

PhD Programme in Aquaculture and Fisheries Science

**A Joint Regional Training Programme by the
Member Universities of the Regional Universities
Forum for Capacity Building in Agriculture
(RUFORUM)**

Hosted by



**Bunda College
University of Malawi
P. O. Box 219, Lilongwe, Malawi**

PhD Programme in Aquaculture and Fisheries Science

**A Joint Training Programme by the Member
Universities of RUFORUM**

Information Booklet

August 2007

© 2007, Regional Universities Forum for Capacity Building in Agriculture
(RUFORUM)

Published by RUFORUM
Plot 151 Garden Hill, Makerere University
P. O. Box 7062 Kampala, Uganda
Tel. : 256 414 535939
Fax: 256 414 543153
Email: secretariat@ruforum.org
Website: www.ruforum.org

Printed by Quick Color Print
P. O. Box 3015
Kampala, Uganda
Tel: 256 414 341402, 348020/0772-729729
Fax: 256 414 347870
Email: qcprint@africaonline.co.ug

Table of content

Executive Summary	i
Background	1
Bunda College, University of Malawi	1
Objectives of the PhD programme	2
Justification and uniqueness of the programme	2
Capacity at Bunda College and in the region	3
Programme structure and curriculum	4
Admission requirements	5
Quality control	7
Programme organisation and management	9
Contacts	10
About RUFORUM	11

Executive Summary

Aquaculture and fisheries production are major contributors to several national economies. In Sub-Saharan Africa, for example Malawi, fisheries contribute about 4% to GDP. In general however, the potential of the aquaculture and fisheries sector remains largely poorly utilized in the region. Consequently, the African Union, through the New Partnership for Africa's Development (NEPAD) is calling for massive investment in the sector, in particular strengthening research and human resource development. This programme is a response by the member universities of the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) to contribute to NEPAD's Comprehensive Africa Agricultural Development Programme (CAADP). Specifically it addresses CAADP pillar 4, which focusses on agricultural research, technology dissemination and adoption. It also directly contributes to the NEPAD's strategy of building science and technology capacity for Africa.

A demand for PhD training in Aquaculture and Fisheries Science was identified from consultation missions commissioned by the RUFORUM to assess the human resource and research needs in the eastern and southern Africa region. The University of Malawi (Bunda College) comparative advantage in Aquaculture and Fisheries was recognized to serve as a regional training centre for the sub-region and beyond. The PhD training is a vital link to develop scientific capacity and leadership for the sector and for training both undergraduate and MSc. scholars to support the broader agricultural sector.

This brochure describes the PhD programme in Aquaculture and Fisheries, which will be hosted at Bunda College but implemented jointly by the member universities of RUFORUM. The programme consists of 1 - 1.5 years of coursework, and 2 years of research, which will be closely linked to national and regional priorities. Students will as much as possible do the research in their home countries, and will be attached to on-going national or regional programmes. Flexibility is in-built to allow for modular course delivery, sandwich training and award of joint degrees.

Graduates of the PhD programme will have skills and knowledge in:

- Key issues and trends in agricultural development, especially in the Aquaculture and Fisheries sector.
- Design and implementation of training, research and development programmes.
- Formulation and implementation of policies relevant to sustainable use and management of natural resources, especially Aquaculture and Fisheries resources.



RUFORUM Secretariat, Plot 151 Garden Hill, Makerere University
P. O. Box 7062 Kampala Uganda

Tel. : +256 414 535939; Fax: +256 414 543153
Email: secretariat@ruforum.org Website: www.ruforum.org

Background

Globally and regionally, one of the most important natural resource is fish. Fish is a food of excellent nutritional value, and it makes a very significant contribution to the balanced diet of many fish-consuming communities. Worldwide, about one billion people rely on fish as their main source of animal protein, both in coastal and inland areas. About 20% of the world's population derives at least 20% of its animal protein from fish, and in some states, fish contributes over 50% of total animal proteins in the diets of their inhabitants. Even in small quantities, fish significantly improves the quality of dietary protein intake. It does that by complementing the essential amino acids that are often present in low quantities in the cereal-and-vegetable diets consumed in many developing states. The sector therefore contributes to good health of people by improving their nutritional status.

Aquaculture and fisheries production are also major contributors to national economies. For example, in the Asia-Pacific region capture fisheries contribute more than 10% to Gross Domestic Product (GDP). In Sub-Saharan Africa, capture fisheries is also important contributing on average 4% to GDP.

There is however a general decline in capture fisheries the world over, but more so in sub-Saharan Africa. In Malawi for example, the capture fisheries is estimated at about 40,000 metric tonnes per year against the potential volume of more than 100,000 metric tonnes. Fish consumption has also declined from 14.7 kg/capita in 1970 to less than 7.0 kg/capita in 2004. The declining pattern is not just true of Malawi but also in several countries in sub-Saharan Africa.

To supplement the declining production of fish from capture fisheries, governments in sub-Saharan Africa have embarked on developing aquaculture at both smallholder and commercial levels. In southern Africa, Malawi has been mandated to co-ordinate the Inland Fisheries and Aquaculture Sectors of the region. To implement this, a state-of-the-art research and training facility was established at Bunda College in Lilongwe in 1999.

Bunda College, University of Malawi

Bunda College, a constituent College of the University of Malawi, was established in 1966 with the original mandate of training middle level staff in agricultural extension at certificate and diploma levels. These were later on upgraded to B.Sc degree programmes. Due to demand from the SADC (Southern Africa Development Community) region for capacity building in aquaculture, starting in 1991, Aquaculture courses were offered as an option in the Animal Science Department. Currently, the College has full fledged B.Sc

and M.Sc programmes in Aquaculture and Fisheries serving the SADC region and beyond. These programmes are supported by excellent facilities and other academic programmes in the College. Following extensive regional stakeholder (universities, other knowledge centres and non governmental organizations) consultations in the region in the period 2004-2006 and a regional strategic planning process undertaken by RUFORUM, a consortium of 12 universities in east and southern Africa (see www.ruforum.org for details), Bunda College has been mandated to host and coordinate a joint Regional PhD training Programme in Aquaculture and Fisheries Science, beginning 2007/08. The consultations culminated in the formation of a Regional thematic group to design the PhD programme, including curriculum and operationalisation modalities.

Objectives of the PhD programme

The goals of the postgraduate programme are to build institutional capacity for capacity development by building capacity to offer demand-driven and quality PhD programme within the region, and to build a critical mass of highly trained human resource to innovate in the aquaculture and fisheries sector. The specific objectives of the programme are to:

- Develop and build capacity in order to support economic advancement of the eastern and southern Africa region, especially in the Aquaculture and Fisheries sector.
- Equip students with a deeper understanding of the theoretical framework underlying aquaculture and fisheries sciences and practices.
- Equip students with skills in articulating aquaculture and fisheries issues for public and private sectors, as well as, for international and non-governmental organizations.
- Strengthen regional collaboration while rationalizing the use of existing resources (human and infrastructure) in the region.

Justification and uniqueness of the programme

In an attempt to reverse the problem of reduced fish production, the region has implemented various interventions such as conventional fisheries management and aquaculture. The NEPAD-Fish for All Summit held in Abuja, Nigeria in 2005, emphasized the need to increase fish production from aquaculture and other fish sources. Recently (2007), NEPAD issued an urgent call to all the sub-regional organisations and governments to strengthen Aquaculture and Fisheries sector. However, all these interventions require

well-trained and qualified staff to address various problems associated with aquaculture and capture fisheries management.

A demand for PhD training in Aquaculture and Fisheries Science was identified from consultation missions commissioned by the RUFORUM to assess the human resource and research needs in eastern, central and southern Africa region. Bunda's comparative advantage in Aquaculture and Fisheries was recognised to serve as a regional training centre for the region.

The proposed PhD programme responds to challenges offered by national and regional fisheries. Considering that the cost of studying abroad has increased tremendously, this PhD Programme to be offered within the region will be cost-effective to the region and other countries in sub-Saharan Africa. The proposed PhD programme has other unique features such as:

- The regional ownership of the programme through extensive consultations with regional universities and other institutions, and their active involvement in the design and implementation of the programme.
- The involvement of regional expertise from universities, other knowledge centres, NGOs, and the private sectors enriches the programme and enhances collaboration and sustainability.
- Most of the existing PhD programmes in the region are by research only and do not have course work to provide strong scientific base and analytical rigor. This programme will fill this gap.
- The human capital to be developed will be trained within the region and will most likely remain in the region and contribute to the development of the region.

Capacity at Bunda College and in the region

Bunda has an advanced state-of-the-art facilities that will support the PhD teaching and research in Aquaculture and Fisheries Science. It has the staff complement and experience required to efficiently handle regional training at both MSc and PhD levels. The facilities available include: hatchery, fish ponds, wet and dry laboratories, etc. Besides the facilities, Bunda College is already offering Master of Science in Aquaculture and Fisheries for the SADC region and beyond. Additionally, the programme will draw expertise from other RUFORUM member universities and beyond. There is therefore adequate capacity and experience to handle the PhD programme.

Programme structure and curriculum

The programme, 3-4 years, will consist of coursework and research. There will be **five** core courses offered to all candidates regardless of areas of specialization. In addition, there will be two areas of specialisation, namely, "Aquaculture Production Technology" and "Fisheries Science and Management". Students will take **four** courses from their chosen areas of specialisation and at least two electives, including from non-area of specialisation and other relevant programmes. Thus, each student will do at least **11** courses. The course work will be completed in three semesters (1.5 years) while research work will take on average five semesters (2 years). **There will be 15 teaching weeks in each semester.** Candidates will sit for a comprehensive examination immediately after completing the course work. Each candidate will be required to have at least one published peer reviewed journal paper as a requirement for PhD degree award.

Core courses

Code	Course	Credit hours	Contact ¹ hours
AQF 611	Aquaculture and Fisheries Economics	3.0	60
AQF 612	Fisheries and Aquatic Resources Management	3.0	60
AQF 613	Molecular Biology and Genetics	3.0	60
AQF 614	Biostatistics and Research Methods	3.0	60
AEC 614	Life Skills and Personal Development	2.5	45

¹ A credit hour constitutes 15 hours of 1 hour lecture or of 2 hour practicals for 15 weeks

Fields of specialization (2)

Aquaculture Production Technology

Code	Course	Credit hours	Contact hours
AQF 621	Aquaculture Nutrition and Feed Technology	3.0	60
AQF 622	Aquaculture Production Systems and Engineering	3.0	60
AQF 623	Fish Reproduction and Breeding	3.0	60
AQF 624	Water Quality Management	3.0	60

Fisheries Science and Management

Code	Course	Credit hours	Contact hours
AQF 625	Advanced Fish Population Dynamics and Stock Assessment	3.0	60
AQF 626	Fisheries Ecology	3.0	60
AQF 627	Limnology and Oceanography	2.5	45
AEC 623	Advanced Resources Economics and Management	4.0	75

Elective courses

Code	Course	Credit hours	Contact hours
AQF 631	Business Management in Aquaculture	3.0	60
AQF 632	Biotechnology Applications in Aquaculture	2.5	45
AQF 633	Integrated Agriculture and Aquaculture Systems	3.0	60
AQF 634	Fish Bioenergetics	3.0	60
AQF 635	Fish Taxonomy and Systematics	3.0	60
AQF 636	Fisheries Bio-economics, Theory Modeling and Management	3.0	60
AQF 637	Fish Quality Management	3.0	60

Partial fulfilment

AQF 699	Thesis	-	-
---------	--------	---	---

Admission requirements

Application Procedure

Students will apply to the Dean of Postgraduate studies and Research at Bunda, or if registering in another university, to the appropriate office in that particular university.

Requirements for Admission for PhD in Aquaculture and Fisheries Science

- Only applicants with a relevant Masters Degree will be considered for the PhD Degree admission.

- Prospective PhD students, where necessary, will also be required to take oral and/or written examinations in their major and minor fields to determine overall preparation and background to cope with the programme. Students will take an examination before advancing to PhD-candidacy (starting their research). The examination serves as a guidance examination, the results of which are used in making a decision as to whether the candidate is suitable for the programme or not.
- The period of study for all PhD candidates shall be at least three years for full-time candidates; and up to six years for part-time candidates.
- Students may also be enrolled for a “split’ PhD programme where necessary and feasible. This may be during research or data collection phase. This can be accommodated within the University of Malawi regulations as long as a minimum of one full academic year is spent at Bunda College.
- If a student does not meet the basic requirements, he/she will be required to take remedial courses in English and/or other key gap areas. This may be before or during the course period.

Students’ Supervisory Committee

- Each student will have a Supervisory Committee consisting of a minimum of three members, one from the University of Malawi, one from any of the other RUFORUM member universities preferably and the third from any institution found appropriate.
- The Department shall recommend the Supervisory Committee to the College Postgraduate Committee in liaison with the Faculty.
- The Major Supervisor (Chairperson of the Supervisory Committee) will be responsible for the level of scholarship exhibited in the research work and thesis and will also serve as a mentor to the candidate. The progress of the research will be continuously monitored and evaluated during regular meetings with the major supervisor and other supervisors.
- It is the responsibility of the Supervisory Committee to ascertain that the thesis of the candidate is written in Standard English, in an appropriate scholarly style and that it is carefully proof read prior to submission to the external examiner or the Post-Graduate Committee.

Major Supervisor

The Major Supervisor shall be a staff member of the University of Malawi where necessary or from another RUFORUM university, the home university. He or she shall have a PhD degree in the relevant field of study.

Second Supervisor

The Second Supervisor will be an academic staff in any one of the other RUFORUM member universities or partner institution. He or she should have a PhD degree in a relevant area.

Third Supervisor

The Third Supervisor will be from any other institution, but should have a PhD degree in a field relevant to broadening the candidate's academic or development horizon.

Quality control

Quality Control will be implemented at regional as well as at university level.

Regional Level: Regional Academic Advisory Board

In addition to the Senate (s), a Regional Academic Advisory Board (RAAB) will be established to oversee the implementation of the joint training programme. The RAAB will comprise 9 members, one per RUFORUM member country and two others. The Chairperson of the Board will rotate annually among the participating countries/universities, but Bunda College will provide the secretariat. This Board will be responsible for quality assurance, scaling out the programme to other member universities, and deciding on courses that may be done in other member universities as part of the joint degree training.

University level: Bunda College, University of Malawi

The Senate procedures at the University of Malawi and where necessary other universities awarding the degree will apply.

Course assessments procedure

- Course assessment shall follow standard procedures used by the University of Malawi (Bunda College).
- Assessment of students' performance shall be based on all courses taught in any one semester and shall be done at the end of each semester.
- Course grades shall be based on 40 marks from continuous semester work (which may be based on tests, essays, practicals, assignments

etc.) and 60 marks from a formal written examination at the end of the semester.

- Assessment of courses shall be based on the Grade Point Average (GPA) system.

Grading System

Students will be required to complete all core courses and all electives selected with end of semester examinations. All courses will have strong theory and practical components to achieve the objectives of graduating students able to apply their learning to the real world. The courses should be completed with a cumulative grade of B- (Cumulative GPA of 3.0) or better, for all the courses taken. Students will re-do and pass failed courses. The Grading system shall be as outlined below:

Range of Marks	Letter Grade for Course	Grade Points for Course	Quality of Grades
90-100	A+	4.0	Exceptional
85-89	A	3.8	Exceptional
80-84	A-	3.6	Exceptional
75-79	B+	3.4	Superior
70-74	B	3.2	Superior
65-69	B-	3.0	Pass
60-64	C	2.5	Compensatable
50-59	D	2.0	Below average
<49	F	0.0	Fail

Auditing a course

A student may register to audit (sit in) courses that are not prescribed in the curriculum upon approval of the Major Supervisor and Head of Department. An auditor (hearer, hence "H") will be required to take assignments or examination but the grade will not contribute to cumulative grade point average (CGPA) of the student and the student's transcript will carry a grade of "H". A student may not change from "H" to "credit".

Incomplete course grade

When the quality of course work is satisfactory but some minor requirement of the course has not been completed for reasons acceptable to the instructor, a report of "I" may be made and additional time granted for completion of work. To remove an incomplete, a student must complete the deficiency within the allotted time and the instructor will submit the appropriate grade.

An incomplete not removed within one calendar year following its receipt becomes an "F".

Withdrawal from a course

Students may withdraw from a course by obtaining the proper forms at the Head of Department's Office offering the course and filing it in accordance with established regulations; in such cases a grade of "W" is assigned. A student who discontinues attendance in a course without official withdrawal receives a grade of "F" in the course.

Failing a course

A student shall be deemed to have failed a course if (1) he/she obtains an F grade by scoring less than 65% in an examination in that course and (2) absents him/herself from an examination in any course without a reason that is acceptable to the Faculty. In that case, the student gets an F grade equivalent to 0 grade points. For graduate students to be in good standing, they need to maintain a grade of B- (Cumulative GPA of 3.0).

Thesis submission and examination

Upon approval by the Supervisory Committee, the candidate will submit three copies of the thesis to the Graduate School. The thesis will be examined by an external examiner and two internal examiners appointed by the respective degree awarding university, who upon examination of the thesis will forward their examination report to the respective Graduate School. Subsequently, the candidate will make a public oral defense of the thesis, and also appear before a Viva Voce Committee which will recommend degree award, revision or decline, whatsoever is applicable.

Programme organisation and management

Key features include;

- The PhD programme will be hosted by Bunda College, who will manage the programme in accordance with University of Malawi standard procedures.
- A Regional Academic Advisory Board (RAAB) will oversee implementation at a regional level, and will work to ensure quality and regional ownership of the programme.
- The RUFORUM Secretariat in partnership with RAAB and University of Malawi will broker other partnership and source resources for the programme.

- The programme will admit both full-time and part-time students, and may involve joint degree award by the participating universities.
- The RAAB will establish modalities for scaling-out the programme to other RUFORUM universities.
- At Bunda, a thematic leader will be appointed to coordinate the programme.
- Adherence to quality and relevance will attract resources and enhance sustainability.
- The programme has been designed to minimize any foreseeable risks.

Contacts

Dean
Postgraduate Studies and Research
Bunda College, University of Malawi
P.O. Box 219
Lilongwe, Malawi

Tel: +265 1 277 222
Fax: +265 1 277 281
Email: pgsr@bunda.unima.mw
Website: www.bunda.unima.mw

RUFORUM Secretariat
Plot 151 Garden Hill
Makerere University
P.O. Box 7062, Kampala Uganda

Tel: +256 414 535939
Fax: +256 414 543153
Email: secretariat@ruforum.org
Website: www.ruforum.org

About RUFORUM: Investing in Africa's Future

The Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) is an association of 12 universities in East and Southern Africa that recognises the important and largely unfulfilled position that universities occupy in contributing to the wellbeing of small-scale farmers throughout the sub-region. This task may be addressed not only through better trained graduates entering the rural development workforce, but also by conducting more relevant and development-oriented research that is directly linked to participatory outreach programmes. In keeping with these needs, the RUFORUM is guided by five Strategic Goals:

- Capacity building at Masters, PhD and Post-doc levels
- Shared research and training facilities and capacities for enhanced economies of scope and scale
- Innovative training, research and outreach activities supported by adaptive management structures in universities contributing to policy and development practice
- Operational capacity and approaches for innovative quality and impact-oriented research for development mainstreamed in universities
- A dynamic regional platform for policy advocacy, lobbying, coordination and resource mobilisation for improved training, research and outreach by universities

RUFORUM'S ROLE AND CORE FUNCTIONS

RUFORUM's mode of operation as a regional umbrella body which targets the five strategic goals determines that RUFORUM plays the following roles:

- RUFORUM will be an **INNOVATOR** that catalyses change within universities in terms of research training, outreach and related management aspects.
- RUFORUM will be a **CATALYST** and **COORDINATOR** for partnerships and collaboration within the countries and across the region
- RUFORUM will be an **INFORMATION** and **KNOWLEDGE BROKER**
- RUFORUM will be a **REPRESENTOR** and **ADVOCATE** of universities and their stakeholders

All the four roles are based on the value-addition at regional level to on-going national universities' efforts. Fundamental to RUFORUM success is a *well focused, prioritised, and efficiently implemented research, training and outreach agenda*. RUFORUM will therefore work with participating universities and their partners to build human resource and institutional capacity aimed at strengthening the region's innovation capacity and competitiveness.