (20), Plant Breeders (30), Soil Physicists (30), Soil Chemists (30), Soil Biologists (20), Seed Technologists (20), Weed Scientists (30), Florists (40), Pomologists

(Fruit Scientists) (50), Olericulturists (Vegetable Scientists) (50), Postharvest Physiologists (60), Geneticists (30), Plant Pathologists (100), Entomologists (60), Greenhouse Technicians (80) and Field Crop Producers (50). The above mentioned skilled and competent personnel are to be provided by BUAN (HRDC 2015, 2019). The above skilled and competent personnel are required at higher level of training at masters and PhD levels to provide evidence-based policy reforms for the agriculture sector (HRDC 2015, 2019).

A country-wide needs assessment survey with the relevant stakeholders in agriculture (Ministry of Agriculture, Ministry of Higher Education, Farmer Associations, Government Parastatals, NGOs, Current and Former Students, etc) was conducted in May, June and July of 2006. An overwhelming majority (97%) of the respondents indicated that they require graduates in Crop Science in their organizations at Master's Degree level.

PURPOSE:

The purpose of the qualification is to provide graduates with advanced knowledge, skills and applied competences to:

- Conduct research related to crop production and management.
- Develop and implement strategies of managing agronomical aspects of crop production.
- Solve complex problems independently, systematically, and creatively in familiar and unfamiliar contexts facing the crop sub-sector of the agricultural industry in Botswana.
- Communicate effectively to a diverse group of people using appropriate technological media.

ENTRY REQUIREMENTS (including access and inclusion)

The minimum admission requirement for Master of Science in Agronomy is:

- Bachelor's Degree NCQF Level 7 in the same or a cognate field of study.
- Applicants who do not meet the above requirements may be considered through Recognition of Prior Learning (RPL) and Credit Accumulation and Transfer (CAT) in line with the national RPL and CAT Policies.

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SECTION B	***QUALIFICATION SPECIFICATION***
GRADUATE PROFILE (LEARNING OUTCOMES)	***ASSESSMENT CRITERIA***
LO 1. Demonstrate advanced knowledge of the influence of crop physiology, crop improvement and advanced methods of crop production on crop yields.	1.1. Develop cropping plans to help in how much of each crop to plant. 1.2. Establish crop types and manage them efficiently. 1.3. Evaluate biological behaviour of crops planted. 1.4. Calculate yields and related parameters of crops. 1.5. Develop methods of crop improvement.
LO 2. Apply and demonstrate advanced knowledge, skills, and competences in the field of agronomy to design, undertake and write up research.	2.1. Develop research proposals. 2.2. Formulate and test hypotheses. 2.3. Select and utilize research instruments that are relevant in research problems in crop and soil science and related fields. 2.4. Undertake field and laboratory work during actual research or investigation relevant to the research project. 2.5. Report the findings of the investigation and formulate recommendations that emanate from the findings.
LO 3. Apply the appropriate research methods or techniques in solving complex or simple problems being investigated.	3.1. Identify and analyse different scientific procedures about the problem being researched. 3.2. Select appropriate methods and tools for analysing research data. 3.3. Compile and present scholarly research work.
LO 4. Demonstrate an understanding of literature relevant to the research problem.	4.1. Evaluate, interpret, and analyse literature from different authors on the topic being researched. 4.2. Draw conclusions from different readings and indicate anomalies. 4.3. Create a theoretical conceptual framework provided by the literature review.

	4.4 Compile a complete bibliography or list of cited references.
LO 5. Demonstrate the ability to write a thesis or dissertation that is linguistically, technically, and scientifically correct.	5.1. Produce a dissertation or thesis that shows that learners can express themselves clearly. 5.2. Produce a dissertation or thesis that is linguistically correct and of an acceptable standard. 5.3. Produce a dissertation that is technically and scientifically correct and acceptable to the examiners.

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SECTION C	***QUALIFICATION STRUCTURE***				
COMPONENT	***TITLE***	***Relevant NCQF Level***			***Total Credits*** ***(Per** Subject/ Course/ Module/ Units)*
		Level [9]	***Level [ ]***	***Level [ ]***	
FUNDAMENTAL COMPONENT *Subjects/ Courses/ Modules/Units*					
CORE COMPONENT *Subjects/Courses/ Modules/Units*	Ecophysiology of crop plants	15			15
	Cropping systems	15			15
	Experimental design	15			15
	Cereal grain crops production	15			15
	Genetic improvement of plants	15			15
	Pulse and oil crop production	15			15
	Proposal Development	15			15
	Research & Thesis Preparation	125			125
	Group 1 electives				

ELECTIVE/ OPTIONAL COMPONENT *Subjects/Courses/ Modules/Units*	Plant biotechnology	8			15
	Fiber crops production or	8			15
	Plant nutrition	8			15
	Group 2 electives				
	Economic entomology or	8			15
	Weed management or	8			15
	Integrated natural resources management	8			15

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SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	***Credit Value***
Level 8: 30 credits	30
Level 9: 230 credits	230
TOTAL CREDITS	**260**

Rules of Combination:

(Please Indicate combinations for the different constituent components of the qualification)

- Candidates will have to complete 230 credits from the core subjects and 30 credits from the electives.
- There are two groups of electives provided.
- Candidates are expected to select 1 subject from group 1 and another from group 2.
- The total number of credits to be completed will add up to 260 credits.

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ASSESSMENT ARRANGEMENTS

Formative and summative assessments will be used.

Formative assessment

It will include continuous assessment that will contribute 50% of the final grade. Integrated assessment procedures will ensure that the purpose of the qualification is achieved.

Summative assessment

There shall be a dissertation to be submitted at the end of the research. The dissertation shall contribute 50% of the final grade. Assessment of the dissertation will be in accordance with respective ETP's regulations and procedures.

Assessors must be BQA registered and accredited.

MODERATION ARRANGEMENTS

Internal Moderation Arrangements

Pre-moderation is done by relevant internal structures. Quality assurance of the assessment instruments is conducted prior to administration. There will also be external moderation. Moderators must be BQA registered and accredited

RECOGNITION OF PRIOR LEARNING

There shall be an award of the qualification using Institutional RPL Policy in line with the National RPL Policy.

CREDIT ACCUMULATION AND TRANSFER

There shall be access and award of credits of the qualification using Institutional Credit Accumulation and Transfer (CAT) Policy in line with the National CAT Policy.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Horizontal Progression:

- Master's Degree in Soil Science
- Master's Degree in Horticulture

• Master's Degree in Agriculture
• Master's Degree in Crop Science
• Master's Degree in Biological Science
• Other related disciplines.

Vertical Progression:

Holders of the qualification meets the requirement for vertical progression and admission to:

• Doctoral Degree in Soil Science
• Doctoral Degree in Horticulture
• Doctoral Degree in Agriculture
• Doctoral Degree in Crop Science
• Doctoral Degree in Biological Science
• Other related disciplines.

Employment Pathways:

Holders of the qualification can work as:

• Private consultant on agronomy issues.
• Agronomy researcher.
• Farm manager.
• Agronomy lecturer.
• Agricultural policy analyst.

QUALIFICATION AWARD AND CERTIFICATION

For a candidate to graduate with a Master of Science in Horticulture, they should have:

• Satisfactorily completed all courses.
• Presented research proposal before a panel of judges.
• Passed the dissertation.
• Attained a minimum 260 credits.

CERTIFICATION:

The graduate will be awarded a **Master of Science in Agronomy** on completion

REGIONAL AND INTERNATIONAL COMPARABILITY

Benchmarking for the Master of Science in Agronomy was done with regional and international universities. Nationally, there are no universities offering this qualification. Comparisons were done using the qualification name, the credit load, the duration of study, the qualification structure as well as the entry requirements. One of the commonalities among all institutions is the existence of courses in proposal writing and thesis or dissertation. Some institutions, for example, University of Pretoria (Master of Science in Plant Science) and North Carolina State University (Master of Science in Soil Sciences) do not offer course work at graduate level, thus the Master of Science is research based. The most similar qualifications to this Master of Science in Agronomy were that offered by the Sokoine University of Agriculture (Master of Science in Crop Science (Horticulture)) and North Carolina State University in the USA (Master of Science Plant Sciences (Agronomy)).

REVIEW PERIOD

Every five (5) years.

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