



# UNIVERSITY OF NAIROBI

PHD PROGRAMME IN DRYLAND RESOURCE MANAGEMENT

ANNUAL REPORT TO THE  
Regional Universities Forum for Capacity Building in  
Agriculture (RUFORUM).

12/9/2011



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Cover photo: Graduating students and staff at the College of Agriculture and Veterinary Sciences, UoN, September 10<sup>th</sup> 2011.

## 1. INTRODUCTION

The Doctoral programme in Dryland Resource Management offered at the University of Nairobi and supported by the Rockefeller foundation under Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) is just concluding its third year of implementation for the first cohort of students (class of 2011). The third and final year of the programme commenced on 1st October, 2010. This report is part of the contractual requirements of annual reporting on the performance of the programme/students under this program. This report presents activities and other highlights during the third and final year of implementation of the programme. The progress presented here captures the accomplishments during this third academic year which is also the scheduled final year of the programme.

Broadly, the regional programme aims to address the pressing regional need for sustainable development of drylands and improved livelihoods through innovative interdisciplinary human capacity building that integrates natural sciences and social sciences. The primary goal of the programme is to train a critical mass of doctoral cadre of experts in dryland resource management for the region, which will subsequently be utilized to train more capacity. It is hoped that the programme will contribute to NEPAD's goal of eradicating poverty and putting African countries on the path of sustainable economic growth and development.

The Doctoral programme consists of two components: a coursework component taken during the first year and a research component taken during the second and third year. Although the programme is hosted by the University of Nairobi, the trainers are drawn from any of the 29 member universities. Qualified resource persons from both the private and public sector also participate in teaching and/or research supervision/mentoring, making the product of this training relevant to the prevailing development environment. A total of 37 applications from seven (7) countries were received during the initial call to the programme. Due to lack of sponsorship to most of the applicants, only 17 were able to join the programme out of which 15 are sponsored by Rockefeller foundation through RUFORUM.

During this final year of the programme, students were expected to complete all their academic work and complete all the requirements towards the achievement of Doctoral degree in Dryland Resource Management. The students admitted to the programme were expected to complete their research work, compile their theses, submit the theses and defend, publish their work and graduate by September 10th 2011. The programme was therefore expected to have adhered to the programmatic milestone guidelines specified at the initiation of this programme as presented in Table 1.

*Table 1. Target Milestones of the PhD programme in Dryland Resource Management*

<b>Timeline</b>	<b>Activity</b>
August 2008	Advertise programme; receive and process applications
September 2008	Admit and award scholarships
October 2008	Receive and register students; 1 <sup>st</sup> semester lectures commence
March 2009	1 <sup>st</sup> semester teaching ends
April 2009	2 <sup>nd</sup> semester teaching begins Drafting of research concept notes (CN) begins
June 2009	End of 2 <sup>nd</sup> semester teaching
July 2009	1 <sup>st</sup> presentation of research CNs in department
August 2009	2 <sup>nd</sup> presentation of CNs in department
September 2009	Presentation of full proposal in department
October 2009	Fieldwork begins; Drafting Chapters 1-3 of thesis
September 2010	Field work ends and students return to UoN to begin data analyses
March 2011	End of data analyses; writing of Chapter 4 and 5 of thesis, and journal articles begins
June 2011	Thesis submitted to BPS; Papers submitted to journal for publication
August 2011	Thesis defense and correction; Paper correction
September 2011	Graduation

## 2. HIGHLIGHTS OF PROGRAMME IMPLEMENTATION

Six students comprising of four females - from Uganda (1), Kenya (2) and Malawi (1) and two males - from Ethiopia (1) and Uganda (1) were able to graduate on September 10<sup>th</sup> 2011, meaning that they were able to complete their academic programmes and graduate in exactly three years.

Four other students in this cohort are concluding their write ups and are on track to graduate by the end of the year (December 2011).

The remaining 6 PhD students are expected to defend their thesis by end of February 2012. All these latter students have made significant progress in completing write-ups for the first three to four chapters of their theses and have plans to wind up their studies early next year. All students who have attended this programme have either drafted and or submitted at least two journal articles in peer reviewed publications.

## 3. SUMMARY PROGRAMME IMPLEMENTATION

The main thrust of the 3rd year of the academic programme revolved around the data analysis, preparation and finalizing of thesis write-ups, defense and submission of journal articles. The six graduated students were able to complete all these activities during the third year while the other students are at various stages of completing the data analysis and thesis write-ups. Several of these students were also able to join their colleagues in a data management and scientific writing workshop by PhD students from Maker-ere University, University of Nairobi, Egerton University and Bunda college students and organized by RUFORUM. . Several students also had the opportunity to participate in seminars and conferences during this period. Overall, bar minor issues related to fieldwork bottlenecks, most students have kept pace with the expected timelines of the programme.

The remaining ten students have completed or at advanced stages of completing their work involving:

**Data Analysis:** Most of students are back at the university from fieldwork and working with their advisors in analyzing their data to address research questions and hypotheses of their research topics.

**Drafting of theses:** Several students have so far completed the first draft of the research thesis which are currently being reviewed by their advisors.

**Drafting & Submission of journal articles:** Most students have completed the process of drafting between one and or two journal articles for submission to refereed journal while some of them have had their articles submitted and accepted.

**Seminars and conferences:**

Several students had the opportunity to speak at various research seminars, or to speak at a conference or other seminar within or outside the University of Nairobi.

Table 2. Student Progress Summary

No.	NAME	Data Analysis on-going	Thesis Draft Completed	Journal Article(s) drafted/subm
1	Zziwa Emmanuel	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	Mugerwa Swidiq	GRADUATED		
3	Mary Wamuyu Baaru	GRADUATED		
4	Obudho Elias Otieno	<input checked="" type="checkbox"/>	--	<input checked="" type="checkbox"/>
5	Joseph N. Ndungu	<input checked="" type="checkbox"/>	--	<input checked="" type="checkbox"/>
6	Tairo Vendeline	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7	Richard Moyo	<input checked="" type="checkbox"/>	--	
8	Eunice Wamuyu Githae	GRADUATED		
9	Chibinga Oswin Chifungwe	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10	Nalule Sarah Agnes	GRADUATED		
11	Debela Hunde Feysa	GRADUATED		
12	Melusi Moyo	-	--	
13	Mulebeke Robert	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
14	Tasokwa Vida Kakota	GRADUATED		
15	Kudra Abdul	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
16	Ndathi Aphaxard J.N.	<input checked="" type="checkbox"/>	--	<input checked="" type="checkbox"/>

#### 4. INDIVIDUAL STUDENT PROGRESS

As indicated above, the main activity during this final year of the programme has concentrated on completion of field research, data analysis and thesis compilation. Most of the students have either completed or are in the last stages of completing their data analysis and thesis preparations with only a few completing the final bits of their field activities. The detailed progress made by each student in terms of research work and overall programme progress is presented in Annex 1. These student progress reports have been prepared by students in collaboration with their advisors and corroborated by the latter.

#### 5. INSIGHTS GAINED AS A RESULT OF THE EXPERIENCE, AND CONCLUDING THOUGHTS

- The programme is viable, sound & implementable within the 3-year time span.
- The graduates are well trained, qualified and have published in reputable journals.
- Adequate resources made available to build students' capacity in a range of areas relevant to the programme and personal capacity have ensured an effective pace of student studies
- The programme has continued to attract a significant number of applicants, beyond the initial programme funding of Cohort-1.
- Given the challenges the students previously (and are now experiencing) in accessing adequate funds to commence their research in time, some additional funds and arrangements are needed.
- RUFORUM Secretariat continues to play a significant role in connecting students/university to funding opportunities.
- The long term sustainability of the PhD Dryland Management Programme lies in the innovative strategies of fundraising e.g. ongoing UON-CSU HED Partnership at LARMAT and the maintenance of a high quality academic programme.
- Strong institution backing and support is crucial, UON, CAVS and LARMAT have provided significant backing and are proud for this programme. This has ensured the capacity-building initiative is effective, prompt, innovative and practical.
- A challenge exists to motivate institutions to offer research funds and fellowship opportunities to support student research work.

Further, the experience emphasized the major components of the successful training methodology:

- Capacity enhancement workshops (e.g. Annual Proposal writing workshops conducted by UON or the data management and scientific courses RUFORUM) play a crucial role in increasing students' ability to execute their research.
- Participants of diverse professional and stakeholder background, occupation and position were involved in a collaborative approach to learning and provided motivation and team learning within the learning environment.
- knowledge- and experience-exchange among the participants enabled a strong learning base
- tutoring and per-topic discussion facilitation by peers from a wide range of disciplines proved very beneficial to students
- online communication through emails and to some scale web2.0 communication tools with supervisors was crucial at ensuring that communications channels between advisors and students were constantly active when students were back in their home countries.
- Regional implementation of the Dryland programme brings in focus the local content and problems, and further encourages regional partnerships and initiatives.

## **6. OTHER DEVELOPMENTS OF RELEVANCE DURING THIS PERIOD**

- UON advertised the PhD Dryland Management Programme for applications for the 2010/2011 Academic year and started teaching in October. The programme attracted a good number of applicants (over 50) out of which nine (9) managed to raise funds (privately (or employer) sponsorship) to pursue the programme and have just completed the first semester of the first year (Ref. Annex 2 for student details and research topics).
- The university has already advertised for application to the programme for the 2010/2011 academic year (third intake), the response of which has so far been quite positive with over 12 applications received.
- The UON-CSU HED Partnership at LARMAT, UoN that since began activities during the third quarter of this year is providing some modest research-fund support to the current cohort of PhD students and working to actively connecting them to various funding/research support avenues.



## Annex 1 Individual Student Progress for Year Three

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### Tasokwa Kakota

#### PhD Progress:

- **Research title:** The Impact of Climate Variability and Extreme Weather Events on Gender and Household Vulnerability to Food Insecurity
- **Journal Articles:** Has submitted three articles in conferences, presented two, submitted one article to journal (under review).
- **Other achievements during PhD course:** Won research grants from AAU and ARDEP. Presented two papers in conferences
- **Graduated:** Yes

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### Sarah A. Nalule

#### PhD Progress:

- **Research title:** Ethnopharmacology, phytochemical composition and toxicity of medicinal plants used against livestock helminthes in Ugandan cattle corridor.
  - **Journal Articles:**
    - Published: Nalule, A.S, Mbaria, J. M., Olila, D. and Kimenju, J. W., 2011. Ethnopharmacological practices in management of livestock helminthes by pastoral communities in the drylands of Uganda; Livestock Research for Rural Development, **23**, Article #040. Retrieved January 12, 2011, from <http://www.lrrd.org/lrrd23/2/nalu23040.htm>
    - Accepted: A S Nalule <sup>1\*</sup>, J M Mbaria <sup>2</sup>, D Olila<sup>3</sup>, J W Kimenju<sup>4</sup>: Ascariocidal activity and phytochemical constituents of root tuber *Rhoicissus tridentate* (L.f.) Wild & R.B. Drummond (Vitaceae) ethanolic and aqueous extracts (by Tropical animal health and production journal )
    - 4 others manuscripts being drafted.
  - **Other achievements during PhD course:**
    - Received small research grant from AAU
    - Received research fund support from Makerere University
    - Submitted my thesis for examination to UON
    - Participated in the GCARD conference in France
    - Co-supervised an Msc student in Makerere University that has submitted for examination.
    - Won and accomplished a food and agriculture organization of UN consultancy
  - **Graduated:** Yes
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**Elias Otieno Obudho**


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**PhD Progress:**

- **Research title:** Modeling Climate Related Index-Based Livestock Insurance to Enhance Pastoralists' Resilience in the Drylands
  - **Journal Articles:** Drafted: 1) Factors Influencing Pastoralist Communities Vulnerability in Group Ranches, (2) Conceptualization and Measurement Challenges: Modeling Risk and Vulnerability
  - **Target graduation date:** May 2012
  - **Graduated:** No
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**Baaru Mary Wamuyu****PhD Progress:**

- **Research title:** Effect of vegetative macro contour lines on soil moisture content and crop performance
  - **Journal Articles:** Submitted: 1) Trends in land use and land cover over a 21 year period in Kathekakai Settlement Scheme, Machakos District, Kenya. Submitted to African Journal of Environmental Science and technology, 2) Effect of vegetative macro contour lines on soil moisture conservation and crop performance in Machakos District, Kenya. Submitted to African crop science
  - **Other achievements during PhD course:** C.K.K Gachene and Baaru M.W. (2011). Vegetative macro contour lines: Effect on soil moisture conservation and crop performance in Machakos District, Kenya. Awarded the best paper of the theme " Agriculture and food security" during the 4th National Council of Science and Technology held at KICC, Nairobi, Kenya
  - **Grdauted:** Yes
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**Vendeline Emmanuel Tairo PhD Progress:**

- **Research title:** Utilization Of Woody Plants In Times Of Food Scarcity From Selected Drylands Of Iringa District, Tanzania
  - **Journal Articles:** Accepted: Nutritive and Anti-nutritive Qualities of mostly preferred edible woody plants in selected drylands of Iringa District, Tanzania
  - **Graduated:** No
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**Debela Hunde Feysa****PhD Progress:**

- **Research title:** A Comparative Analysis of the Use and Management of Wild Edible Plants on Food Security among Transhumance and Settled Farmers in Semiarid East Shewa, Ethiopia
- **Journal Articles:** 4 articles are published, 2 are submitted and under review, for 1 article the abstract is accepted to be presented on 10<sup>th</sup> Annual Conference of Association of African Crop Science Society
- **Grdauted:** Yes

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**Elizabeth Nduku Muthiani**
**PhD Progress:**

- **Research title:** The Impact of Community Wildlife Sanctuaries on Pastoral Livestock Production System
  - **Target graduation date:** May 2012
  - **Graduated:** No
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**Eunice W. Githae****PhD Progress:**

- **Research title:** Effects of soil physicochemical properties and genetic characteristics on the distribution of *Acacia senegal* (L.) Willd. varieties in the dryland areas of Kenya.
  - **Journal Articles:** She currently has two publications from her PhD work: one submitted in a peer reviewed journal on soil physicochemical properties under *A. senegal* varieties in the dryland areas of Kenya and the other in a book on genetic characterization of *A. senegal*, edited by Technical Centre for Agricultural and Rural Cooperation (CTA), which is a contribution from the finalists of the 2009/2010 African-wide Women and Young Professionals in Science Competition
  - **Other achievements during PhD course:**
    - Women in Science Award (5<sup>th</sup> position) granted by CTA/FARA/AGRA/RUFORUM/ANAFE/NPCA
    - Poster Presentation Award (2<sup>nd</sup> best) granted by RUFORUM
    - Abdou-Salam Quèdraogo Fellowship Award granted by Bioversity International
  - **Graduated:** Yes
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**Kudra, Abdul****PhD Progress:**

- **Research title:** Influence of soil fertility management on *Striga* seed bank dynamics and grain yield of sorghum in semi arid area of Tanzania.
  - **Journal Articles:** Drafted: 1) The influence of different sources of fertilizer on *Striga* reproduction and sorghum grain yield 2). Physico-chemical characteristics of *Striga* infested soils and their influence on *Striga* reproduction
  - **Other achievements during PhD course:**
    - Kudra has also won 15 000 USD, from IDRC research grants during the PhD course
  - **Target graduation date:** December 2011
  - **Grdauated:** No
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**Robert Mulebeke**

**PhD Progress:**

- **Research title:** "Enhancing water use efficiency in dryland cropping systems in eastern Uganda". The study evaluates effects of cropping systems and tillage management strategies on soil water flows in cassava and sorghum cropping systems. He was awarded an IFS grant (W/4652-1) in 2009 under the title "Water use efficiency in dryland cropping systems: Characterization of surface and green water flows in cassava and sorghum based farming system of eastern Uganda". This grant helped to secure some basic equipment like soil sampling kit, tension infiltrometer and a set of tensiometers, which were used to kick-start the project. The last field experiment is on-going till end of August 2011. A research application summary entitled "Enhancing water use efficiency of cassava and sorghum based cropping systems in drylands" was presented during the Second RUFORUM Biennial Meeting 20 - 24 September 2010, Entebbe, Uganda.
  - **Journal Articles:** Drafted: 'Soil moisture dynamics in cassava-sorghum based cropping systems in the drylands of eastern Uganda.' is being prepared for submission to the African Crop Science Journal.
  - **Target graduation date:** December 2011
  - **Graduated:** No
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**Oswin C Chibinga****PhD Progress:**

- **Research title** Climate Variability: Enhancing Adaptive Utilisation Of Grassland And Browse Species In The Agro-Pastoral System In Gwembe Valley, Southern Zambia
  - **Journal Articles:** Submitted: Climate Variability Perception, Livelihood Strategies and Adaptation Among Pastoralists in Southern Zambia; Drafted: 1) Climate Variability; Enhancing Adaptive Pasture use for improved livestock production in Choma District, Southern Zambia, 2) Effect of Lopping of Julbernardia globiflora so as to determine the appropriate browse harvesting regime.
  - **Target graduation date:** December 2011
  - **Graduated:** No
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**Richard Moyo****PhD Progress:**

- **Research title:** Climate variability and Tillage practices: Effect on soil moisture, carbon dynamics and crop productivity in semi arid Zimbabwe
  - **Other achievements during PhD course:** Presented a conference paper
  - **Graduated:** No
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**Ndung'u Joseph Njoroge****PhD Progress:**

- **Research title:** Predicting nutritional status and performance of free-grazing cattle through NIRS faecal profiling in southeastern drylands of Kenya
- **Journal Articles:** Drafted: Effect of climate variability on forage and livestock productivity in the drylands of southern Kenya (drafted). Using historical data (2001 – 2010) on rainfall, forage production and livestock mortality from drought for KARI Kiboko as a case study.
- **Other outstanding achievements during the PhD course :** Received financial support of KES 871,000 (~USD 11,000) for fieldwork from the Kenya Arid and Semi Arid Lands (KASAL) project in KARI in October 2010.
- **Target graduation date** December 2011.
- **Graduated:** No

### Mugerwa Swidiq

#### PhD Progress:

- **Research title:** "Ecology of subterranean termites (Isoptera) on grazing lands in semi-arid Nakasongola, Uganda".
- **Journal Articles:** Papers accepted: 1) "Termite assemblage structure on Grazing lands in Semi-arid Nakasongola" (to be published in the June issue of the Agriculture and biology journal of North America). 2) "Effect of biotic and abiotic factors on composition and foraging intensity of subterranean termites" (to be published in the June issue of African journal of environmental sciences and technology) and 3) "Farmers' Ethno-ecological Knowledge of the Termite Problem in Semi-arid Nakasongola" (to be published in the June issue of African journal of agricultural research).
- **Graduated:** Yes

### Zziwa Emmanuel

#### PhD Progress:

- **Research title:** "Land use and cover changes in the rangelands of Uganda: impacts on soil quality and pasture productivity"
- **Journal Articles:** Drafted: 1) Land use and cover changes in Nakasongola district, Uganda (1986 – 2004): Implications on sustainability of savanna ecosystems, 2) Effects of land use and cover changes on soil quality and pasture productivity in Nakasongola district
- **Other achievements during PhD course:**
  - Received a thesis writing grant from AAU

- Participated in FSC sandwich program at ILRI Nairobi for training in GIS and remote sensing
- Won a travel grant from McKnight found to participate in climate change symposium in PenState University, USA
- **Target graduation date:** December 2011
- **Gratuated:** No

## Annex 2: List of Students currently enrolled in the PhD Dryland Resource Management Programme at the UoN

Number	Name	Country	Gender	Research Title
1	Bibianne Wanja Waiganjo	Kenya	Female	Efficacy of Indigenous Knowledge Used to Protect Bites by Ectoparasites in Eastern Kenya
2	Peris Mweru Kariuki	Kenya	Female	Livelihoods from Medicinal Plants: Sustainability of Commercialization in Dryland areas in Kenya.
3	Patrick Mwambi Mwanyumba	Kenya	Male	Sustainable Trade, Conservation and Utilization of Indigenous Livestock: Case of North-Eastern Kenya
4	Koech Oscar Kipchirchir	Kenya	Male	Evaluation of Pasture Species Production to Adapt to Climate change in Drylands of Kenya; Case Study of Tana River County
5	Judith Mbau	Kenya	Female	Determinants of Mammalian Resource Gradients, Use and Implications on Human-Wildlife Conflicts and Livelihoods in Kitobo Agro-Ecosystem, Taita-Taveta District, Kenya
6	Elhadi, Yazan Ahmed Mohamed	Sudan	Male	The Role of Climate Change and Gender in Livestock Value Chain in Kenya
7	Staline Kibet	Kenya	Male	The Influence of Plants Functional Traits, Topography and Herbivory in Community Structuring in a Semi-Arid Ecosystem, Laikipia, Kenya
8	Mary Morara	Kenya	Female	Climate Change Impacts and Coping Strategies in Kajiado