

**AGRO-INNOVATIONS IN DRYLANDS: EDUCATION, INNOVATION, RESEARCH AND DEVELOPMENT PROGRAMME**

**Call for DPhil and MPhil Positions**

**Programme Overview**

Great Zimbabwe University invites applications for 6 DPhil and 10 MPhil positions within the Agro-Innovations in Drylands: Education, Innovation, Research and Development Programme. The main purpose of this programme is to develop agricultural practices and technologies that make efficient use of locally available epistemic and material resources, thereby reducing vulnerability to adverse impacts of climate change and variability, and increasing productivity of drylands. This is premised on the fact that agriculture is the backbone of Zimbabwe’s economy and hence becomes the basis of all wealth, secret to fast industrialisation of economies, starting with rural industries and building the much needed rural middle class. This programme is funded by the Government of Zimbabwe through the Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development, and is in line with Zimbabwe’s heritage-based Education 5.0 Philosophy. The DPhil and MPhil vacancies fall within eleven (11) Sub Programmes as follows:

**Sub Programme 1** (**SP1): Heritage-based indigenous knowledge systems (IKS) for mitigating impacts of climate change in dryland areas.**

This sub programme will promote the use of heritage based IKS in mitigating the impacts of climate change in drylands. Sub Programme 1 aims to achieve the following outputs: development of innovative methods integrating IKS and modern technology to address agricultural production and biodiversity management and conservation under a changing climate, identification and documentation of heritage-based IKS in drylands, and development of heritage-based products and services, including valued-added locally produced foods, feedstuffs and technologies. Applications are invited for one (1) MPhil position within the framework of SP1. A Bachelor`s Degree in a relevant field, with at least a 2.1 overall degree class is required.

**Sub Programme 2** (**SP2): Production of new traditional crop varieties (sorghum and millet) from parent crop landraces.**

This sub programme will focus on development of new drought tolerant traditional crop varieties (sorghum and millet) from parent traditional crop landraces of sorghum and finger millet that were found in the old Great Zimbabwe State and other ancient civilizations. Genetic and physiological traits will be extracted from the indigenous traits, and combined with modern technology to produce the new varieties that retain the original ethnical characteristics for use as food in dryland regions. The new varieties will also have increased palatability, a greater shelf life, and ability to withstand dryland conditions. Applications for one (1) DPhil and one (1) MPhil are invited within the framework of SP2. For the DPhil position, a good MPhil or Master’s Degree in Plant Breeding or any other relevant field is required. For the MPhil position, a Bachelor`s Degree in History / Archeology, or any other relevant field with at least a 2.1 degree class is required.

**Sub Programme 3** (**SP3): Establishment of soil management and conservation strategies appropriate for dryland ecosystems**

This sub programme will focus on development of novel methods and strategies of soil and water management and conservation for sustainable agricultural production. Soil fertility research will include use of composted material, with special emphasis on co-composting different materials. The research should result in production of an organic based fertilizer for commercialisation. Applications for one (1) DPhil position relating to sustainable soil fertility management and soil moisture conservation strategies in drylands are invited under SP3. A good MPhil or Master`s Degree in Soil Science, or any other relevant field is required.

**Sub Programme 4 (SP4): Development of new sustainable production systems of apiculture, cuniculture and other lesser livestock in drylands**

This sub programme will focus on apiculture and production of lesser livestock such as rabbits. For apiculture, research will focus on comparative analysis of the profitability of honey production using different production systems. Biochemical, physicochemical and melissopalynological analyses of honey from various dryland forages will be determined, and the spatio-temporal distribution of native bees and bee forages will be mapped. Product diversification will be promoted, including making of candles, wines, lotions, polishes and royal jelly. Industrialisation opportunities also promoted will include carpentry for hives and hive tools manufacture, pharmaceuticals, cosmetics and bee suit making. New technologies for sustainable biodiversity utilisation and conservation will be developed. Applications are invited for one (1) MPhil position within the framework of SP4. A Bachelor`s Degree in Ecology or any other relevant field, with at least a 2.1 overall degree class is required.

**Sub Programme 5 (SP5): Integrating aquaculture in farming systems of dryland areas**

The focus of this sub programme will be on fish and crocodile farming, including research and demonstration of the feasibility of these projects under the small scale farming sector. New early warning systems for the diagnosis and management of diseases will also developed. Applications are invited for one (1) DPhil position within the framework of SP5. A good MPhil or Master’s Degree in Fisheries / Aquatic Science / Animal Science or any other related field is required.

**Sub Programme 6 (SP6): Development of novel feed products from pastures, rangelands and other forage crops.**

This sub programme will promote production of livestock feeds such as home-based livestock rations using locally available rangeland resources like browse and grasses, forage crops and cereal and leguminous crop residues. The distribution of rangeland resources with potential for inclusion in livestock feeds will be mapped. These foraging resources will also be characterised and genetically improved. Additionally, pasture reinforcement programmes and other novel technologies to determine rangeland carrying capacity and stocking densities will be developed. Livestock feeding experiments will be conducted to evaluate performance of animals offered these diets. Applications are invited for one (1) MPhil position within the framework of SP6. A Bachelor`s Degree in Ecology, Agriculture, Biology or any other relevant field from a recognized university is required, with at least a 2.1 overall degree pass.

**Sub Programme 7 (SP7): Promotion and authentication of traditional herbal medicines in dryland areas**

This sub programme will focus on promoting herbal medicines for use in agricultural production and productivity. The spatio-temporal distribution of identified ethnobotanical and ethnoveterinary plants will be mapped. Further work will include characterization and development into new medicines for livestock and human health management respectively, through extraction of the active ingredients. These medicines will be promoted as cost-effective, environment friendly drugs. The projects will involve medicinal chemistry, ethnobotany, computational pharmacology, ethnopharmacology, pharmaco-toxicology, formulation development, pre-clinical, clinical trials, product development, registration and commercialization. Applications are invited for two (2) DPhil and two (2) MPhil positions within the framework of SP7. The first DPhil position under the School of Agriculture will work on the use and application of indigenous medicinal plants for the management of diseases in drylands livestock production systems. The second DPhil position, and two (2) MPhils under the School of Medicine and Health Sciences will work on use and application of indigenous medicinal plants in management of human diseases common in dryland areas. For the DPhil positions, a good MPhil or Master’s Degree in a relevant field is required. For the MPhil positions, a Bachelor`s Degree with at least a 2.1 overall degree pass in a relevant field is required.

**Sub Programme 8 (SP8): Generation of novel foods from traditional grains, indigenous fruits, wild mushrooms and vegetables, and edible insects (food processing and value addition).**

This sub programme contributes towards development of appropriate food technologies for processing of traditional grains, indigenous fruit species, wild vegetables and edible insects etc. Existing food technologies will be evaluated, and the nutritive value of the food items quantified. Foods with desirable traits for domestication will be screened for further studies. Industrial value addition and commercialization of indigenous foods can help to maintain cultural heritage and practices, enhance food and nutrition security, improve livelihoods, health and nutrition status of rural and urban communities, and ensure constant availability of these foods. Applications are invited for one (1) MPhil position within the framework of SP8. A Bachelor`s Degree in Food Science and Technology or any other relevant field from a recognized university is required, with at least a 2.1 overall degree pass. The applicant should have an interest in food related innovations and processing along the value chain.

**Sub Programme 9 (SP9): Development of sustainable water harvesting and management strategies in dryland areas.**

This sub programme focuses on development of appropriate water harvesting techniques that can be used in dryland regions to improve water availability for both domestic use and agricultural production. Effectiveness of different water harvesting techniques will be compared, and more appropriate technologies with potential for commercialization will be designed. This sub programme aims to achieve the following outputs: establishment of sustainable water harvesting techniques to improve soil moisture, ground water and surface water supply in drylands, development of novel water harvesting techniques to improve water supply in dryland areas, and commercialisation of appropriate water harvesting techniques for dryland areas. Applications are invited for one (1) MPhil position within the framework of SP9. A Bachelor`s Degree in Agricultural Engineering or any other relevant field, with at least a 2.1 overall degree pass is required.

**Sub Programme 10 (SP10): Development of novel methods in precision agriculture for adoption in Dryland agriculture**

This sub programme employs precision agriculture technologies to achieve agricultural sustainability. Digital technologies such as satellite based positioning systems, GIS and remote sensing and drone technology will be used to support optimised decision making in agricultural production. Applications for one (1) DPhil and one (1) MPhil positions are invited within the framework of SP10. The DPhil student will work on the food-energy-water nexus in drylands, assessing the agrivoltaics technology. For the DPhil position, a good MPhil or Master’s Degree in an appropriate field is required. The MPhil student will be expected to conduct research into precision agriculture including improving no-till planting into cover crops through planter settings and attachments, remote sensing and mapping of areas affected by pests and diseases, and analysis of optimal spatial resolution and spectral regions for predicting yields, and differentiating nutrient status and leaf concentrations. A Bachelor`s Degree in Geography and Environmental Science, Crop Science or any other relevant field is required, with at least a 2.1 overall degree pass.

**Sub Programme 11 (SP11): Business development and marketing of dryland agricultural products**

This sub programme will ensure that farmers are linked to markets, and that they receive favourable and equitable prices for their products across the whole marketing chain. Thus, SP11 will help in developing strategies for strengthening existing markets as well as establishing new ones locally, regionally and internationally. Key activities under SP11 will include conducting market research to understand customer needs, understanding existing product markets and their dynamics, developing customer-driven marketing strategies for various agricultural products, and developing networks to promote local regional and international markets for different products. Applications are invited for one (1) MPhil position within the framework of SP11. A Bachelor`s Degree in either of the following: marketing, data analytics, consumer and market intelligence, or any other relevant field is required, with at least a 2.1 overall degree pass.

**General Information and Application Procedure**

1. For the DPhil positions, a good Master`s Degree or MPhil in a relevant field, and from a recognised university is required. A track record of research in the relevant field is an added advantage. The DPhil Programme has a duration of 3 years full time.
2. For the MPhil positions, a Bachelor`s Degree in a relevant field, and from a recognised university is required. The MPhil Programme has a duration of 2 years full time.
3. All positions are fully funded for the duration of the registration period. Applicants are expected to:
4. Submit a cover letter (maximum 1 page, Times new Roman Font Size 12) outlining your motivation and suitability for the project
5. A CV (maximum 4 pages) including the names and contact details of at least two referees
6. Certified copies of academic certificates and transcripts
7. A concept note of 4 pages, and
8. A business proposal for the expected innovations from the project.

All applications should be submitted to:

The Director

Research and Postgraduate Studies

Great Zimbabwe University

P. O. Box 1235, Masvingo

Phone: 0392 266841

+263773223088

Email: researchpostgrad@gzu.ac.zw

Clearly indicate the Sub Programme (SP) and Position (DPhil / MPhil) for which you are applying. The closing date for receipt of applications is 13 August 2021