VLIR-OUS RESEARCH PLATFORM UGANDA

BOOK OF ABSTRACTS AND PROGRAMME FOR THE DISSEMINATION WORKSHOP ON 1ST JUNE 2017 AT MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY, KIHUMURO MAIN CAMPUS

Theme: Research for Capacity Building for a Sustainable Future

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1. Introduction

The VLIR-OUS Research Platform Uganda also known as Health, Environment and Food Security ('HEFS') platform is sponsored by the Belgian Development Cooperation. The Platform is comprised of 5 Flemish Universities: Antwerp University, Ghent University, Leuven University, Free University of Brussels, Hasselt University and 8 Ugandan Universities: Mountains of the Moon University, Uganda Christian University, Uganda Martyrs University, Makerere University, Mbarara University of Science and Technology, Gulu University, Kyambogo University and Busitema University. The coordinating universities of this Platform are: the University of Antwerp in Belgium by Professor Jean-Pierre Van Geertruyden and Mbarara University of Science and Technology in Uganda by Associate Professor Charles Tushabomwe-Kazooba.

2. The University of Antwerp

The university of Antwerp roots go back to Sint-Ignatius Handelshogeschool (Saint-Ignatius School for Higher Education in Commerce) founded by the Jesuit (Society of Jesus) in Antwerp in 1852. This was one of the first European business schools to offer formal university degrees. It later opened a Faculty of Literature and Philosophy (including Law) and a Faculty of Political and Social Sciences. It was renamed Universitaire Faculteiten Sint-Ignatius Antwerpen (UFSIA) in the 1960s when the Belgian government granted it university status. In the early 1970s UFSIA joined into a confederation with "Rijksuniversitair Centrum Antwerpen" (RUCA) and "Universitaire Instelling Antwerpen" (UIA), public institutions.

In 2003 UFSIA, RUCA, and UIA merged into the University of Antwerp to become the first explicitly pluralistic university in Belgium, offering philosophical, ethical, and spiritual discourse and openness towards religion and intercultural dialogue. It soon became the third largest university in Flanders with 20,000 students. The University of Antwerp has 33 academic bachelor programmes, 69 master programmes, 18 master-after-master programmes and 23 postgraduates. In addition, there are 31 programmes completely taught in English (13 master, 14 master-after-master and 4 postgraduate programmes). All these programmes are divided into 9 faculties i.e. Applied Economics, Applied Engineering, Arts, Design Sciences, Law, Medicine and Health Sciences, Pharmaceutical, Biomedical and Veterinary Sciences, Social Sciences, and Science. The University of Antwerp is characterised by its high standards in education, internationally competitive research and entrepreneurial approach.

3. Mbarara University of Science and Technology (MUST)

Mbarara University of Science and Technology also known as MUST was opened in October 1989 after extensive modification of physical facilities of the former School of Midwifery at the Mbarara District hospital. The Mbarara University of Science and Technology Statute 1989 as passed by the National Resistance Council; was the enabling law that established MUST as a corporate body. At that time Uganda's economy and social infrastructure had collapsed, due to civil wars in the 1970's and

1980's. Therefore, with the government's realization that higher education was a critical asset for nation building, and in particular that Science and Technology was the most realistic driver to lead this initiative, MUST was therefore a welcome idea and has to date lived to that expectation.

To overcome several set up challenges, the first Vice Chancellor Professor Frederick I.B Kayanja, in collaboration with 4 Cuban professors started the pioneer Faculty of Medicine, opening its gates to the first 43 students admitted to the Bachelor of Medicine and Bachelor of Surgery (MBChB) program. Since October 28th, 1989 MUST has seen many community innovations, which have contributed to its development and that of our motherland Uganda. It has grown from a single Medical Faculty university serving a student population of 43 to six Faculties of Science, Computing and Informatics Sciences, Business and Management Sciences, Interdisciplinary Studies, Applied Sciences and two Institutes of Maternal Newborn Child Health and Tropical Forest Conservation (ITFC) which is based in the Bwindi Impenetrable National Park. To attain this level of educational progress has been no small feat.

In May 2012, the University finally unveiled and commissioned the much talked about move to a spacious campus at Kihumuro, located 7 km on Mbarara - Bushenyi road, with the commissioning of the Estates and works Block, and handing over the site for the construction of the Faculty of Applied Science and Technology to bring to fruition the whole spectrum of this great University of Science and Technology. The new program, Bachelor of Biomedical Engineering has 27 pioneer students.

The current Vice Chancellor Prof. Celestino Obua took over the leadership of the great institution on 27th October 2014 and he has brought on board innovative changes in the field of research and grant writing. The University recently established the Directorate of Postgraduate Research and Training in February 2017.

4. HEFS Platform

HEFS Platform is driven by assessing the **relevance of the community in promoting food security, a healthy wellbeing and environmental sustainability**. The researches carried out under this platform utilize a multidisciplinary approach, from social science disciplines, exact sciences as well as from medical sciences. One of the core activities of the platform is providing the opportunity to PhD fellows and junior researchers to complete and disseminate stagnating or sleeping research outputs on the above mentioned topics via a Completion Grant Call. A number of people from the partner universities in Uganda have benefited from these completion grant calls as follows:

4.1 Beneficiaries of the First Completion Grant Call 2013

1. **Frank Ahimbisibwe** is a Senior Lecturer at Mbarara University of Science and Technology. He successfully completed his PhD after undertaking a Short Research Stay (SRS) in Belgium from 8/4/14 - 7/7/14. He was under the supervision of Prof. F. Reyntjens at the Institute of Development Policy and Management (IOB),

Antwerp. His study was titled "The Host State and Refugee Security in Uganda: the case of Rwandan refugees".

2. **Geoffrey Musinguzi** is from Makerere University, School of Public Health. He was in Belgium at the University of Antwerp to attend the 'EBQ' during his research stay. This is a six-week International Course on Epidemiology, Biostatistics and Qualitative research methods at the University of Antwerp, held from 20/10/14-28/11/14. During his SRS, he developed a paper titled "Capacity of Health facilities to provide services for hypertension".

3. **Aggrey David Mukose** is from Makerere University. He attended and completed the EBQ from 1/10/14 - 20/12/14. On top of that, he analyzed part of his research data and started drafting a manuscript entitled "Health system preparedness in the implementation of Option B+ in Uganda from the providers' perspective". He submitted a PhD application proposal titled "Implementation of Option B+ for Prevention of Mother-to-Child Transmission (PMTCT) of HIV in Uganda: Health system preparedness, Uptake, Adherence, Male involvement and Retention in care".

4. **Martin Mbonye** is from Makerere University, Institute of Infectious Diseases. He was in Belgium between 9/9/14 - 8/12/14 hosted at the University of Antwerp. He drafted the first two sections (background and methods) of his manuscript and completed literature review and write up of the introduction section of his thesis. He was not able to submit the thesis, conduct mock defense and finalize the thesis as planned because of time constraint. However, he worked on peer review feedback he had received from a BMC journal where he had earlier submitted a manuscript titled "*Disease diagnosis in primary care in Uganda*" and resubmitted it. The manuscript was published on the 8th October 2014. He also completed a manuscript titled "*Malaria care in infants aged under six months in Uganda: an area of unmet needs!*" and submitted to Plos One peer reviewed journal for consideration. He received feedback which he worked on mid-February 2015; Plos One journal informally accepted this manuscript for publication.

5. **Joseph Ngonzi** is from Mbarara University of Science and Technology. He was in Belgium between 18/10/14 - 8/12/14, hosted at the University of Antwerp, attended the EBQ course in the fall of 2014. During his SRS he finished draft of his paper 'Puerperal sepsis, the leading cause of maternal deaths at a Tertiary University Teaching Hospital in Uganda', submission was planned on 27th March 2015. Dr. Ngonzi noted in his report that the EBQ course equipped him with skills that helped him to analyze the data he had gone with and come up with a deliverable manuscript.

6. **Pius Nina** is from Makerere University in the Department of Biological Sciences. He was in Belgium between 25/4/15 - 18/7/15, hosted at the University of Antwerp. This was a selected scholar of the first Call in AP2013, but due to circumstances he was not able to come on an SRS until mid-2015.

4.2 Beneficiaries of the Second Completion Grant Call 2014

1. **Benjamin Alipanga** is from Makerere University. He was hosted in the Faculty of Psychology and Education Sciences, Ghent University, Belgium. His PhD thesis was on "The Impact of violent behaviour in adolescents on post-conflict recovery processes in Northern Uganda".

2. **Medard Twinamatsiko** is from Mbarara University of Science and Technology. He was hosted at the Institute of Development Policy and Management (IOB), Antwerp University in Belgium. His PhD thesis was on "Responding to policy practice gaps: revenue sharing policy implementation and livelihoods of people bordering Bwindi impenetrable national park".

3. **Julius Tanayen** is from Mbarara University of Science and Technology. He was hosted at Catholic University Leuven, Belgium. His research title was "Antidiabetic studies of Spathodea campanulata (P.Beauv.) Bignoniaceae stem bark extract on alloxanised rats. He came up with two publications in the British Journal of Pharmacology and Toxicology and Pharmacognosy Journal respectively.

4. **Jane Namukasa Wanyama** is from Makerere University. She was hosted at Antwerp University in Belgium. Her research title was "Long-term HIV Treatment Adherence and Risk Reduction among HIV infected Individuals in Kampala, Uganda: the Infectious Diseases Institute (IDI) experience".

5. **Joshua Wesana** is from Mountains of the Moon University. He was hosted at Ghent University, Belgium. His research title was "Analysis of the parents' and school authorities' reactions towards the use of biofortified foods in school feeding programs. An application of the Protection Motivation Theory to Lodine Enriched Legumes in Uganda".

4.3 Beneficiaries of the Third Completion Grant Call 2015

1. **Patricia Bamanyaki** is from Makerere University. She was hosted at the Institute of Development Policy and Management (IOB) at the University of Antwerp. Her research title was "Evaluating effects of local-level outside government gender budget initiatives in maternal health: An application of theory-based evaluation, process tracing and a quasi-experiment in Kabale, Uganda".

2. **Emmanuel Seremba** is from Makerere University. He was hosted at Global Health Institute between 23/8 - 15/11/16. His research title was "Early childhood transmission of viral hepatitis B among HIV and non-HIV infected mothers attending postnatal and immunization clinic at Gulu Hospital, Northern Uganda".

3. **Prudence Kemigisha** is from Mbarara University of Science and Technology. She was hosted at Institute of Development Policy and Management (IOB), University

of Antwerp between 07/02 to 29/04/2017. Her research title was "Women land rights and household food security in Uganda, a case of Bushenyi District".

4. **Estellina Namutebi** is from Uganda Martyrs University. She was hosted in Uganda at Uganda Martyrs University between 01/05 - 31/07/2016. Her research topic was "Eco-socio impact of mineral resource mining in Karamoja region, Uganda"

5. **Pius Mbuya Nina** is from Makerere University. He was hosted at University of Antwerp, Department of Biology between 23/5 - 14/8/16. His research title was "Risk Pathways and Spatial Variability of Zoonotic Brucellosis in Cattle: Implications for Pastoralists' Development at the Nexus of Wildlife-Livestock in South western Uganda".

6. **Rolland Agaba** is from Makerere University. He is still waiting for a supervisor in his research area in Belgium to be identified and allocated to him before he goes for the short research stay.

4.4 Fourth and last Completion Grant Call

This is the last call of the completion grant. It was put up in March 2017, the selection process is ongoing. The successful applicants will be announced by mid-June 2017.

5. Conclusion

Dissemination conferences under the VLIR-OUS Research Platform Uganda have always been arranged on a rotational basis in the 8 partner universities in Uganda. This time round, Mbarara University of Science and Technology, was chosen to host today's dissemination conference and the Joint Steering Committee Meeting (JSCM) to be held on June 2, 2017.

This dissemination conference is special because we have brought on board researchers from the University of Technology and Arts Byumba, Rwanda.

You are all welcome.

6. Programme for the Dissemination Conference

Theme: **Research for Capacity Building for a Sustainable Future**

Time	Activity	Responsible Person/Presenter
08:00 – 08:30	**Arrival & Registration**	Winfred & Team
	Session One: Opening Ceremony	
08:35 – 08:45	Remarks by the HEFS Uganda Coordinator	Assoc. Prof. Charles Tushabomwe Kazooba
08:45 – 08:55	Remarks by the Flemish HEFS Coordinator	Prof. Jean-Pierre Van geertruyden
08:55 – 09:05	Remarks by the Vice Chancellor, MUST	Prof. Celestino Obua
09:05 – 09:15	Remarks by LCV Chairman Mbarara	Mr. JB Tumusiime
09:15 – 09:25	Remarks by the Belgian Ambassador & official opening of the conference	His Excellency the Ambassador
09:25 – 09:30	Group Photo	Photographer
09:30 – 10:00	**Break Tea**	
	Session Two: Environmental Issues **Chair: Assoc. Prof. Julius Lejju Bunny**	
10:00 – 10:15	**Topic** – Towards environmental sustainability: Assessing family contribution in addressing environmental degradation in western Uganda	Kamugisha Marsiale, Uganda Martyrs University
10:15 – 10:30	**Topic** - Soil erosion risk assessment in the Rwenzori region using the revised universal soil loss equation model and geographic information systems applications	Kabasiita Juliet Kiiza, Adalbert Aine-Omucunguzi, Mountains of the Moon University
10:30 – 10:45	**Topic** - Sustainable flood risk management: The Need for Considering Humans as Part of the Riverine Ecosystem	Bosco Bwambale and Adalbert Aine-Omucunguzi, Mountains of the Moon University
10:45 - 11:00	**Topic** – The relevance of Families in addressing Environmental issues	Dr. Mutyaba Emmanuel Musoke, Uganda Martyrs University
11:00 – 11:20	**DISCUSSIONS**	
11:20 – 11:35	**Topic -** The analysis of the decrease of Lake Victoria water level	Sr. Estellina Namutebi, Uganda Martyrs University, School of Arts and Social Sciences
11:35 – 11:50	**Topic -** Linking Conservation to the Implementation of Revenue Sharing Policy and Livelihoods of People Bordering Bwindi Impenetrable National Park, Uganda	Dr. Medard Twinamatsiko, Mbarara University of Science and Technology
11:50 – 12:15	**Topic -** The role of rice fields in the adaptation of water birds to the drought climate shock	Sarah Nachuha Kasozi (DPhil, Oxon) University of Technology and Arts of Byumba
12:15 – 12:30	**Topic -** Decolorization of Dye Containing Solutions Using Nano Zerovalent Iron Immobilized on Functionalized Paa/Pvdf Membranes	Mujyambere Jean Marie Vianney, Karuppan Muthukuma, University of Technology and Arts of Byumba
12:30 – 12:45	**Topic -** Effect of Deforestation on Soil Conservation in Byumba, Gicumbi District, Rwanda	Prof. Kaaya Siraje, University of Technology and Arts of Byumba – Rwanda (UTAB)
12:45 – 01:00	**DISCUSSIONS**	

01:00 – 02:00	**Lunch break**	
	Session Three: Health Issues **Chair: Assoc. Prof. Samuel Maling**	
02:00 – 02:15	**Topic** – Obstacles to the Implementation of Sexual and Reproductive Health Policy in Uganda	Anna B Ninsiima, Mbarara University of Science and Technology
02:15 – 02:30	**Topic** – Investigating determinants of Sexual and Reproductive Health Behaviors among Young Adolescents in SW Uganda	Elizabeth Kemigisha, Viola N Nyakato, Gad Ndaruhutse Ruzaaza, Wendo Mlahagwa, Anna Ninsiima, Solome Najjuka, Els Leye, Gily Coene, Olivier Degomme, Kristien Michielsen, MUST
02:30 – 02:45	**Topic** - Assessing the relationship between nodding syndrome and mycotoxin in grains based foods in northern Uganda	Richard Echodu, Emilio Ovuga, Joyce Moriku Kaducu, Hilary Edema, Geert Haesaert, Gulu University
02:45 – 03:00	**Topic –** Antidiabetic properties of an aqueous-methonalic stem bark extract of spathodea campanulata (Bignoniaceae)	J.K. Tanayen, A.M. Ajayi, J.O.C. Ezeonwumelu, J. Oloro, G.G. Tanayen, B. Adzu and A.G. Agaba all from Mbarara University of Science and Technology
03:00 – 03:15	**Topic -** Incidence of postpartum infection, outcomes and associated risk factors at Mbarara regional referral hospital in Uganda	Joseph Ngonzi, Lisa M. Bebell, Yarine Fajardo, et al, Mbarara University of Science and Technology
03:15 - 03:35	**DISCUSSIONS**	
	Session Four: Food Security **Chair: Mr. Richard Echodu**	
03:35 - 03:50	Topic - Indigenous Vegetables, Food Security and Sustainable Development in Post-war Northern Uganda	Charles Amone, Gulu University
03:50 – 04:15	**Topic-** Collaborative Forest Resources Management and Economic well-being: A look at peri-urban tree planting among pastoral communities of South Western Uganda	Assoc. Prof. Charles Tushabomwe Kazooba, Dr. Imelda Kemeza and Dr. Manasseh Tumuhimbise, Mbarara University of Science and Technology
04:15 – 04:30	**Topic** – Effects of residue management practices on maize yields and soil macronutrients in the Rwenzori region: a case of Hima town council	Ekyaligonza Deous Mary and Kagorora John Patrick Mountains of the Moon University
04:30 – 04:45	**Topic -** Farmer Knowledge on *Tagetes Minuta* and Its Potential Use as Alternative to Synthetic Insecticides for the Control of Maize Weevils in Rwanda	Rutikanga Alexandre., Kagoyire C., Hagena Kakumba J., Rudahunga JB1., Hategekimana A., University of Technology and Arts of Byumba
04:45 - 05:00	**DISCUSSION**	
05:00 – 05:05	Closing Remarks	Assoc. Prof. Nixon Kamukama, Deputy Vice Chancellor Academic Affairs, MUST
05:05 - 05:30	**EVENING TEA & DEPARTURE**	Winfred

7. Session One: Environmental Issues

7.1 Towards environmental sustainability: Assessing family contribution in addressing environmental degradation in western Uganda

Marsiale Kamugisha, Uganda Martyrs University

Abstract

The family as the basic school for acquiring values and skills and for translating environmental knowledge into practice is very fundamental and key to environmental sustainability as well as food security. It is very clear that without sustainable environment, there cannot be food security, good health, peace as well as a decent life for the people. This requires that the basic knowledge about the care of ecosystems, forest cover, rivers and water catchment areas and above all the well-functioning of the ecosystems be cultivated at the family level, where not only parents but also other community members have a key role to play in adding value to ecological integrity. This shows the significance of a family and its worthwhile responsibility in laying a solid foundation for promoting nature. However, today the current environmental trends demonstrate that there is already environmental crisis being experienced in many developing countries. Several communities are increasingly being confronted with the issues of environmental degradation as a result of poverty, greed and poor governance. Other most people degrade the environment due to lack of accessibility to information, displacement, being left landless or pushed to the periphery where environmental stress is a big issue in affecting the wellbeing of families. The family has further to play a role in emphasizing the role of individual responsibility in taking care of the environment. One of the reasons why many communities are facing increasingly environmental degradation is that the family is no longer deliberately and emphatically perceived as a basic school, agent and instrument of environmental transformation, which instills ethical values for environmental sustainability.

Key words: *family, environmental sustainability, environmental degradation, values, responsibility.*

7.2 Soil Erosion Risk Assessment in the Rwenzori Region Using the Revised Universal Soil Loss Equation Model and Geographic Information Systems Applications

Juliet Kabasiita Kiiza[1*], Adalbert Aine-Omucunguzi[2]
[1]Mountains of the Moon University, jkab75@yahoo.co.uk
[2]Mountains of the Moon University,

Abstract
Using a methodology that integrates the Revised Universal Soil Loss Equation (RUSLE) model model and Geographic Information System (GIS) techniques, the critical soil erosion prone zones of the Rwenzori Region districts of Uganda was assessed. The spatial pattern of annual soil erosion rate was obtained by integrating geo-environmental variables in a raster based GIS environment. GIS data layers including, rainfall erosivity (R), soil erodability (K), slope length and steepness (LS), cover management (C) and conservation practice (P) factors were calculated to determine their effects on average annual soil loss in the area. The total Annual Soil Loss in the Rwenzori region ranged from 307 to 6,407 tons per hectare per year with an average value 1,301 tonnes /hectare/year. The spatial locations of the hotspot areas for soil erosion in the study revealed that the potential soil loss is typically greater along the steeper cultivated slopes of the Rwenzori region. The Soil Erosion Risk Model developed shows that the entire region is at high risk of soil erosion and there is a strong need for proper soil conservation measures to be implemented. However, heavily cultivated high altitude areas warrant special attention and priority for the implementation of control measures. The proposed conservation measures include; construction of terraces on land with long and steep slopes, contouring the land for slopes less than 8%, construction of soil bunds and terracing. While the model helps mapping of vulnerability zones, micro-scale data on rainfall intensity, high resolution of DEM data can augment the prediction capability and accuracy of GIS-based soil erosion risk analysis.

Keywords: *Soil Erosion, Risk Assessment, RUSLE Model, GIS techniques, Rwenzori Region*.

7.3 Sustainable Flood Risk Management: The Need for Considering Humans as Part of the Riverine Ecosystem

Bosco Bwambale* and Adalbert Aine-Omucunguzi
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Mountains of the Moon University

Abstract

Although flash-flooding constitutes disastrous impacts in other parts of Uganda, owing to the prediction of more intense rainfall and the fragile topography of the Rwenzori, it is envisaged that the region will grow more vulnerable to flash-flooding. Consistent with the commendation, by flood related scholars in the region, that riverbank and catchment management would address the disaster, local governments (along river Nyamughasana) enacted regulation, focusing on observance of the buffer area and replacement of the *eucalyptus* tree and crop farms with the indigenous riverbank forests; this was rejected by the communities-at-risk. Consequently, the main objective is the investigation of the reasons for non-compliance. To achieve this objective, a qualitative study was carried, assessing the feasibility of the riverbank catchment management regulation. More specifically, guided by the stratified and purposive sampling techniques, data were collected from a sample of 114 participants using nominal group discussions and key informant interviews. In addition, secondary data was collected, including policy regulations relating to flooding and other disasters. The collected data was analyzed using the thematic and analytic techniques, conclusions drawn guided by the SWOT matrix.

This study reveals that communities-at-risk do understand the regulation and its precepts; they were able to elaborate, just as the regulation states that indigenous riverbank forests are better than *eucalyptus* tree farms in remedying flash-flood damages, and that ruthless human activities on riverbanks enhance flood risk. However, the main identified issue centres on the shift in the value attached to the riverine ecosystem: unlike in the past (where a cultural value was attached), the focus, today, is more on an economic value which the regulation seems silent about. These findings suggest that the regulation should first regard the human component as part of the riverine ecosystem, accommodate their attached economic value and devise alternatives to crop farming on riverbanks.

7.4 The relevance of Families in addressing Environmental issues

Emmanuel Mutyaba Musoke
Uganda Martyrs University

Abstract

The family is the basic social unit; family life is an initiation of social life. It is the first school of social values and moral virtues. People's social behavior are learnt from families; if in the family they do not litter, family members will not litter in society, if they do not pollute, they will not pollute in society. However much students are taught not to litter in schools yet at home littering is the order of the day, they will litter in public places too. Besides that, the family is the original cell of both individual and social life. Since they are families which transmit life, they have the role in the first place of protecting it by campaigning against any form of environmental degradation that may endanger it. Life sustenance connotes ensuring all what is needed for life to thrive, such as proper food production and environmental protection for good health. So, the family is the first place where education for the respect of the environment should begin. It is where children learn from, that we should not waste water, electricity and gas and giving away plastic materials for recycling rather than dumping it in gardens, practicing green houses, regular servicing of vehicles so as to reduce pollution for the sake of our environment. There is a need of empowering families to play their role as primary places for learning both moral and civic duties including environmental protection. For that matter, I suggest a creation of family sensitization programs on their responsibility in environmental protection on village, regional and country levels. Educating families on environmental protection effort can greatly influence society at large on environmental protection.

7.5 The Analysis of the Decrease of Lake Victoria Water Level

Estellina Namutebi
School of Arts and Social Sciences, Uganda Martyrs University

Abstract

Water is very vital for both human beings and biodiversity in the biosphere. Without water, all beneficiaries in the ecosystem would not survive. Nevertheless, the water level of many lakes in Africa today is gradually dropping. The ultimate contributing factors are human activities like deforestation and industrialisation, which have reduced the fresh waters of Lake Victoria in particular. For instance, a large portion of the natural forest in Kalangala District was cut down and replaced by palm oil trees for the cooking oil factory. The aftermath of this deforestation is the gradually dwindling waters of Lake Victoria, which makes survival of both marine and terrestrial biodiversity difficult. How can the human population achieve a sustainable future without being mindful of their actions? Since the dawn of the 20th Century, climate conditions have dramatically changed in the globe up to this time. As mentioned above the biggest attribute to climate change is the human activities (Maergoiz1 et al. 2013). What are the major contributing factors in the reduction of Lake Victoria water level? The study conducted in Kalangala District, discovered that there are various activities around Lake Victoria, which include agriculture and industrial development. These are the main factors of carbon emissions in the atmosphere in addition to increasing population, which drives deforestation for settlement and development. Thus, humans are daily inventing new ways of exploiting the environment, which in turn retaliates and they face the consequences. This study analysed the major contributing factors in the reduction of Lake Victoria water level, and the eco-socio challenges that are now experienced in the central region Districts of Uganda.

7.6 Linking Conservation to the Implementation of Revenue Sharing Policy and Livelihoods of People Bordering Bwindi Impenetrable National Park, Uganda

Medard Twinamatsiko
Mbarara University of Science and Technology

Abstract
This article presents and interprets key parameters within Revenue Sharing policy implementation framework and links them to people's livelihood improvement and conservation. This study creates a linkage between equitable distribution of Revenue Sharing projects, people's livelihood improvement and conservation support. The article further presents the distribution of projects across various sections of people bordering with Bwindi. Data was analysed both quantitatively and qualitatively to generate frequencies and percentages in order to illustrate the differences. Not all the variables to explain benefit distribution were significant for both livelihood improvement and conservation support. Significant variables included; resource users, ethnicity, gender, proximity from park boundary and homestead distance to vehicle roads and village centres. Results further indicate that projects are not well targeted and there is no equity during implementation. Those who bear the most conservation costs are not well targeted by resource benefits. The article recommends a Revenue Sharing Equitable Framework and Community Based Monitoring approach in order to improve the policy implementation practice.

Key words: *Equity; Revenue Sharing Policy; Benefit sharing; Integrated Conservation and Development; Revenue Sharing Equitable Framework; Livelihood Improvement*

7.7 The role of rice fields in the adaptation of water birds to the drought climate shock

Sarah Nachuha Kasozi
University of Technology and Arts of Byumba

The 21st century is experiencing an overarching and emerging problem of unpredictable weather patterns as a result of climatic changes. This phenomenon is affecting everyone on earth and has heightened poverty among the already poor resulting in unprecedented degradation of natural habitats. In addition, the conversion of natural wetlands to rice fields is occurring in many countries to meet economic development goals. Rice growing is now the main activity in the flood plains of Uganda, with rice replacing cotton as a cash crop. This study gathered empirical evidence that rice fields when managed organically can provide foraging ground for waterbirds and other fauna. Data on waterbird numbers was collected from 48 wetlands (38 swamps, two rice paddies and eight lakes) using total counts. Species diversity and overall abundance, and the abundance of some waterbird feeding guilds, and migratory species varied significantly among wetland types and between seasons. Rice paddies were both more species-diverse and species-rich than lakes and swamps. These results seem to indicate that rice fields act as a refugium for waterbirds during drought. However, they do not compensate for loss of papyrus that is suitable for papyrus endemics such as the Swamp Warbler (*Acrocephalus rufenscens*). Therefore, the needs of food production for human consumption should be balanced with the conservation of endemic species.

Key words: *Climate shock, adaptation, rice paddies, waterbirds, refugium*

7.8 Decolorization of Dye Containing Solutions Using Nano Zerovalent Iron Immobilized on Functionalized Paa/Pvdf Membranes

Jean Marie Vianney Mujyambere, Karuppan Muthukuma
University of Technology and Arts of Byumba

Abstract

In this work, Fe^0 nanoparticles immobilized on the functiolized polyacrylic acid coated polyvinylidene fluoride (Fe^0/PAA/PVDF) membrane were used to decolorize three azo dyes such as Methyl red (MR), Congo red (CR) and Eriochrome black T (EBT). Polyvinylidene fluoride (PVDF) membrane's surface was modified by in situ polymerization of acrylic acid and this was followed by ion exchange with Fe^{2+} and its reduction to Fe^0 with sodium borohydride. The characterization of the surface morphology of functionalized membranes and nanoparticles was carried out using scanning electron microscopy (SEM). FTIR and GC-MS analysis were also carried out to find out the end products of the decolorization process. The results showed that 88.1%, 73.6% and 62.8% decolorization of solution (200µM) of CR, EBT and MR respectively was achieved after 120 min using 4 pieces of membrane-supported iron nanoparticles (Fe^0/PAA/PVDF) combined with ultrasound (US). The effect of various operating parameters such as pH, temperature, sonication, hydrogen peroxide dosage and iron loading on the performance of the process was investigated. The reduction in chemical oxygen demand (COD), biological oxygen demand (BOD), hardness and alkalinity were assessed. The Fe^0/PAA/PVDF membranes exhibited high reactivity in decolorizing azodyes and this can be regenerated and reused by washing it with a solution of sodium borohydride.

Key words: *Dyes, Degradation, Ultrasound, Iron nanoparticles, PVDF membrane.*

7.9 Effect of Deforestation on Soil Conservation in Byumba, Gicumbi District, Rwanda

Siraje Kaaya
University of Technology and Arts of Byumba – Rwanda (UTAB)

Abstract
The study sought to examine the effect of deforestation on soil conservation in Byumba, Gicumbi District, Rwanda. The study objectives were; to identify the causes of deforestation in Byumba, Gicumbi District, to assess the effects of deforestation on soil conservation in Byumba, Gicumbi District and to examine the methods employed to conserve soil in Byumba, Gicumbi District. The study applied explanatory research design to reflect aspects of perception, feelings, experiences, facts and emotional feelings of the study respondents in finding out the effect of deforestation on soil conservation in Byumba, Gicumbi District. The study population of the study was 80 people and it was drawn from Byumba; they included; District Environmental Officers, Officials from HIL with environment management department and selected local people who were involved in practices that caused deforestation. Purposive sampling was also used to select only respondents for the researcher to attain the purpose of the study. Data was collected from primary and secondary sources using questionnaires and interviews. The data was presented in tabular form, pie charts and bar graphs with frequencies and percentages. It was revealed according to the findings that majority of the respondents 41.3% were between the age range of 26 – 35. Next were those within the age range of 36 – 45 and these were statistically represented by 26.3%. Next were those within the age range of 18-25 and these were statistically represented by 18.8%. Least of the respondents were between the age range of above 46 years and these were statistically presented by 13.8%. This implies that middle aged adults were the majority since these were the ones mostly engage in deforestation hence affecting soil conservation in Gicumbi District. The study concludes that some farmers do not know how to use the land effectively. They may essentially strip the land of everything that it has before moving on to another plot of land. By stripping the soil of its nutrients, desertification becomes more and more of a reality for the area that is being used for farming. The study recommends that there is need to implement green business. This concerns re-use and recycling. Green methods of production and utilization of resources should immeasurably reduce deforestation. Particularly, it's the focus on re-using items, reducing the use of artificial items, and recycling more items. Paper, plastics, and wood are linked to the destruction of forests and other natural resources.

8. Session Two: Health Issues

8.1 Obstacles to the Implementation of Sexual and Reproductive Health Policy in Uganda

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Abstract

Uganda has witnessed risky sexual behaviours among adolescents. Adolescents are identified as torch bearers for the success of sustainable development goals. Investing in the health of adolescents generates a 'triple dividend', fulfilled youth potential and the healthiest possible start to life for the next generation. Some scholars argue that formulating and implementing policies can enable or disable sexual and reproductive health (SRH) outcomes. This paper interrogates the obstacles to implementation of Adolescent Sexual and Reproductive Health Policy in Uganda. Document analysis was done of the Adolescent Health Policy, plans and strategies on ASRH. Interviews were done with policy makers and key stakeholders from Kampala district. More interviews and focus group discussions were done with adolescents, parents, teachers and health workers in Mbarara district. The total sample size was 61 in-depth interviews and 10 FGDs. Content analyses were done thematically and manually using open and axial coding. Categories were formed, read and re-read to ascertain accuracy and make sense of the data, picking out the most important information answering the research question. The Adolescent Health Policy outlines a holistic approach and stresses the need for youth friendly services, training of teachers and health workers to teach sexuality education. However, there was no evidence of policy implementation in Mbarara district. Unacceptability of sexuality education, lack of finances, poor coordination between the concerned ministries, poor monitoring and regulation on what must/or not be done in schools seem to be the major constraints to implementation. Work on ASRH in Uganda is done by donors through projects, which have limited coverage and lifespan. Government has not yet put structures for sustainability. Policy implementation has not created an enabling environment for sexuality education and healthy adolescents. There is need for the government to appreciate multiplier effect of investing in adolescents.

Key words*: Policy, Implementation, Reproductive Health, Adolescents*

8.2 Investigating determinants of Sexual and Reproductive Health Behaviors among Young Adolescents in SW Uganda

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Abstract

Introduction

In most SSA countries, adolescents and young people are at risk of poor SRH outcomes, such as high rates of teenage pregnancies and HIV/STIs. Whereas exploration of factors associated with SRH risks forms the basis for SRH prevention interventions, this has mainly been among older adolescents. Little is known about SRH among young adolescents and its determinants. This study examined the association between personal, interpersonal and societal factors on the one hand and risky sexual practices among young adolescents on the other.

Methods

A cross-sectional survey of young adolescents 10-14 years of age was carried out between June and July 2016 in 33 primary schools in Mbarara district, Uganda. Ethical clearance and informed consent and assent were obtained. Trained research assistants interviewed pupils using standardized pre-tested questionnaires. Information on their social demographics, school environment, family structure, knowledge on puberty, sexual and reproductive health and sexual behaviors and attitudes was obtained. The main outcome measured was risky sexual practices defined as unprotected sex. Multivariate logistic regression analysis was done to determine associations with the outcome.

Results

A total of 1104 children were interviewed and 1096 analyzed, the median age was 12 years, IQR (11, 13) with 460 (42%) male and 636 (58%) female. Of the 83 (7.6%) sexually active adolescents, a total of 75 children were classified as having risky sexual behavior, of which 60 (80%) boys and 15 (20%) girls. In the multivariate logistic regression, the variables significantly associated with higher prevalence of risky sexual behaviors were watching pornography and school truancy whereas those associated with lower prevalence were being female, higher school connectedness score and having ever talked about sexuality with the mother.

Conclusion

Even though a small proportion (7.5%) of young adolescents were sexually active, a large proportion of these have sexual risky behavior. Targeted interventions to address influences of media, school absenteeism and promoting parental involvement and conducive school environment are recommended

Funding: VLIR-UOS Team Project Uganda

Key words: *Young adolescents, Sexuality, Uganda* **Contacts**: ekemigisha@must.ac.ug

8.3 Assessing the Relationship between Nodding Syndrome and Mycotoxin in Grains Based Foods in Northern Uganda

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Abstract

Nodding syndrome (NS) is a severely debilitating neurological syndrome, affecting children between the ages of 5 and 15 years in Africa. NS is characterized by head-nodding, seizures, developmental retardation and growth faltering. NS remains a public health problem in Uganda, the Democratic Republic of Congo, South Sudan and Tanzania where it is associated with high morbidity and mortality, severe socio-economic consequences and social exclusion. The exact causative agent and the disease burden is unknown. For any effective management and control of NS, it is very important that the causative agent of the disease is identified. Many hypotheses are being investigated like the possibility that NS is an infectious disease caused by a micro-organism or virus. Little attention has been paid to mycotoxins in relation to NS. Mycotoxins are secondary metabolites produced by toxigenic fungi that infect food crops in the field and stored food. Several mycotoxins have a neurotoxic effect when they interact with the immune system. Recent studies have demonstrated that the Fusarium mycotoxin fumonisin B1, often present in maize, interacts with neuroblastoma cells leading to mitochondrial membrane potential depolarization and calcium deregulation. More evidence show that fumonisin B1 makes neurons more vulnerable to epileptiform conditions. Epilepsy is often present in the more proliferated phases of the NS. This suggests that mycotoxins could at least accelerate disease development. We recently assessed the burden of mycotoxins in grain-based foods in Northern Uganda. We used enzyme-linked immunosorbent assay to assess the burden of Aflatoxin, Deoxynivalenol and Ochration in grain-based foods in northern Uganda in households having NS cases and no NS. We will discuss the results of these analyses in light of NS and their potential impact in providing insights into the cause of NS and control measures.

8.4 Antidiabetic Properties of an Aqueous-Methanolic Stem Bark Extract of *Spathodea campanulata* (Bignoniaceae) P. Beauv

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Abstract

Spathodea campanulata (Bignoniaceae) P. Beauv. is a common medicinal plant in the central and south-western regions of Uganda. It is popular for its use primarily in the treatment of diabetes and some other ailments. In this study the antidiabetic properties of an aqueous methanolic extract (SCE) of the stem bark were explored using experimental rat models. In normoglycemic rats, the extract reduced blood glucose levels with a significant effect ($p<0.05$) after 2 h at the 800 mg/kg dose. The standard chlorpropamide also produced significant lowering of normal blood glucose at all the time intervals studied (0.5, 1, 2, 4 h.). In the oral glucose tolerance test (OGTT), SCE reduced glucose-induced glycemia in a moderate manner. SCE 200, 400, 800 mg/kg bodyweight caused reduction in glycemia by 62, 63 and 35% respectively. SCE (200, 400 and 800 mg/kg) caused reduction in hyperglycemia by 10, 29 and 4% respectively, in the alloxan-induced hyperglycemia. The standard drug Chlorpropamide (400 mg/kg) significantly ($p<0.05$) reduced hyperglycemia by 85%. Prolonged treatment (daily dose for 17days) with SCE reduced alloxan diabetes as well; 33% by the 200 mg/kg dose, 66% by the 400 mg/kg dose and 42.9% by the 800 mg/kg dose. Both single dose and multiple dose effects were not significant ($p<0.05$). Therefore, SCE has hypoglycemic and antihyperglycemic effects in the experimental diabetic models used and at the doses applied. Further purification of the crude extract may improve on the potency. Toxicity studies are also required to standardize its safety.

Keywords: *Alloxan, antihyperglycemic, diabetes, hypoglycemic, spathodea*

8.5 Incidence of postpartum infection, outcomes and associated risk factors at Mbarara regional referral hospital in Uganda

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Abstract

Background

There is a paucity of recent prospective data on the incidence of postpartum infections and associated risk factors in sub-Saharan Africa. Retrospective studies estimate that puerperal sepsis causes approximately 10% of maternal deaths in Africa.

Methods

We prospectively enrolled 4,231 women presenting at a regional referral hospital in Uganda for delivery or postpartum care, and measured vital signs postpartum. Women developing fever (>38.0 °C) or hypothermia (<36.0 °C) underwent symptom questionnaire, structured physical exam, malaria testing, blood, and urine cultures. Demographic and treatment data were collected, and a telephone questionnaire was administered at two and six weeks postpartum to febrile/hypothermic women and a random sample of 1,708 normothermic women to get some information about outcomes post discharge. The primary outcome was in-hospital postpartum infection. Multivariable logistic regression was used to determine factors independently associated with postpartum fever/hypothermia and with confirmed infection.

Results

Of 4,231 women enrolled, the mean age was 25 years; 214 (12%) were HIV-infected, 875 (50%) delivered by cesarean and 667 (38%) were primigravidas. Overall, 4,176 (99%) had ≥1 temperature measured and 205 (5%) were febrile or hypothermic. Of these, 174 underwent full evaluation and 84 (48%) had confirmed postpartum infection, for an overall incidence of postpartum infection of 2 cases per 100 births. Postpartum endometritis was the commonest infection (76/193, 39%) followed by urinary tract infection (25/175, 14%) and blood stream infection (5/185, 3%). Cesarean delivery was independently associated with incident, in-hospital postpartum infection (aOR 3.9, 95% CI 1.5-10.3, *P*=0.006), while antenatal clinic attendance was protective (aOR 0.4, 95% CI 0.2-0.9, *P*=0.02). There was no difference in postpartum infection-related in-hospital maternal mortality between the febrile/hypothermic and normothermic groups [65 (5%) versus 22 (12%)].

Conclusions

Among rural Ugandan women, postpartum infection incidence was low overall, and cesarean delivery was independently associated with postpartum infection while antenatal clinic attendance was protective.

9. Session Three: Food Security

9.1 Indigenous Vegetables, Food Security and Sustainable Development in Post-war Northern Uganda

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Northern Uganda's Savannah Grassland vegetation and tropical climate support hundreds of plant types many of which are utilized as vegetables. Some of these indigenous vegetables are now domesticated while a good number are still wild. Ironically, northern Uganda is among the regions of the world that is highly food-insecurity prone and poverty stricken. The current research synthesizes the efforts of Acholi women in northern Uganda to utilize indigenous vegetables to enhance food security and cause sustainable development. The research relies on key informants' interviews, observations during transect walks in villages and across major market places as well as analysis of documents from Uganda Bureau of Statistics (UBOS), district officials and market leaders . The study found that Acholi women originally grew vegetables as traditional occupation against famine but today they have formed groups to increase production of these vegetables that they sell through well-organized supply chains to leading markets across Uganda. The major conclusion of this study is that indigenous vegetables are a potential source of food security, financial independence and sustainable development in northern Uganda and perhaps all over Uganda and the rest of Sub-Saharan Africa.

Key Words: *Indigenous Vegetables, Food Security, Sustainable Development, Women, Northern Uganda*

9.2 Collaborative Forest Resources Management and Economic well-being: A look at peri-urban tree planting among pastoral communities of South Western Uganda

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Abstract

The increasing loss of forest cover due to human activity like agriculture, charcoal burning, timber harvesting and urban growth is a growing concern worldwide. In Uganda, woodlands make up 81 percent of the forest area, 19 percent is tropical high forests and less than 1 percent is plantation. Evidence shows that more than 35 percent of the forest resource is now degraded. Therefore with high population growth rate devoid of concerted forest management effort may end in resource use conflicts, loss of ecological value and economic benefits. As such many countries including Uganda, management of forest resources has changed from 'command and control' system to 'participatory approach' that requires involvement of different stakeholders - from local, national and international communities. This change is expected to enable people with a direct stake in forest resources to be part of decision-making in all aspects of forest management, from managing resources to formulating and implementing institutional frameworks. In addition the change in approach focuses on balancing the forests' ecological value and economic benefits. The participatory forestry management approach is a structured partnership between governments, interested organizations, community groups, and other stakeholders to achieve sustainable forest use. The approach intends to improve the livelihoods of the forest adjacent communities through mutually enforceable plans; but the government does not surrender ownership of the forest. This study shares experiences of collaborative forest resources management [CFRM] for economic wellbeing. The study covered the peri-urban area cutting across the Southwestern cluster of the Uganda cattle corridor traversed by River Rwizi, the main source of water. Views and experiences were collected through individual interviews with a sample of 177 participants. Additionally, seven focus groups comprising 68 participants were conducted. Results show that the financial stability and security, meeting family needs, access to employment, increased business activities, saving culture, and financial freedom are integrated aspects of economic wellbeing and are linked to collaborative forest resources management in the supply chain. The results also provide that the CFRM framework has attracted service organizations to serve the local community needs, enhanced private sector growth, and the civil society has complemented government agencies in forest resources management for economic wellbeing. Furthermore, the findings indicate greater benefits are expected if evaluations and assessments of policies address conflicts related to plot allocation, tree growers and cattle keepers.

Key words: *Collaboration forest resource management; Climate Change; Conflict; Economic well-being; Peri-Urban; Southwestern Uganda; Value Chains.*

9.3 Effects of Residue Management Practices on Maize Yields and Soil Macronutrients in The Rwenzori Region: A case of Hima Town Council

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Abstract
There has been a challenge of food insecurity in Uganda resulting from nutrient mining due to continuous cultivation of crops without nutrient input. Soil fertility has also been lost to crop residue removal among smallholder farmers and this loss is one of the reasons for reduced crop yield in the country. This study was aimed at determining the impact of the different residue management practices on maize yields and soil macronutrients. It was conducted in 03 farmers' fields in Hima Town Council of Rwenzori region. In each field, three treatments that were replicated thrice were set up and these included; 1) cutting and scattering maize stovers and husks all over the garden (termed as residue incorporation), 2) burning the maize stovers and husks within the garden (residue burning) and 3) cutting and carrying away maize stovers (residue removal). Maize crop yield for each residue handling practice before and after treatment was measured. Soil samples before and after subjecting the fields to the treatments were collected and tested for macronutrient levels of N, P and K. The collected data was analyzed using T-Test and ANOVA in Minitab Statistical Package. This study concluded that the different residue handling practices increased maize yields and the increase was particularly significant under residue incorporation and burning. Levels of pH and macronutrients of nitrogen, phosphorus and potassium in the soil increased after the treatments. However, increase in pH, potassium and nitrogen levels among the crop residue handling practices was not significant. But significant increase in phosphorus was observed under crop residue incorporation compared with other treatments. It was concluded that farmers can choose between burning and incorporation for adoption since the two practices equally contributed to increase in maize yields and soil nutrient levels.

Key words: *Residue management practices, macronutrients, crop yields*

9.4 Farmer Knowledge on *Tagetes Minuta* and Its Potential Use as Alternative to Synthetic Insecticides for the Control of Maize Weevils in Rwanda

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Abstract
Maize plays a major role in the food security of Rwandans. Maize producers are challenged by storage pests particularly *Sitophilus zeamais*. Synthetic insecticides are currently the only reliable control option for storage insect pests in Rwanda. These insecticides are expensive and hazardous to humans and environment. Naturally occurring plant extracts can be used as alternative for the control of storage insect pests since they are available, relatively affordable and safe. The main objective of this study was to assess farmer's knowledge on the use of botanical pesticides with much focus on Marigold (*Tagetes minuta*) and its effectiveness for the control of maize weevils. The study was divided into two parts (1) a survey and (2) bioassays. The survey was conducted to assess availability of pesticidal plants and farmer awareness on their use as botanical pesticides with much focus on Marigold. The survey covered five districts namely: Rusizi, Muhanga, Gicumbi, Gasabo and Bugesera. At least one sector was selected in each district. Twenty farmers were randomly chosen to stand in for households in sectors selected for the survey. Respondents (farmers) were selected in such a way they represent at least three villages per cell and participation of both sexes (male and female) was ensured. The bioassays were carried out in the Animal Biology laboratory of the University of Rwanda-College of Agriculture, Animal Sciences and Veterinary Medicine, Busogo campus (with typical highland climatic conditions). The experimental layout was a Complete Randomized Design (CRD) with three replications. Samples of 100 maize grains were put in small buckets, infested with 10 weevils and treated with various doses of air-dried and grinded Marigold biomass. The treatments were as follow: Treatment 0 (untreated maize grain, set as negative control), Treatment 1 (Maize grains + 0.5g of *T. minuta*), Treatment 2 (maize grains + 1g of *T. minuta*), Treatment 3 (maize grains + 1.5 g of *T.minuta*) and Treatment 4 (maize grains + Malathion, set as positive control). The survival of weevils and the level of grain damage were assessed on an interval of two days for a period of four weeks. During the bioassay, the temperature and relative humidity in the room were recorded on a daily basis. Findings from the survey revealed that pesticidal plants (including marigold) are available in selected districts but farmer awareness on their use as botanical pesticides was low (16.4%). Results from the bioassays, showed that *Marigold* was less effective (40%) compared to Malathion (66%) for the control of maize weevils. However, similar studies conducted in Zimbabwe revealed that after 56 days Marigold was as effective as Malathion, meaning leading to 100% death of maize weevils. The application of marigold, being able to cause 40% of maize weevils under this study, provides a good step to developing alternative control product other than synthetic Insecticides. Some factors such as the relative humidity, low temperature, dose and the short period of the bioassay, may have influenced the experiment, particularly the activity of weevils and release of active compounds from Marigold. It was recommended that similar studies be conducted under different climatic conditions with increased dose and period of the bioassay in order to confirm the effectiveness of Marigold for the control of maize weevils in stored grains.
Key words: *Marigold (Tagetes minuta); Maize weevils (Sitophilus zeamais); alternative control product*