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Training

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Theme: 'Transforming Society through Research and Innovations'

ABSTRACTS

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ABSTRACTS

THEME: HEALTH & HEALTH SYSTEMS RESEARCH FOR NATIONAL DEVELOPMENT

A01: My partner wants a child: A cross-sectional study of the determinants of the desire for children among mutually disclosed sero-discordant couples receiving care in Uganda

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Abstract

Background: The percentages of couples in HIV sero-discordant relationships range from 5 to 31% in the various countries of Africa. Given the importance of procreation and the lack of assisted reproduction to avoid partner transmission, members of these couples are faced with a serious dilemma even after the challenge of disclosing their HIV status to their spouses. Identifying the determinants of the decision to have children among sero-discordant couples will help in setting reproductive intervention priorities in resource-poor countries.

Methods: We conducted a survey among 114 mutually disclosed sero-discordant couples (228 individuals) receiving HIV care at four centres in Greater Kampala, between June and December 2007. The data we collected was classified according to whether the man or the woman was HIV-positive. We carried out multivariate logistic regression modeling to determine factors (age, gender, and the influences of relatives and of health workers, ART knowledge, and disclosure) that are independently associated with a desire for children.

Results: The majority, 59%, of the participants, desired to have children. The belief that their partner wanted children was a major determinant of the desire to have children, irrespective of the HIV sero-status (adjusted odds ratio 24.0 (95% CI 9.15, 105.4)). Among couples in which the woman was HIV-positive, young age and relatives' expectations for children were significantly associated with increased fertility desire, while among couples in which the man was positive; knowledge of ART effectiveness was associated with increased fertility desire. Availability of information on contraception was associated with decreased fertility desire.

Conclusions: The gender of the positive partner affects the factors associated with a desire for children.

Interventions targeting sero-discordant couples should explore contraceptive choices, the cultural importance of children, and partner communication.

A02: Gender, HIV/AIDS Prevention and Development: The Politics of Condom Use.

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Key words: Gender and HIV/AIDS, Human Development; Practice of Preventive Health Belief Model

Abstract

Introduction:

Studies have shown that HIV/AIDS has greatly impacted on individual and national development particularly in the African region. This study aimed at assessing the interaction of gender and condom use as a tool for HIV prevention to promote individual and national development. The paper argues that although Uganda has registered a decline in HIV infection, women remain more vulnerable than men to HIV infection.

Method:

The study was based on empirical findings on the model of the Practice of Preventive Health Behavior (PPHB) developed by Kabonesa (1998) for a study conducted in 1996 in Kabarole District, Uganda. The model was developed from a number health risk related theories and models such as the Theory of Reasoned Action, the Health Belief Model and the theory of Self-Regulation to assess individual response to life threatening illnesses.

The study used a cross sectional design. A simple stratified random sampling method was used to select one county (Bugahya), and two sub-counties (Kitoba and Kyabigambire subcounties). Parishes and villages in these sub-counties formed units where every adopter and every sixth non-adopter were interviewed until a sample of 160 was attained. Because of the low condom adoption rate in the rural area, quota sampling was used to guarantee the inclusion of condom adopters in the sample, thus making the sample representative of the population.

Data were collected using a semi structured questionnaire. Key informant interviews were conducted with community and district leaders. Univariate analysis aimed at describing the sample and bivariate analysis was used to assess demographic characteristics vis-à-vis perception variables on condom use status. A model of the Practice of Preventive Health Behavior was used predict future use of condoms.

Results:

Among condom adopters 30.0% used condoms "very often," 52.0% used condoms "less often," 18.0% adopters did not use the condom in the last 12 months before the study. The majority of "adopters" had used condoms in the last year. Future condom use had a significant relationship to adoption status (Chi-square (2, N=200)=26.80, $p < .001$) where 72.0% said they were "very likely" to use condoms in the future; 16.0% said they were "somewhat likely" to use condoms in the future; and 12.0% said they were "not likely" to use condoms in the future

Although it is acknowledged that positive perceptions and attitudes regarding health issues are important in the practice of preventive health behaviors, limited agency or lack of self-efficacy to influence the behaviour of the partner and to control one's own life as well as personal characteristics have left many women vulnerable to HIV infection and in a state of economic vulnerability. In addition, assumptions about individual's ability to decide to use or not to use a condom based on perceptions of

the HIV health risk, and the general beliefs associated with sexual health risk work well with men, for women cultural norms greatly influence their response to HIV infection.

Conclusion:

Issues of vulnerability and the rights of an individual are influenced by the constructions of sexuality and gendered power relations between sexual partners. Practice of preventive health behavior heavily depend on individuals self efficacy and social factors. Strategies to address prevention and mitigation should continue to emphasize community and individual dialogues.

A03: To use or not to use a condom: A prospective cohort study comparing contraceptive practices among HIV-infected and HIV-negative youth in Uganda

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Abstract:

Unwanted pregnancy and HIV infection are issues of significant concern to young people. Limited data exists on contraceptive decision-making and practices among HIV-infected and HIV-negative young people in low resource settings with generalized HIV epidemics.

Methods: From July 2007 until April 2009, we recruited, and followed up over a one-year period, a cohort of 501 HIV-negative and 276 HIV-infected young women and men aged 15-24 years residing in Kampala and Wakiso districts. We compared contraceptive use among HIV-infected and HIV-negative young people and assessed factors associated with contraceptive decision-making and use, using multivariate logistic regression modelling to estimate odds ratios (OR) and 95% confidence intervals (CI).

Results: Contraceptive use among sexually active HIV-infected young people was 34% while it was 59% among the HIV-negative group. The condom was the most frequently used method of contraception. Only 24% of the HIV-infected used condoms consistently compared to 38% among the negative group OR 0.56 (95% CI 0.38, 0.82). HIV-infected young people were more likely to discuss safe sex behaviour with health workers OR 1.70 (95% CI 1.13, 2.57), though its effect on fertility decision-making was not significant. Throughout the year's follow-up, only 24% among the HIV-negative and 18% among the HIV-infected continued to use contraception while 12% and 28% among the HIV-negative and infected respectively did not use contraception at all. At multivariate analysis, the HIV-infected young people were less likely to maintain contraceptive use. Other factors independently associated with sustained contraceptive use were age of the respondent, marital status and being a male. Conversely, HIV-infected young people were less likely to initiate use of contraception. Being married or in a relationship was associated with higher odds of initiating contraceptive use.

Conclusion: Compared to the HIV-negative group, sexually active HIV-infected young people are less likely to use contraception and condoms. Initiating or sustaining contraceptive use was also significantly less among the HIV-infected group. Strengthening family planning services and developing new innovative ideas to re-market condom use are needed. Policy and guidelines that empower health

workers to help young people (especially the HIV infected) express their sexuality and reproduction should urgently be developed.

A04: Socio-demographic determinants of child caregivers' social capital in the Iganga-Mayuge Demographic Surveillance Site in Eastern Uganda

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Abstract

Background: The socio-demographic distribution of social capital has rarely been described and yet this can highlight potential social exclusion patterns.

Objective: To assess the socio-demographic determinants of social capital amongst child caregivers in Eastern Uganda

Data and Methods: Data from the Iganga-Mayuge Health and Demographic Surveillance Site (HDSS) in Eastern Uganda collected from 2006 to 2008 were used to estimate the variation of 4 social capital dimensions (perceptions of reciprocity, civic trust, instrumental and informational social support) by 3 different socio-demographic parameters (age, education status, wealth) separately for female and male caregivers. Statistical analysis used binary and logistic regression models.

Results: Each socio-demographic parameter had a unique association with the four dimensions of social capital. For female caregivers, living in a higher quintile household was associated with low perceptions for three social capital dimensions – trust OR 0.67, 0.46-0.97; instrumental support OR 0.74, 0.58-0.94; informational support (OR 0.57 0.43-0.75). Amongst male caregivers, living in a higher quintile household was associated with low levels of reciprocity (OR 0.64, 0.44-0.92). Being older than 30 years old – (OR 1.94, 1.01-3.72) and having attained more than primary five school level (OR 1.94, 1.18-3.19) were both associated with a higher level of informational support.

Conclusion: The study shows that there are gender-associated differences in the socio-demographic patterning of social capital. Taking account of these differences could improve effectiveness of interventions designed to modulate or work through social capital.

Key words: social capital, child caregivers, socio-demographic, Uganda

A05: In vitro sensitivities of Plasmodium falciparum to different antimalarial drugs in Uganda [Nsoby SL](#), [Kiggundu M](#), [Nanyunja S](#), [Joloba M](#), [Greenhouse B](#), [Rosenthal PJ](#). *Antimicrob Agents Chemother.* 2010 Mar; 54(3):1200-6.

Abstract.

Introduction

The control of malaria is challenged by resistance of Plasmodium falciparum to multiple drugs. New combination regimens are now advocated for the treatment of uncomplicated falciparum malaria, but the extent of resistance to newer agents is incompletely understood.

Methods

We measured the in vitro sensitivity of P. falciparum parasites cultured from children enrolled in a drug efficacy trial in Kampala, Uganda, from 2006 to 2008. Sensitivities were measured by comparing levels of histidine-rich protein-2 in parasites incubated with different concentrations of drugs with those in untreated controls. The cultured parasites exhibited a wide range of sensitivities to chloroquine (CQ); monodesethylamodiaquine (MDAQ), the major active metabolite of amodiaquine; and quinine (QN).

Results

Mean 50% inhibitory concentration (IC (50)) results were above standard cutoffs for resistance for CQ and MDAQ. Parasites were generally sensitive to dihydroartemisinin (DHA), lumefantrine (LM), and piperaquine (PQ). For CQ, MDAQ, and QN but not the other drugs, activities against individual strains were highly correlated. We also assessed known resistance-mediating polymorphisms in two putative transporters, pfcr1 and pfmdr1. When parasites that were least and most sensitive to each drug were compared, the pfmdr1 86Y mutation was significantly more common in parasites that were most resistant to CQ and MDAQ, and the pfmdr1 D1246Y mutation was significantly more common in parasites that were most resistant to MDAQ and QN.

Conclusion

In summary, we demonstrated in parasites from Kampala a range of sensitivities to older drugs; correlation of sensitivities to CQ, MDAQ, and QN; and good activity against nearly all strains for DHA, LM, and PQ.

A06: Cognitive rehabilitation in Ugandan children after severe malaria: effects on cognition, academic achievement and behaviour

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Abstract

Background: Infection with severe malaria in African children is associated with not only a high mortality but also a high risk of cognitive deficits. Recent evidence suggests that the frequency and severity of these deficits increases as the child grows implying that interventions carried out early after the illness may be more beneficial than delayed interventions. We designed a study in which children who had suffered from severe malaria three months earlier were enrolled into a cognitive rehabilitation program and assessed for short-term benefit in cognitive, academic and behavioral outcome.

Methods: Sixty-one Ugandan children with severe malaria were assessed for cognition (using the Kaufmann Assessment Battery for Children, second edition and the Test of Variables of Attention), academic achievement (Wide Range Achievement Test, third edition) and psychopathologic behaviour (Child Behaviour Checklist) three months after an episode of severe malaria. Twenty-eight were later randomized to sixteen sessions of computerized cognitive rehabilitation training lasting eight weeks and 33 to a non-treatment group. Post- intervention assessments were done a month after conclusion of the intervention. Analysis of covariance was used to detect any differences between the two groups after post-intervention assessment, adjusting for age, sex, weight for age z score, quality of the home environment, time between admission and post-intervention testing and pre-intervention score.

Key findings: Significant intervention effects were observed in learning, (mean difference in adjusted scores between intervention and control groups (standard error), 12.46 (6.05); $P = 0.04$) and working memory (-2.08 (0.01); $P = 0.04$), however the direction of the change was in favour for learning and not working memory. No effect was observed in the other cognitive outcomes or in any of the academic or behavioural measures.

Conclusions: In this pilot study, computerised cognitive rehabilitation three months after severe malaria had a short-term effect on cognitive outcomes but did not appear to affect short-term academic achievement or behaviour. Larger trials with long-term follow-up are needed to investigate the potential long-term cognitive benefits of this intervention.

Key words: cerebral malaria, cognition, behaviour, rehabilitation, child health

A07: Plasma Vitamin C in women of reproductive age in Kampala, Uganda.

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Key words: Risk factors, pre-eclampsia, vitamin C, women of reproductive age, Uganda

Abstract

Background: Pre-eclampsia is a complication which affects women in the second half of pregnancy. It is characterized by hypertension and protein loss in urine. It contributes to ill health in the mother and her unborn baby and may lead to their death. Its cause is unknown but oxidative stress in which there is consumption of antioxidants like vitamin C in the body play a role.

Objective: To assay plasma vitamin C in women of reproductive age in Kampala, Uganda.

Methods: This was a cross-sectional comparative study conducted at Mulago Hospital from 1st May 2008 to 1st May 2009. Two hundred and fifteen women with pre-eclampsia were compared to 400 pregnant women with normal blood pressure in the second half of pregnancy and 200 hundred non pregnant women. Plasma vitamin C was assayed in the women using the acid phosphotungstate method. ANOVA was used to find the differences in the means of plasma vitamin C.

Results: The mean plasma vitamin C levels were $1.72(\text{SD } 0.68) \times 10^3 \mu\text{g/L}$ in women with pre-eclampsia, $1.89(\text{SD } 0.73) \times 10^3 \mu\text{g/L}$ in pregnant women with normal blood pressure and $2.64(\text{SD } 0.97)$ in non pregnant women. Plasma vitamin C was lowest in women with pre-eclampsia followed by pregnant women with normal blood pressure ($P=0.005$) and non pregnant women ($P<0.001$).

Conclusion: The acid phosphotungstate method for vitamin C assay was easy to use in our setting. It can be adopted for vitamin C assay in Mulago hospital.

Health workers need to advise women of reproductive age on diet especially on foods which are rich in vitamin C. This may improve their vitamin C status and hence pre-eclampsia and the maternal and fetal ill health associated with this condition.

A08: Occupational Stress, Job Satisfaction, and Job Performance Among Hospital Nurses in Kampala, Uganda

Authors:

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Abstract

Introduction

Occupational stress, a common occurrence among various professions worldwide, is regarded as a major occupational health problem for healthcare professionals especially nurses. Occupational stress has been reported to affect job satisfaction and job performance among nurses, thus compromising nursing care and placing patients' lives at risk. Stress is a complex phenomenon resulting from the interaction between individuals and the environment. Therefore, significant differences in occupational stress, job satisfaction and job performance among nurses may exist due to different work settings.

The aims of the study were to: 1) examine the relationships between occupational stress, job satisfaction and job performance among hospital nurses in Kampala City, Uganda; 2) establish whether personal background characteristics affect the relationships between occupational stress, job satisfaction and job performance; and 3) examine whether there is a difference in levels of occupational stress, job satisfaction and job performance by type of hospital.

Methods

A non-experimental co relational design was used in the study. A total of 333 nurses from four hospitals completed the Nurse Stress Index, the Job Satisfaction Survey, and the Six-Dimensional Scale of Nurse Performance scales.

Key Findings

There were significant differences in levels of occupational stress, job satisfaction and job performance between the public and private not-for-profit hospitals. Occupational stress was significantly and negatively correlated to job satisfaction and performance. Nursing experience and number of children had a statistically significant relationship with occupational stress, job satisfaction and job performance. Job satisfaction was shown to mediate the relationship between occupational stress and job performance.

Conclusions and recommendations

Nurses in public hospitals have low job satisfaction and performance than those in private not-for profit hospitals. Large scale studies to identify sources of occupational stress, factors that enhance job satisfaction and performance among hospital nurses are recommended.

Key words: occupational stress, job satisfaction, job performance, hospital nurses, Uganda

A09: The mechanism of Sulfonamide Resistance in *Streptococcus mutans*

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Introduction

Cotrimoxazole (trimethoprim and sulfamethoxazole) is a combination regimen that inhibits dihydrofolate reductase(DHFR) and dihydropteroate synthase (DHPS) in bacteria. Interest in antibiotic resistance among commensals like *Streptococcus mutans* is due to their potential to transfer resistance determinants to pathogenic bacteria hence making the management of infectious agents more difficult.

Objective

To determine if point mutations in the DHPS gene of *Streptococcus mutans* is responsible for sulfonamide resistance

Methods

Isolates of bacteria were obtained from oral specimens of HIV/AIDS patients taking cotrimoxazole as prophylaxis in Kampala, Uganda. DNA was extracted from isolate 797 of *Streptococcus mutans* that was found to be resistant to 100 uM of sulfonamide and to have 4 point mutations at positions 46, 80,122, and 146 of DHPS when compared to strain NM2025, whose genome is fully sequenced. The gene encoding DHPS was cloned in a plasmid vector and the point mutations were removed using mutagenesis by polymerase chain reaction followed by digestion with Dpn 1 enzyme to remove unchanged DNA and

transformation into DHPS knock out *E. coli* cells (C600 Δ folP). Plasmids were prepared from transformant colonies and sequenced to confirm the mutagenesis. Using cultures on media containing varying levels of sulphonamide (10 to 100 μ M), we assessed the growth of knockout *E. coli* cells harbouring plasmids with differing number of DHPS mutations.

Key findings

On the plates with higher concentrations of sulfonamide, only transformants with the original four point mutations grew. Removing one, two, three and all four mutations successively led to diminished growth. Higher number of point mutations thus yielded more resistance than lower number of mutations. Still, the cloned plasmids conferred lower resistance to knockout *E. coli* cells than what was observed for isolate 797.

Conclusion

Point mutations are one of the explanations for the mechanism of sulfonamide resistance in *Streptococcus mutans*. However, since cloned DHPS gene did not confer full resistance to DHPS-knockout cells compared to the original isolate 797, our studies could not rule out other explanations for resistance.

Key words

Streptococcus mutans, DHPS gene, point mutation, sulphonamide, Cotrimoxazole.

A10: Multiple micronutrient supplementation does not influence diarrhoea morbidity in Ugandan HIV infected children: a randomised controlled trial

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Abstract

Background

HIV infected children living in low-income countries have an increased risk of diarrhoea compared to uninfected children. The benefits of single micronutrient interventions with zinc and vitamin A are well known. However, few studies have reported the role of multiple micronutrient supplementation on diarrhoea morbidity in HIV infected children. In a randomised trial, we examined the effect of multiple micronutrient supplementation on incidence of diarrhoea in Ugandan HIV infected children aged 1-5 years.

Methods

We enrolled 847 HIV infected children in a trial of a supplement containing 14 micronutrients (MMS) given in twice the recommended dietary allowance (RDA) versus a 6 multivitamin (MV) supplement given in one RDA as the 'standard of care'. The participants were stratified into the highly active antiretroviral therapy (HAART) and the non-HAART group. The supplements were given daily for 6 months. Participants were evaluated for presence of diarrhoea on the routine monthly visits and during the sick visits. The main outcome was incidence of diarrhoea and rate ratios were used to compare person-time rates in the two groups.

Results

The incidence of diarrhoea was 11.0 (9.0 – 12.0) in the MMS and 11.0 (9.0 – 12.0) per 100 person months in the MV group with a rate ratio of 9.0 (8.0 – 12.0). In the non-HAART stratum the incidence was 11.0 (95% CI; 9.0 – 13.0) in MMS and similar to that in the MV group [11.0 (95% CI, 10.0 – 13.0)]. The rate ratio was 10.0 (95% CI; 8.0 – 12.0). Diarrhoea incidence was lower in the HAART stratum, 3.4 (95% CI; 1.5 – 6.8) in the MMS versus 4.0 (95% CI; 1.8 – 7.7 in the MV group; but not different in the two intervention arms. The rate ratio was 1.2 (95% CI; 0.4 – 3.0). The prevalence of diarrhoea at 6 months was lower than at baseline but not different in the two groups. The number of hospitalisations due to diarrhoea was also similar. Diarrhoea was associated with age but not any of the other baseline characteristics.

Conclusion

Supplementation with a 14 multiple micronutrient supplement did not reduce the incidence of diarrhoea in both HAART naïve and HAART treated HIV infected children aged 1-5 years compared to a 6 multivitamin supplement as the 'standard of care'. Only age predicted diarrhoea but not any of the participants' characteristics.

Trial registration: NCT00122941 (<http://clinicaltrials.gov>)

A11: A Stochastic model to optimize hospital bed capacity under Markovian demand

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Abstract

Hospitals continually face the challenge of planning and managing bed capacities within an environment of demand uncertainty. In this paper, an optimization method for allocating hospital bed capacities is proposed. The model, based on Markov decision process approach, matches demand to bed availability levels of a health care system. Adopting such an approach, the states of a Markov chain represent possible states of demand for bed occupancy. The decision of whether or not to admit additional patients is made using dynamic programming. This approach demonstrates the existence of an optimal state and

policy dependent capacity level, and produces an optimal admission policy for patients as well as the corresponding total capacity costs.

Keywords Stochastic model, hospital, bed capacity, Markovian demand

A12: Genetic Diversity of *Plasmodium falciparum* in mild and severe malaria of children, from Kampala Uganda.

Background

The genetic diversity of *Plasmodium falciparum* has been extensively studied in various parts of the world. However, limited data are available from Uganda. Several factors, including host, and parasite genetic characteristics, are thought to contribute, to the clinical outcome of malaria. This study aimed to establish whether the severity of Plasmodium falciparum attack in endemic areas is associated with the multiplicity of infection (MOI) and/or with a particular genotype(s). The analysis of plasmodium falciparum genetic diversity in children with symptomatic malaria may help decipher the effect of MOI on parasite virulence.

Methods

A cross-sectional study was conducted in malaria mesoendemic districts in central Uganda to ascertain the distribution of *Plasmodium falciparum* genotypes in patients with mild ($n = 122$) and severe ($n = 109$) malaria. PCR and nested PCR were used to determine the glutamate-rich protein (GLURP), merozoite surface proteins 1 and 2 (MSP1 and MSP2) and circumsporozoite (CSP) as polymorphic markers for characterization of the parasite genotypes.

Results

The multiplicity of infection based on highest number of bands detected, whatever the genetic locus, was significantly higher in severe cases than in mild cases (mean numbers of 3.91 and 3.06, respectively, $P < 0.01$). The MOI ranged from one to eight in severe malaria compared to one to seven in mild malaria cases. No particular genotype or allelic family was associated with severity of the malaria episodes.

Conclusions

Severity of malaria was associated with higher MOI in our study but not linked to the preponderance of some particular genotypes. In comparison to findings from other studies, the distribution of *P.falciparum* genotypes between different clinical categories differs geographically. This suggests a probable impact of MOI on parasite virulence. Further explorations on the role of immunity and genetic factors of the host need to be undertaken to unravel parasite virulence mechanisms.

Key words *Plasmodium falciparum*, severe malaria, mild malaria, multiplicity of infection.

Authors: Kiwuwa Stephen Mpungu, Kironde Fred, Mats Wahlgren, Nicholas Joanin, Ulf Ribacke, Kirsten Moll.

A13: Assessment of the burden of PTB in HIV infected Smear Negative TB patients using liquid culture in a Public facility HIV clinic.

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Background

TB is common in HIV infected patients. Diagnosis mainly depends on direct detection of the *Mycobacteria tuberculosis* bacilli, using light microscopy. However, this method has low sensitivity and many patients are usually found smear negative despite having active disease.

Objectives

We set out to determine the proportion of HIV infected TB suspects without disease on smear microscopy but with disease on liquid culture (MGIT 960).

Methods

We evaluated 68 patients, presenting at an adult HIV clinic for PTB using a standard Ministry of Health symptom questionnaire. Patients with the following symptoms 1) cough for 2 or more weeks, 2) cough with blood stained sputum, 3) persistent fevers for 3 weeks or more, 4) noticeable weight loss (more than 3 kg) in the last One month, 5) night sweats for 3 weeks or more, were investigated for PTB using light microscopy after ZN staining. Patients found positive on microscopy were immediately started on TB treatment. Those found negative were further investigated using liquid culture (MGIT 960). Tests were interpreted negative on culture after 42 days.

Results

Growth was detected in 9 out of the 68 patients (13%). Of the 9, five (5) were determined to be MTB using capilia while 4 were determined to be none MTB (NMTB).

Conclusion

In this study, we determined that 7.4% of the HIV patients without disease using smear microscopy had *MTB* in their sputum on culture, while 5.8% had *NMTB*. A full study with a larger patient population is recommended to investigate these findings further.

A14: African 2, a Clonal Complex of *Mycobacterium bovis* Epidemiologically Important in East Africa

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Background

Bovine tuberculosis (TB), caused by *Mycobacterium bovis* (one of seven species constituting the *Mycobacterium tuberculosis* complex), is mainly a disease of cattle, but it is also a zoonosis infecting humans. There is little or no exchange of chromosomal DNA between cells from the *M. tuberculosis* complex, making this group of bacteria highly clonal, such that any mutation present in an ancestral strain will be present in all its descendants and can be used to identify clonal complexes.

Materials and Methods

Spoligotyping, VNTR typing, deletion typing of the RD4 region, IS6110 Restriction Fragment Length Polymorphism typing and *M. tuberculosis*-*M. bovis* composite amplicon microarray analyses were used to interrogate a panel of *M. bovis* isolates from Africa and Europe. Nine strains were collected at an abattoir in Kampala from cattle originating from seven districts in Uganda; 10 strains were collected from three sites in or close to the capital Bujumbura in Burundi; fourteen strains were collected from cattle at a Morogoro slaughterhouse in Tanzania and 120 strains collected from six abattoirs in Ethiopia. Additional population samples of *M. bovis* isolated from cattle from South Africa ($n=22$), Chad ($n=5$), Mali ($n=20$) (42), Cameroon ($n=3$), Nigeria ($n=5$), Mozambique ($n=14$), Algeria ($n=17$) (51), Italy ($n=93$), and Spain ($n=20$) were also analyzed.

Results

Presence of deletion RDAf2 (14.1 kb between Mb0599 and Mb0610), absence of spacers 3 to 7 with signature of 11000001011111101111111111111111111100000 (SB0133) on spoligotyping and 4 or more copies of the insertion sequence IS6110 were characteristic of strains from Uganda, Ethiopia, Tanzania and Burundi. This was in contrast to results of analysis on strains from Algeria, Mali, Chad, Nigeria, Cameroon, South Africa, Mozambique and outside Africa which were intact at the RDAf2 locus and had 1 or few copies of IS6110.

Conclusion

We have identified a clonal complex of *Mycobacterium bovis* isolated at high frequency from cattle in Uganda, Burundi, Tanzania, and Ethiopia. We have named this related group of strains the African 2 (Af2) clonal complex of *M. bovis* and conclude that the Af2 clonal complex is localized to cattle in East Africa.

A15: Direct susceptibility testing for MDR-TB: Comparison of four rapid tests at the National TB Reference Laboratory Kampala, Uganda.

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Background:

Multi drug resistant tuberculosis (MDR-TB) - defined as resistance to at least isoniazid and rifampicin is estimated to occur in 12% of previously treated TB patients in Uganda. Early detection through laboratory testing is one of the key requirements for effective management and control of MDR-TB. Conventional indirect testing with the Lowenstein-Jensen proportion method (LJPM) takes too long (2-3 months). In this study, four direct tests - the Nitrate Reductase Assay (NRA), Microscopic Observation Drug Susceptibility (MODS), Mycobacterium Growth Indicator Tube (MGIT 960: Becton Dickinson, Sparks, Maryland) and Genotype[®] MTBDR^{plus} (Hain Life Sciences, Nehren, Germany) were compared

for rapid detection of MDR-TB. Interpretable results, time to results, sensitivity and specificity, and cost were compared against the indirect Lowenstein-Jensen proportion method (LJPM) as reference.

Methodology:

Smear positive sputum was collected from 245 consecutive re-treatment TB patients at the TB clinic of Mulago National Referral Hospital Kampala. Samples were processed at the national tuberculosis reference laboratory (NTRL), and sediments tested for susceptibility to rifampicin (Rif) and isoniazid (INH) with the four tests and the reference test.

Results

Based on the Genotype[®] MTBDR*plus* assay, 229(93%) specimens were confirmed to contain *M. tuberculosis* complex DNA and these were analyzed further. Interpretable results were 217 (95%) with either the NRA or MODS, and 204(89%) with the MGIT960. Sensitivity, specificity and *kappa* agreement for detection of rifampicin resistance were: NRA - 98%, 98% and 0.93; Genotype[®] MTBDR*plus* - 97%, 98% and 0.93; MODS - 88%, 93% and 0.77; and MGIT 960 - 73%, 99% and 0.80, respectively. For isoniazid, the corresponding values were NRA - 93%, 96% and 0.88; Genotype[®] MTBDR*plus* - 77%, 98% and 0.81; MODS - 90%, 93% and 0.80; MGIT 960 - 90%, 97% and 0.88, respectively. For MDR-TB, the values were 97%, 98% and 0.93 with NRA; 84%, 98%, and 0.86 with Genotype[®] MTBDR*plus*; 87%, 95% and 0.78 with MODS; and 73%, 99% and 0.80 with MGIT 960, respectively. The median time from sample receipt to results was 2, 7, 8, 10, and 64 days with the Genotype[®] MTBDR*plus*, MODS, MGIT 960, NRA and the indirect LJPM method, respectively. The cost of laboratory supplies per sample was around 5 USD for the culture-based assays and was lowest with the direct NRA at \$3.58.

Conclusion

With the direct NRA, Genotype[®] MTBDR*plus* and MODS, interpretable susceptibility results were obtained in > 93% of MTB-containing samples almost eight weeks earlier than with the conventional LJPM. In the study settings, the direct NRA was highly sensitive and specific for detection of MDR-TB. The commercially available Genotype[®] MTBDR*plus* was highly accurate for rifampicin resistance - a marker of MDR-TB in 90-95% of cases. We consider the direct NRA and Genotype[®] MTBDR*plus* tests to have strong potential for the timely detection of MDR-TB in resource-limited settings.

Significance

The WHO has recommended the use of non-commercial susceptibility tests such as the NRA, and line probe assays such as the Genotype[®] MTBDR*plus* for MDR-TB in RLSs. Data on direct NRA was however scanty. Our study presents up-to-date evidence on the performance of these assays in a typical resource-limited setting (RLSs). TB programs in RLSs can utilize this data to select the most optimal MDR-TB test for the settings.

A16: Cognitive dysfunction among HIV positive and HIV negative patients with psychosis in Uganda.

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Key words: Cognition; psychosis; HIV positive; AIDS;

Background

Cognitive impairment is an established phenomenon in HIV infected individuals and patients that have psychosis. However there is need to establish the severity of the impairment if patients are co morbid with both conditions.

Methods

To compare cognitive function among HIV positive individuals and HIV negative individuals with psychosis, we recruited patients with psychosis at two national referral hospitals. A standardized demographics questionnaire, psychiatric, physical, and laboratory assessments were conducted after admission to the hospital. Types of psychosis were diagnosed using the Mini International Neuropsychiatric Inventory while cognitive functioning was determined using the Mini mental state examination and a neuropsychological battery. Patient and clinical characteristics were compared between HIV positive and the HIV negative individuals using bivariate and multivariable logistic regression analysis.

Follow-up assessments on cognitive function and severity of psychiatric illness were performed at 3 and 6 months.

Key findings

There were 156 HIV positive and 322 HIV negative participants. The mean age was 33.2 years for the HIV positive group and 29.6, years for the HIV negative group ($p < 0.001$). In comparison to the HIV negative group the HIV positive individuals were almost three times (OR = 2.62 CI 95% 1.69 - 4.06) more likely to be cognitively impaired on the MMSE as well as the following domains compared to the HIV negative group:- verbal memory (OR 1.79, 95% CI 1.09-2.92), verbal fluency (OR 3.42, 95% CI 2.24-5.24), colour trails 1 (OR 2.03, 95% CI 1.29-3.02 & Colour trail 2 (OR 3.50 95% 2.00-6.10) all $p = 0.005$. There was improvement in cognitive function however the impairment remained higher for the HIV positive group ($p < 0.001$).

Conclusion

Cognitive impairment in psychosis was worsened by HIV infection. Strategies to minimize the effect of this impairment should be structured into the care of individuals with HIV and psychosis.

A17: Effect of food on the steady-state pharmacokinetics of a fixed-dose combination tablet containing tenofovir, emtricitabine and efavirenz in HIV-positive Ugandan patients

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Introduction

A proprietary fixed-dose combination (FDC) tablet containing tenofovir disoproxil fumarate (TDF), emtricitabine (FTC) plus efavirenz (EFV) was introduced in 2006. Food intake was shown to influence the pharmacokinetics of single-drug formulations of TDF and EFV without affecting FTC exposure; however, the food effect has not been investigated using the new FDC formulation.

Methods

An open-label, two-phase, crossover study was conducted in 15 Ugandan HIV-1 infected patients receiving TDF/FTC/EFV (Atripla®) one tablet daily for >1 month. Blood sampling was performed on Day1 in the fasted state and repeated seven days later (Day8) when TDF/FTC/EFV was administered with a local meal (650 kcal, 19g fat content). On each occasion, venous samples were collected pre-dose and 0.5,1,2,3,4,6,8,12 and 24 hours post-TDF/FTC/EFV dosing. Plasma concentrations of tenofovir (TFV), FTC and EFV were determined by validated LC-MS/MS assays. Pharmacokinetic parameters (AUC_{0-24} , C_{24} , C_{max}) were calculated by non-compartmental methods (WinNonlin). Geometric means (GM), GM ratios (GMR) with Day1 data as reference, and 90% confidence intervals (CI) were calculated.

Results

Fifteen participants (4 female) completed the study. Median (interquartile range) age and weight were 43 (40–50) years and 74 (61–80) kg, respectively.

On Day1, for TFV, FTC and EFV AUC_{0-24} (GM, 90% CI) were 1316 ng.h/mL, 7029 ng.h/mL and 46299 ng.h/mL, respectively. On Day8, corresponding values were 1568 ng.h/mL, 6115 ng.h/mL and 52194 ng.h/mL, respectively. Five patients on Day1 and four patients on Day8 had EFV C_{24} concentrations below 1000 ng/mL.

For EFV, C_{max} , AUC_{0-24} , and C_{24} , (GMRs,90% CIs) were 1.47 (1.24–1.75), 1.13 (1.03–1.23) and 1.01 (0.91–1.11) respectively. Corresponding values for TFV and FTC were 1.04 (0.84 – 1.27), 1.19 (1.10–1.29), 0.99 (0.82–1.19); and 0.83 (0.76–0.92), 0.87 (0.78 – 0.97) and 0.91 (0.73–1.14).

Conclusions

Efavirenz peak concentration was significantly increased with a local Ugandan (moderate fat) meal while the effect of food on TDF and FTC pharmacokinetics was consistent with data previously reported with a light meal. For patients experiencing EFV concentration-dependent toxicity (e.g. central nervous system side effects), this FDC formulation should be taken without food.

A18: Is Self-reported adherence adequate as a measure for assessment of Sulphadoxine Pyrimethamine use in Intermittent Presumptive Treatment (IPTp) during pregnancy. A case of Mulago National Referral Hospital, Uganda

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Introduction

Malaria in pregnancy is a major health problem. It is responsible for maternal anaemia, stillbirths, spontaneous abortion, low child birth-weight and intra-uterine growth retardation. The WHO recommends use of *Sulphadoxine-Pyrimethamine* (SP) in endemic areas as intermittent preventive treatment for malaria control (IPTp) in pregnancy. To assess usage, the WHO Roll Back Malaria recommends self reported information for estimation of IPTp coverage in the population. However, previous studies have questioned the validity of self reported data in policy design and decision making. Here, we have estimated the levels of SP derivatives in blood of mothers at delivery and compared the results to the reported use of IPT in order to assess the accuracy of self reporting.

Methods

In a cross sectional study, we recruited 333 mothers at delivery after informed written consent was obtained. Data on demographic characteristics, thick blood smears prepared microscopy, the remaining blood was separated by centrifuge and the plasma kept at -70 degrees till it was tested by High Performance Liquid Chromatography . With sulphadoxine blood levels as a proxy for presence of SP, we compared self reported use of IPTp with results of blood sulphadoxine assay.

Results and conclusion

About fifty nine percent (58.9%) of the recruited participants reported using IPTp. Notably, those who reported taking IPTp tended to be older and more educated. We found that majority of the participants where the drug was detected in blood also reported using IPTp use. Nevertheless, considerable discordance was found between self report results and findings of blood sulphadoxine, thus putting into further question the accuracy and use of self reported drug-use information. We think that, still, because drug estimation in blood is expensive and impractical in population based studies, further research and developments in the self-reporting tools may be worthy of further studies towards improving the reliability of self reported use of IPTp in pregnancy.

A19: Urinary tract infections in pregnancy: Causative organisms and their susceptibility pattern in Mulago Hospital.

Authors:

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- 1. Makerere University**
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Abstract:

Introduction:

Urinary tract infections are the commonest infections in women and they are even commoner during pregnancy. Urinary tract infection in pregnancy is associated with preterm labour, premature rupture of membranes, and pre-eclampsia. It is therefore essential to accurately diagnose and treat these infections appropriately and timely for better pregnancy outcomes

The causative organisms of urinary tract infections vary from region to region but Enterobacteriaceae are by far the commonest offending organisms.

There are increasing reports from both developed and developing countries of resistance of various uropathogens to conventional antibiotics like cotrimoxazole, ampicillin/amoxicillin and to some extent cephalosporins.

In Uganda, the national standard treatment guidelines recommend cotrimoxazole and amoxicillin as first and second line respectively in the management of urinary tract infections

Methods:

A cross sectional study was conducted among pregnant women who present to the antenatal clinic with symptoms of urinary tract infections; these included increased frequency of micturition, dysuria, and lower abdominal pain.

Mid stream urine was collected from 1207 women and cultured on MacConkey agar, CLED agar and blood agar. Significant growth was taken to be 10^4 colony forming units per milliliter of urine; this was found among 124 specimens (10.2%). Isolated organisms were screened using biochemical assays and confirmation was done using appropriate API (Analytical Profile Index). Susceptibility testing was done using the disk diffusion method on Muller Hinton agar against cotrimoxazole, ampicillin, nitrofurantoin, augmentin, ciprofloxacin, and cefuroxime.

Results:

Causative organisms:

E.coli isolates (55) contributed 45% of organisms that caused urinary tract infections in pregnancy, Staphylococcal isolates were (34) 27% of offending organisms. Other isolates identified included K. pneumoniae (4%), R. ornithinolytica (4%), E.feacalis (4%), K.oxytoca (2.7%), Serratia (1%), Kluyvera spp (4%), Streptococcus haemolyticus (1%) and Enterobacter spp (7.3%).

Antibiotic susceptibility of isolates:

E.coli isolates were significantly resistant to Cotrimoxazole (79%), Ampicillin (70%), Augmentin (35%), nitrofurantoin (52%); while susceptible to Cefuroxime (82%) 18% were resistant and Ciprofloxacin (82%) while 18% were resistant Staphylococcal isolates (these included S.aureus and S.saprophyticus) were resistant to Cotrimoxazole (90%), Ampicillin (40%), Augmentin (30%) while 80% were susceptible to both Cefuroxime and Ciprofloxacin.

Conclusion:

The locally recommended antibiotics in the management of urinary tract infections that is Cotrimoxazole and Amoxicillin are no longer effective against majority of causative organisms.

A20: Immunomodulatory activity of the aqueous extracts of *Auricularia* sp and *Pleurotus* sp mushrooms in experimental animals.

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Abstract

Introduction

Wild edible saprophytic mushrooms are believed to have various nutritive and medicinal properties that include anticancer, antibiotic, antiviral activities, immunity and blood lipid lowering effects. However, little is known of the variety of wild edible mushrooms of Uganda (e.g. *Auricularia* sp and *Pleurotus* sp) that are widely consumed and also claimed to be of medical uses among local communities. However, to date, the immunomodulatory potential of these mushrooms had not been preclinically investigated and characterized despite claims of their immune boosting properties.

Methods

We investigated the toxicity (LD50) level and immunomodulatory potential of the aqueous extracts of *Auricularia* sp and *Pleurotus* sp with a possibility of being used to reverse the symptoms of drug induced immunosuppression in humans. This was achieved through a preclinical study in which Swiss albino mice and Wistar albino rats were used to determine the toxicity level and immunomodulatory activity respectively. The toxicity (LD50) level was investigated using six (6) increasing doses of the aqueous extracts for both *Pleurotus* sp and *Auricularia* sp were orally administered to mice in six different groups. The percentage death in each group was used to estimate the toxicity level of extracts (LD50) using the probit analysis method. In investigating the immunomodulatory potential, the immune system of 50 Wistar albino rats (divided in five groups of 10 each) was compromised using cyclophosphamide drug (10mg/kg). Group 1 received only distilled water, while Group 2 received 600mg/kg of *Auricularia* sp extract, Group 3 1200mg/kg of *Auricularia* sp extract, Group 4 800mg/kg *Pleurotus* sp extract, and Group 5 1600mg/kg *Pleurotus* sp extract.

Results

Treatments were continued over a period of 28 days and blood samples obtained on days 0, 14, 28 to determine WBC counts. In experiment 3, thirty six (36) rats were randomized into four groups and treated for 14 days using distilled water, 600mg/kg *Auricularia* extract, 1200mg/kg *Auricularia* extract, 800mg/kg *Pleurotus* extract or 1600mg/kg *Pleurotus* extract respectively. On day 14 the rats were injected with 0.5×10^9 SRBC/rat (i.p). The treatments were continued for another 14 days and then rats challenged with 0.025×10^9 SRBC (s.c). The Paw sizes for the rats were measured using a vanier calliper at 0, 4, 8, and 24 hrs after the challenge. Data were analysed using a One way Analysis of Variance (ANOVA) followed by a Student-Neumann-Keuls t-test. Mushroom extract were found to be non-toxic according to WHO classification with LD50 levels of 10,223mg/kg for *Auricularia* extract and 16,345mg/kg for *Pleurotus* extract. Rats treated aqueous mushroom extracts had significantly ($P < 0.05$) lower reduction in WBC on days 14 and 28 compared to distilled water treated rats.

Conclusion

Generally *Auricularia* sp. aqueous extracts were more potent than *Pleurotus* sp. extract ($P < 0.05$) in stimulating WBC production in cyclophosphamide immune-suppressed rats. Percentage change in paw edema was significantly higher in extract treated groups ($P < 0.001$ for *Auricularia* sp and $P = 0.003$ for *Pleurotus* sp) than in control groups. No mortality of rats was observed throughout the experimental period. In conclusion, the aqueous extracts of *Auricularia* sp and *Pleurotus* sp have very low levels of

toxicity in experimental animals suggesting possible safety for human consumption. The mushroom aqueous extracts showed significant immunomodulatory potential through stimulation cell mediated immune response, and WBC and Lymphocytes production in cyclophosphamide immune-suppressed rats.

Acknowledgement: The research was supported by a Research Grant from the NORAD under Phase II of continued Government of Norway support to Makerere University Institutional Development Programme. This research was part of a major project titled: *Developing strategies to sustainably utilise indigenous edible Auricularia and Pleurotus mushrooms for food security and household incomes around Uganda's forest reserves.*

A21: Perinatal mortality in Eastern Uganda: a community based prospective cohort study

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Abstract

Background: To achieve a child mortality reduction according to the millennium development goal 4, it is necessary to considerably reduce neonatal mortality. We report stillbirth and early neonatal mortality risks as well as determinants of perinatal mortality in eastern Uganda.

Methods: A community-based prospective cohort study was conducted between 2006 and 2008. A total of 835 pregnant women were followed up for pregnancy outcome and survival of their children until 7 days after delivery. Mother's residence, age, parity, bed net use and whether delivery took place at home were included in multivariable regression analyses to identify risk factors for perinatal death.

Results: The stillbirth risk was 19 per 1,000 pregnancies and the early neonatal death risk 22 per 1,000 live births. Overall, the perinatal mortality risk was 41 [95%CI: 27, 54] per 1,000 pregnancies. Of the deaths, 47% followed complicated deliveries and 24% preterm births. Perinatal mortality was 63/1,000 pregnancies among teenage mothers, 76/1,000 pregnancies among nulliparous women and 61/1,000 pregnancies among women who delivered at home who, after controlling for potential confounders, had a 3.7 (95%CI: 1.8, 7.4) times higher perinatal mortality than women who gave birth in a health facility. This association was considerably stronger among nulliparous women [RR 8.0 (95%CI: 2.9, 21.6)] than among women with a previous live birth [RR 1.8 (95%CI: 0.7, 4.5)]. All perinatal deaths occurred among women who did not sleep under a mosquito net. Women living in urban slums had a higher risk of losing their babies than those in rural areas [RR: 2.7 (95%CI: 1.4, 5.3)].

Conclusion: Our findings strengthen arguments for ensuring that pregnant women have access to and use adequate delivery facilities and bed nets.

A22: Prevalence of malaria parasitaemia among infants in Uganda and its association with breastfeeding peer counselling and vitamin A supplementation

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Abstract

Background: Malaria is the second highest contributor to the disease burden in Africa and there is a need to identify low cost prevention strategies. The objectives of this paper were to estimate the prevalence of malaria parasitaemia among infants and to assess the effect of peer counselling for exclusive breastfeeding, vitamin A supplementation and anthropometric status on malaria parasitaemia.

Methods: A cluster randomized intervention trial was conducted between 2006 and 2008. Twenty four clusters, each comprising one to two villages, in Eastern Uganda were randomised to the intervention, receiving peer counselling for exclusive breastfeeding or to control, receiving standard care. Pregnant women were recruited in these villages and followed up. In the intervention clusters, five home based peer counselling visits were scheduled, one in the third trimester and four postpartum. Blood was drawn for malaria parasitaemia from 483 infants between 3 and 12 months.

Results: The prevalence of malaria parasitaemia was 11% in the intervention areas and 10% in the control areas. Children in intervention areas were as likely as children in control areas to have malaria (RR 1.7; 95% CI: 0.9, 3.0). After controlling for potential confounders, infants not supplemented with Vitamin A had a higher risk for malaria than those who had been supplemented (RR 6.1; 95% CI: 2.1, 17.7). Among children supplemented with vitamin A, every unit increase in length-for-age Z (LAZ) scores was associated with a reduced risk in malaria (RR 0.5; 95% CI: 0.4, 0.6). There was no association between LAZ scores and malaria among children that had not been supplemented.

Conclusion: There was no association between peer counseling for exclusive breastfeeding and malaria parasitaemia. Children that had not received Vitamin A supplementation had a higher risk of malaria compared to children that had been supplemented.

Trial registration: Clinicaltrials.gov: NCT00397150

A23: HIV/AIDS patients display lower efavirenz relative bioavailability compared to healthy volunteers.

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Background: Pharmacokinetic studies including those on antiretroviral (ARV) drugs are often conducted in adult healthy volunteers and results extrapolated to HIV/AIDS patients. HIV/AIDS however is known to cause morphological and physiological changes that may alter pharmacokinetics ARVs. We examined the effect of HIV/AIDS on efavirenz pharmacokinetics among Ugandans.

Methods: Blood samples were collected and analyzed at 8 time points up to 72 hr and at 9 time points up to 24 hr for healthy volunteers (n=32) and patients (n=29) respectively. Population pharmacokinetic models were fitted to the data using NONMEM VI. Covariate analyses were performed to estimate the effects of HIV/AIDS disease, demographic characteristics (sex, body weight, age), biochemical variables (serum creatinine, urea, ALT) and pharmacogenetic variation in CYP2B6, CYP3A5 and ABCB1 on the population pharmacokinetic parameters.

Result: The model identified sex and HIV/AIDS disease as predictors of efavirenz pharmacokinetics. Females were predicted to have a 2-fold (95% CI 1.53-2.63) higher peripheral volume of distribution (V_p/F) as compared to males while HIV/AIDS patients were found to have a 30% (95%CI 19-41) lower relative bioavailability compared to healthy volunteers. The increased V_p/F in females resulted in a 2 fold longer half-life compared to males.

Conclusion: Based on findings of this analysis we conclude that, apart from body weight based differences, both HIV/AIDS disease and sex affect efavirenz pharmacokinetics in Ugandans. HIV/AIDS disease is associated with reduced relative efavirenz bioavailability. We recommend that findings from healthy volunteer studies be confirmed in patients and that caution be taken before direct extrapolation of exposure data to the target patient population.

Keywords: HIV, Efavirenz, Bioavailability, Ugandans

A24: Pharmacokinetics of the non-nucleoside reverse transcriptase inhibitor Efavirenz among HIV Infected Ugandans

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Background: Pharmacokinetic variability of non-nucleoside reverse transcriptase inhibitor efavirenz has been documented and great variation in trough concentrations or clearance is cited as a risk for virological failure. The African population has been shown to exhibit greater variability in efavirenz concentrations and a better understanding of the pharmacokinetics of the drug and their relationship to clinical outcome is needed. This study aimed at a detailed characterization of the pharmacokinetics of efavirenz among HIV infected Ugandans.

Methods: Efavirenz plasma concentrations were obtained from 66 (female 42 and male 22) HIV sero-positive Ugandan patients initiating on efavirenz- based regimens between September 2007 and March 2009. An intensive pharmacokinetic study was done on Day 1 and 14 with blood samples collected and analysed at 8 time points over 24hrs, contributing to 924 data points. Non-compartment analysis was used to describe efavirenz pharmacokinetics on both days.

Results: A mean steady-state efavirenz C_{min} of 2.9 $\mu\text{g}/\text{mL}$ was observed. AUC was 278.5 $\text{h}^* \mu\text{g}/\text{mL}$, half life of 27.2 h, and V_f of 247L. Average C_{max} increased from 4.1 $\mu\text{g}/\text{mL}$ on day 1 to 7.4 on day 14, while the average half life and V_f did not change significantly within the two weeks of treatment. Though no overall change was observed in the mean clearance of the entire study population between day 1; 7.5L/hr and day 14; 7.4L/hr, 41.9% of the participants showed an average 95.8% (range 1 - 423%) increase in clearance between the two study days while the other participants either experienced no change or had a reduction in clearance. The C_{max} for 96.6% of the participants was above 4 $\mu\text{g}/\text{mL}$, while C_{min} was below 1 $\mu\text{g}/\text{mL}$ in only 3 (5.2%) participants. Two of the patients with sub-therapeutic C_{min} had experienced over 95% increase in clearance within the two weeks of treatment.

Conclusion: Findings from this study show that HIV-infected African patients on efavirenz based regimens may exhibit auto induction to different extents or at different stages of treatment and this need to be taken into consideration during clinical management of individual patients. The percentage of patients with C_{max} above the therapeutic range indicates that many patients may be at risk for efavirenz central nervous system toxicity during the early phase of treatment.

Financing: This work was entirely sponsored by the SIDA Programme through a collaboration between Karolinska Institutet, Sweden and Makerere University, Uganda.

THEME: NATURAL RESOURCES UTILIZATION, CONSERVATION & ENVIRONMENTAL SUSTAINABILITY

B01: Tourism Revenue Sharing Policy at Bwindi Impenetrable National Park (BINP), Uganda ; A Policy Arrangements Approach (PAA)

Wilber Manyisa Ahebwa, V. René van der Duim & Chris. G. Sandbrook, UK

Abstract

Introduction

Debates over how to deliver conservation benefits to communities living close to high-biodiversity areas have pre-occupied conservationists for more than two decades. One of the most commonly pursued

strategies to this end has been the sharing of revenues from nature-based tourism, known as Tourism Revenue Sharing (TRS).

Methods

TRS has become a widespread policy intervention in Africa and other tropical regions where large populations of wildlife still exist. In this paper, we analyze the Tourism Revenue Sharing policy at Bwindi Impenetrable National Park (BINP), Uganda, from a policy arrangements perspective. The paper is based on data collected at BINP and the three surrounding parishes, using qualitative research methods.

Results

Specifically, these were documentary reviews, focus group discussions, key stakeholder interviews, and informal discussions and observations. First, this paper briefly introduces the Policy Arrangement Approach and the methodology applied. Second, it describes how and by whom TRS has been introduced and implemented at BINP. Third, the paper seeks to explain the disparities between the rhetoric and the reality of tourism revenue sharing at BINP.

Conclusion

Finally, the paper will comment on the broader relevance of the findings to tourism revenue sharing programs for poverty alleviation.

B02: Governing Common Property Tourism Resources through 'Cooperative' Associations in Uganda; The case of Bigodi Wetland Sanctuary (BWS)

Wilber Manyisa Ahebwa, Jim Ayorekire & Andrew Lepp

Abstract

Introduction

Bigodi Wetland Sanctuary (BWS) is located at the edge of Kibale Forest National Park and is endowed with a diversity of natural resources such as plant species, diurnal and nocturnal primates, mammals, different fish species and more than 335 species of birds. BWS originally referred to as Magombe wetland existed as a common property resource for local communities in Bigodi.

Methods

Community members would collect firewood, poles for building houses, timber, medicinal plants, papyrus for craft making, logs for charcoal burning and conduct hunting to acquire bush meat. As a result of uncontrolled use, the resources were under threat of degradation. To address this challenge, a community 'cooperative' called KAFRED was formed by local elites who have over the last 10 years used tourism and the associated revenues as an intervention to improve the management of BWS and addressing livelihood requirements of the surrounding communities.

Results

Basing on data generated through extensive review of secondary materials (reports, and other KAFRED documents), focus group discussions, participant observations and key stakeholder interviews, this paper

uses a combination of the policy arrangements approach and principles of good governance to analyze the governance of BWS and examine the emerging challenges. Though the analysis reveals several positive outcomes associated with KAFRED such as: increasing tourism related revenue from BWS, initiation of a member's revolving fund, construction of a Bigodi secondary school, and establishment of a community library among others, this paper further reveals several governance challenges associated with KAFRED. There is growing discontent among the community on how the association is being managed and how benefits are being shared.

Conclusion

A large section of the community feel marginalized in decision making since membership to KAFRED is restricted; there is also conflict of interest, for example; while KAFRED is managing community projects like the school, KAFRED founder members are dominating control of these projects. Other challenges revealed include; lack of transparency, unfair distribution of benefits and power wrestling among various actors and interest groups. If not addressed the above governance challenges are a threat to the various achievements attained in conserving BWS.

B03: Regeneration status of indigenous forest tree species of mt. Otzi forest reserve, moyo district

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Abstract

Introduction

This study examined the regeneration status of indigenous forest tree species of Mt Otzi Forest Reserve, Moyo District, Uganda, an area which was affected by anthropogenic and natural disturbances over many years. Mt Otzi Forest Reserve was established because of its rich biodiversity, but over the years it has been affected by anthropogenic and natural disturbances. It also was assessed diversity and population structure of some tree species within the reserve.

Methods

The study also generated information to be used to support sustainable forest management and interventions practices that enhance tree growth.

Species richness was high in the forest reserve with 103 species recorded. The forest population structure indicated an ecologically stable forest population. Many tree species had a high IVI that range from 33.69 to 0.11. Canonical Correspondence Analysis (CCA) showed that Fire, Farm lands, Fallow and felling by cutting greatly influenced tree species distribution in the forest reserve.

Some species had poor recruitment.

Results

Species diversity and distribution of some trees were affected by environmental stresses therefore strategies that take account of fires, felling by cutting and species with poor stem density; especially saplings are required to conserve tree species in Mt Otzi Forest Reserve.

Conclusion

The study has generated information to be used to support sustainable forest management and interventions practices that enhance tree growth.

Keywords

Regeneration, Environmental variables, Species Diversity, Population Structure, Dominant tree species

B04: Population structure and regeneration Status of *Vitellaria paradoxa* (C.F.Gaertn.) under different land management regimes in Uganda

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Abstract

Introduction

Vitellaria paradoxa is an ecologically and economically important tree in the dry savanna woodlands of Africa contributing immensely to livelihoods and amelioration of microclimate in areas where it occurs. Despite its importance this tree is currently considered threatened by the World Conservation Union. This has been mainly due to over exploitation of this tree and agricultural encroachment. Despite its red list status there is no clear understanding of its population structure and regeneration status under different land management regimes.

Methods

In this study we assessed the population structure and regeneration status of *V. paradoxa* under old fallows, young fallows and current fields. The specific objectives were: to determine the density of seedlings, saplings and mature *V. paradoxa*; to examine the size class distribution and regeneration status of *V. paradoxa*. We hypothesised that its density is not influenced by land management regime. We measured thickness of all mature trees, saplings and seedlings in 50x50 plots.

Results

The population structure was described using densities, size class distributions and their slopes. Generalised linear model analysis was used to compare the density of each size class under different land management regimes. Seedling density was influenced by land management regime while sapling and mature tree densities were not. Young fallows registered high seedling density compared to old fallows and current fields.

Conclusion

Size class distribution and regeneration status were influenced by land management regime. Young fallows had more stable populations with better regeneration compared to old fallows and current fields.

This study confirms that land management regimes can influence the population structure and regeneration status of *V. paradoxa*.

Key words: Seedlings, size class distribution, fallows, shea butter tree, density, savanna

B05: Medicinal plants of Otwal and Ngai Sub Counties in Oyam District, Northern Uganda

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Abstract

Background

An ethnobotanical study was carried out in four parishes in the Ngai and Otwal Sub Counties in Oyam district, Northern Uganda, where insurgency has been prevalent for the past 20 years. Documenting medicinal plant species used in treating various health conditions among the local people.

Methods

Information was obtained from mainly the local population, the traditional healers and other experienced persons through interviews, formal and informal discussions and field excursions.

Results

Seventy one plant species were reported for use in the treatment of various diseases in the study area. These plant species belongs to 41 families, with Asteraceae being the most represented. Roots were ranked the commonest plant part used. Oral administration was the most frequently used route of administration. A total of 41 different health conditions were reported to be treated by use of medicinal plant species. Thirty nine percent of the recorded plant species were reported for treating stomach related ailments.

Conclusion

The use of medicinal plants in primary healthcare is still a common practice in Ngai and Otwal Sub Counties. The trust they have is built on the curative outcome properties claimed, poverty and armed conflict that lead to inadequate healthcare facilities. The generation gap caused by the over 20 years of insurgency in the area has brought about knowledge gap on the usage of medicinal plant species between the young and the older generation.

B06: Anti- Inflammatory and Analgesic Activity of *Teclea Nobilis* Root Bark Extract.

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Abstract

Introduction

Ticlea nobilis (Rutaceae) is a common medicinal shrub in tropical Africa used as traditional medicine remedy to reduce pain and fever. The study investigated the anti-inflammatory and analgesic potential of the ethanolic root-bark extract of *Teclea nobilis* in paw edema albino mice and acetic acid induced writhing in male albino winter rats, respectively.

Methods

The anti-inflammatory activity was determined using 30 male albino mice (weighing between 12.6-19.6g) put into 6 groups (A-F). Male albino rats in group A (positive control) were given a dose of diclofenac (25mg/kg) and those in group B, C, D and E were given a dose of ethanol extract of *Teclea nobilis*; 100, 200, 400 and 600 mg/kg body weight, respectively. Group F of male albino rats (negative control) were given a dose of 1ml of distilled water. Analgesic activity of the extract was determined using twenty four (24) male albino winter rats weighing between 150-200g put into six groups. Male albino winter rats in group A (positive control) were given a dose of acetyl salicylic acid (aspirin) (50mg/kg) and those in groups B, C, D and E, got ethanol extract dose of *Teclea nobilis*; 100, 200, 400 and 600mg/kg body weight, respectively. Male albino winter rats in group F (negative control) got a dose of distilled water (10mg/kg).

Results

The ethanolic extract of *T. nobilis* exhibited significant anti-inflammatory effects at dose level of 400mg/kg body weight ($P<0.05$), comparable to that of Diclofenac. The analgesic effect of *Teclea nobilis* root-bark extract was achieved at a dose level of 600mg/kg, comparable to that of aspirin. The findings justify the therapeutic claim of *Teclea nobilis* as anti inflammatory and analgesic herbal remedy. There is need to assess the safety of the *Ticlea nobilis* root bark extract as part of standardizing the herbal formulation.

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B07: Morphological variation among shea tree (*Vitellaria paradoxa* ssp. *nilotica*) ethno-varieties in Uganda

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Abstract

Introduction

Vitellaria paradoxa C. Gaertn. (the shea tree) is an indigenous tree species widely spread in the drier areas of northern and eastern Uganda. The tree is widely known for its oil which is used in cooking, cosmetics and traditional medicine. Local folk classification by farmers recognizes the presence of 44 ethno-varieties on the basis of fruit and nut characters.

Methods

Morphological variation was analyzed in shea tree ethno-varieties in West Nile, Northern and Teso farming systems to (1) assess the patterns of morphological variation among shea tree ethno-varieties and (2) establish whether there is morphological evidence for shea tree folk classification in Uganda. Knowledge of fixed variation is important for any breeding or conservation programme. A total of 176 shea trees representing all the 44 farmer folk varieties were analysed for 14 fruit, nut, leaf and tree traits. Morphological measurements were made on 40-50 leaves; 20-30 fruits crown and stem diameters for a maximum of 5 trees of each ethno-variety in the three farming systems. Pearson's correlation coefficients, Principal Component and Hierarchical Cluster Analysis were utilized to explore and reveal patterns in morphological variation among the ethno-varieties.

Results

High variation was found in pulp weight (CoefVar = 35.9%), DBH (CoefVar = 28.48%), fruit weight (CoefVar = 27.81%) and canopy diameter (CoefVar = 26.69%). Apocopoco (soft pulp variety) had the heaviest fruits, nuts and pulp while Acula (oval fruit variety) had the longest fruits. There was strong positive correlation between pulp and fruit weight ($r = 0.963$, $p < 0.001$), leaf length and leaf width ($r = 0.652$, $p < 0.001$) and between petiole length and leaf length ($r = 0.788$, $p < 0.001$). Principal component analysis showed no underlying quantitative morphological structure among the 44 ethno-varieties.

Conclusion

Hierarchical cluster analysis revealed the presence of five groups with no clear aggregation based on ethnographic or geographic separation. From morphological evidence alone, there are no discrete forms of *V. paradoxa* related to folk classification Uganda. However, the high variation in fruit characteristics offers great opportunities for cultivar selection for improvement and domestication programmes.

B08: Developmental changes in the activity of intestinal brush border enzymes in the wild juvenile Nile perch (*Lates niloticus*)

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Abstract

Introduction

The Nile perch, *Lates niloticus* is a carnivorous fish and a potential candidate for aquaculture. The relationship between fish size (total length) and the activity of three brush border enzymes: leucine aminopeptidase (LAP), γ -glutamyl transferase (γ -GT) and maltase was evaluated in six size groups (1-5, 6-10, 11-15, 16-20, 21-25 and 26-30cm) of the wild juvenile Nile perch. Enzymatic activity was evaluated in three intestinal sections: pyloric caeca, upper and lower intestine.

Methods

All the three enzymes were influenced by the fish size, intestinal section and the interaction between the two factors ($p < 0.05$). The highest specific activity of LAP and maltase was observed in the upper intestine while that of γ -GT was highest in the lower intestine. The specific enzyme activity and the relative total enzyme activity were significantly higher ($p < 0.05$) in the 11-15cm and 16-20cm size groups

in all the tested enzymes. Total enzyme activity for all the enzymes increased with fish size. The variation in enzyme activity with fish size reveals insights in the formulation of artificial diets for this species.

Results

The results of the present study reveal that, the most critical stage in the nutrition of juvenile Nile perch occurs when the fish attains a total length of 11-20cm. The presence of maltase is an indicator that carbohydrates cannot be precluded from formulated diets for this species.

Key words: Nile perch (*Lates niloticus*); Intestine; Brush-border enzymes

B09: Local knowledge on use and management of *Balanites aegyptiaca* in drylands of Uganda

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Abstract

Introduction

There is strong evidence across the drylands of Africa that local communities have utilized indigenous fruit trees (IFTs), including *Balanites* for generations. IFTs have however, received limited recognition from research and development community. It is now widely accepted that IFTs research needs to embrace 'local' knowledge since this can be a useful resource in solving local problems and contribute to meaningful development.

Methods

This study explored local knowledge on use and management of the *Balanites aegyptiaca* among two contrasting dryland communities in Uganda. A survey involving 150 respondents was conducted using a semi-structured questionnaire. Focus group discussions and key informant interviews were conducted to capture detailed information on various aspects of *Balanites* Use and management.

Results

The results revealed a wealth of time-tested knowledge on local use and management of *B. aegyptiaca* tree and its products. Besides being a market commodity, several uses of the tree products were reported, especially among women and children. Contrary to its early reference as 'famine food', *B. aegyptiaca* products were used by most households. The young leaves and ripe fruits were regarded as dependable dry season food sources in both years of food scarcity and plentiful harvest.

Conclusion

However, institutional arrangements for management of *Balanites* and other IFTs are weak and trees are increasingly being cut for fuel wood. There is a need to build on the local peoples' knowledge, especially

on processing of products so as to realize increased contribution of Balanites to rural livelihoods in the Drylands of Uganda and other areas where the species grows.

Key words: Conservation, desert date, indigenous fruit trees, livelihoods.

B10: Natural Resource Economic Efficiency under Mangoes-based Agro forestry Systems in Buyaza County, Kamuli District

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Abstract

Introduction

This study analyzed the resource economic efficiency of mango (*Mangifera indica*) growers in Buzaya country, Kamuli District, Uganda.

Methods

It estimated the existing scales of mango producers, their relative resource-use efficiency, the relative profitability of their operations and their determinants using the profit function.

Results

Results showed that the identified scales of producers are inefficient in their use of resources, but the potentials still exist for increases in their levels of mangoes output. The hypothesis that the various scales of producers are equally efficient in their resource allocation was rejected at 5% probability level. The hypotheses that there was no significant difference in their level of profitability as well as the factors influencing their operations were also rejected at 5% probability level.

Conclusion

It is recommended that micro-financial institutions should give credit preference to the mango producers because of their relatively higher profit margin, which reflects their potentials for repayment. Necessary adjustments to be made in their levels of resource use for enhanced level of mangoes output and profitability were also recommended.

Keywords: Mangoes production, farmers, resource efficiency, Uganda

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THEME: AGRICULTURAL PRODUCTIVITY, FOOD SAFETY & SECURITY, AND VALUE ADDITION

C01: Information needs and use among urban farmers in Kampala City in Uganda

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Abstract

Introduction

The paper presents results of a study on information needs and use among urban farmers in Kampala City in Uganda. An information need is recognition that one's knowledge is inadequate to satisfy a goal. Although urban farming is viewed as an important survival strategy, the information needs of urban farmers in Kampala City are not known. Because of this, the farmers do not readily access useful agricultural information for better production. Urban farming is hence characterized by low agricultural production leading to food insecurity.

Methods

The study used a mixed methods approach. Face-to face interview and focus group discussion were the methods used to collect data. Respondents included 380 urban farmers and 58 focus group respondents (15 from Kawempe, 16 from Nakawa and 27 from Rubaga).

Results

Results show that the information needs of urban farmers were as varied as the heterogeneity of their agricultural enterprises. Information was used for different purposes and depended on the type of farming enterprise(s) and activities. The paper concludes that no one can claim to know all the information needs of urban farmers especially in an information dependent sector like agriculture where there are new and rather complex problems facing farmers every day. However, there is a possibility to identify significant groups of urban farmers who share common information needs. Secondly, information use is also as subjective as information need, and like information need, is not observable since it takes place in the mind of the individual. The value of a piece of information to a farmer may vary due to the ways in which it is used, the characteristics of the individual farmer seeking for information, social and organizational factors, and tasks requirements.

Conclusion

The paper recommends that dissemination of agricultural information to urban farmers should be based up on the farmers' enterprise groups and their information needs. There is also need to create awareness among the farmers about the value of agricultural information, its source and accessibility.

Key words: information, information needs, information use, urban farmers, urban farming and Food security

C02: Use of mayflies (*Ephemeroptera*) as total replacement of *Rastrineobola argentea* in diets for catfish, (*Clarias gariepinus*) in Lake Victoria basin.

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Introduction

A study was carried out to determine the nutrient composition of the May flies and growth and feed conversion rates of *Clarias gariepinus* stockers fed on Busoga 1 diets (mayflies, cassava and premix) in relation to standard fish feeds in happas for 90 days.

Methods

Proximate analysis and oil characterization of the dried Mayfly powder was done using AOAC and Blair and Drier methods respectively. A simple random and double blinded field controlled trial was carried out using stockers (average weight of 10 gms and length of 13-15 cm) in happas with a stocking density of 20 fingerlings per happa. The latter was two meters apart and the interventions were done in duplicates and involved the administration of feeds Feed type A= Cassava only (used as the control); Feed type B= cassava, mayflies (47.5% constant protein) and vitamins premix top up; Feed type C= Standard feed to fingerlings for growth and feed conversion. The vital parameters growth, feed gain ratio and feed conversion ratio were analyzed using R-2.10.1 software.

Results

May flies had a crude protein of 72.00 ± 1.23 on dry weight basis as compared to *Rastrineobola argentea* (*Haplochromines*) (59%) the common source of protein in livestock feeds and were rich in the macro and microelements crucial in the growth of the fish hence was recommended as a suitable replacement for the fish meal. Feed type B had the highest total weight gains, was statistically significant ($0.00844, p < 0.05$) and also had the lowest FCR ranging from 1.5-1.7 which ranked the first as compared to the standard (feed type C) which had FCR ranging from 1.9-1.98.

Conclusion

In conclusion, feed type B had the lowest feed conversion ratio amongst the feed types studied hence May flies act as a perfect replacement for the fishmeal in the fish diets.

Key words: *clarias gariepinus* Mayflies value addition

C03: Logit Models for Household Food Insecurity

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Abstract

Introduction

Food insecurity is a global problem which can only be solved when one is able to understand and measurement it at micro-level.

Methods

Measurement of food insecurity is a challenge because it is a multi-faceted latent and continuous phenomenon explained by a wide range of both quantitative and qualitative variables. This paper examines the quantitative variables and applies exploratory factor analysis to identify which of them significantly influence household food insecurity. Logit models are then developed using these variables. Empirical data was obtained from Tororo and Busia rural households in Uganda and analysed.

Results

Feasibility and appropriateness of exploratory factor analysis, and relationships between variables were respectively tested using Pearson's correlation coefficient, Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's test of sphericity. Six factors with 26 variables were extracted using Principle Component Analysis and [logit models were developed for all households, households which store food compared to those who did not store food and households who cultivated little land compared to those who cultivated more than 2 acres of land.](#)

Conclusion

[The key finding is that no single model can be used for various categories of households. The type of model to be used would depend on type of household being assessed.](#)

Key words: *Food insecurity, factor analysis, household, logit model.*

C04: Performance Of Growing Pigs Fed Cereal Processing By-Products From Maize Bran Or Wheat Bran

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Introduction

A feeding experiment and a digestion trial were conducted to evaluate the growth, feed intake, feed efficiency and carcass characteristics of growing finishing pigs. 48 crossbred Landrace x Large white pigs with an average body weight of 7 ± 0.5 kg were divided into groups of four, balanced for ancestry, sex and body weight were used in the experiment.

Methods

They were allotted to the dietary treatments in a completely randomized design with four replications. Pigs were assigned to two diets in which maize bran or wheat bran provided the energy source. A third

dietary treatment where whole maize grain was used as the energy source was included for comparison. All diets were formulated to contain same levels of energy and protein. Four pigs per pen per treatment formed an experimental unit. The trial lasted for 4 months and data was collected on feed intake, weight gain.

Results

Digestibility trial was carried on two male pigs per replicate during the growth period. At the end of the growth period two pigs per treatment were slaughtered carcass characteristics determination. Average daily gain was 0.23, 0.31 and 0.13 (kg/day) for pigs fed maize bran, wheat bran and whole maize grain as dietary energy sources. Average feed intake and final body weight were significantly ($P<0.05$) affected by feeding on maize bran, wheat bran or whole maize. Digestibility of dry matter, crude fibre and calcium were significantly higher ($P<0.05$) for pigs fed maize bran than those fed wheat bran and whole maize. However, crude protein digestibility was highest ($P<0.05$) for the pigs fed wheat bran.

Conclusion

There were significant differences between diets in carcass yield, ham, head, trotters, and heart weights were significant ($P<0.05$). Carcass composition at the 6th rib showed significant differences ($P<0.05$) for rib weight, rib eye muscle and other tissues. Intra-muscular fat (IMF), subcutaneous fat, and bone weight were not significantly ($P<0.05$) affected by diet. The results show that feeding growing pig on wheat bran diet improves ADG, feed efficiency and carcass yield. Wheat bran can therefore be substituted for maize bran depending on cost.

C05: Nutrition Analysis & Innovative Approaches in the Value-Addition of *Ruspolia nitidula* (Nsenene Grasshoppers) for Income Generation in Central Uganda Masaka and Kampala Districts

Project Scientific Team: Prof. Makadasi Buyinza (PhD)-Principal Investigator, Dorothy Nakimbugwe (PhD) Co-investigator, Jacob.G. Agea (PhD)-Co-investigator, Marry Namaganda (PhD)- CO-investigator, Biryomumaisho Dickson Master of science Student

Project Summary

Introduction

The study on nutrition analysis & innovative approaches in the value-addition of *Ruspolia nitidula* (Nsenene Grasshoppers) for income generation in central Uganda was carried out in Kampala (Central Division-Nakasero parish and Lubaga Division-Kasubi parish) and Masaka (Kimanya/kyabakuza Division-Kyabakuza parish and, Nyendo/Ssenyagge Division- Nyendo parish) districts. The major objective of the study was to assess the nutritional analysis and innovative approaches in the value addition of popularly edible *R. nitidula* for increased income generation and food security in Uganda while the specific objectives were (i) establish the knowledge, attitude and practices (KAPs) related to preparation and consumption of *R. nitidula* in central Uganda, (ii) determine the nutritional contents of *R. nitidula* and the effect of common processing and storage methods on its nutritional levels and (iii) explore and develop the innovative approaches to value addition (value-added products), packaging, protocols (recipes) suitable for up-take by private food processors. The projects major activities to achieve the stated objectives were planning meetings and reconnaissance, literature review, community mobilization for field work, survey/ field work, laboratory work, protocol development, packaging and value-added products, data synthesis and analysis, production of progress report, recruitment of Master of Science student, monitoring, evaluation and conducting feedback workshop.

Methods

The project was further divided into two levels survey (for objective i and iii) and laboratory level (mainly for objective ii). At survey level, simple random sampling was used to select study divisions, parishes and respondents. A total of 120 respondents were selected for the study and the sample size was reached on using Nyariki (2009) recommended formula for determining sample size where random sampling is used where $N = z^2 (pq) / d^2$. Cross-sectional research design with help of participatory rural appraisal tools (questionnaire, key informants interview and focused group discussions) were used to collect data. Data was analysed using Statistical Package for Social Sciences (SPSS), MINTAB 14 and Excel 2003 Spreadsheet were coded responses on in-home built approaches for value addition, knowledge, attitude and practices (KAPS) related to harvesting, preparation, trading and consumption of *R. nitidula* were analysed descriptively and inferentially (Ch-square) and summaries into graphs, tables showing percentages (mean percentage and SEM). At laboratory level, proximate analysis methods were used to determine the composition of *R. nitidula* samples of different. AOAC methods and those outlined by Kirk and Sawyer (1991) were used. Mineral analysis was done by methods outlined by Okalebo *et al* (2002). Sensory evaluation on both pan-fried and boiled samples oven-dried and stored out of light was done basing on a 9-point hedonic scale as outlined by Moskowitz *et al* (2006), for the different attributes of colour, flavour, texture, taste and appearance. Acid value, a chemical test and Total Plate count, a microbial test accompanied sensory evaluation. Sensory tests, acid value and microbial tests ran for 6 weeks.

Results

The results were analyzed using Excel and SPSS data analysis tools to determine whether there was a significant difference among the observations.

The project achieved the stated objectives at different levels; On survey level, community KAPS on *R. nitidula* was established the socio-economic characteristics of respondents were determine were 71% out of 120 respondents were male the rest female who mostly (40%) attained secondary education and there was a relationship between education of the respondents and the level of involvement in value chain activities ($X^2 = 42.95, P = 0.000$). The average household size of respondents ranged from 7-9 people and average annual income of Ugx 100,000 \approx USD 50 and There was also a relationship between sex of the respondents and the level of involvement in value chain activities ($X^2 = 156.4, P = 0.000$).The majorly (68%) were engaged in off-farm employment (trading in shops and hawking) and rest in farm employment (crop and animal farming), seasonal calendar on *R.nitidula* activities were determined (it was found out that gathering is biannual first season in Apirl-May and November-December, processing is Apirl-May and November-December while trading all year round in Kampala and for Masaka it ranged from Apirl-June and November-January), peoples' attitude on consumption was established where equal number ($48.3 \pm 1.7\%$) of the respondents viewed the consumption of *Nsenene* as a good and a very good thing and believed that *Nsenene* are nutritious, very tasty and that it adds diversity to the diet and in-built home based approaches of adding value was documented where deep frying and air drying was the commonly ($60.0 \pm 6.7\%$) used method for processing *Nsenene*. Pan frying *Nsenene* with without cooking oil was also popular ($31.7 \pm 1.7\%$). However, some ($22.5 \pm 2.5\%$) people prefer to boil and sun dry *Nsenene* for either home consumption or sale. 500 g was used as a case study to document procedural steps involved in preparing *R. nitidula* using the above in-home based methods. Results on proximate analyses showed that *R. nitidula* were highly nutritious. *R. nitidula* was found to have 47-55% moisture, 36-40%protein, 41-43% fat, 2.5-3.2% carbohydrate, 2.6-3.9% ash, 11-13% dietary fiber, 3.37-4.69mg/kg phosphorus,4.56-5.56mg/kg potassium and 900-2200ug/100g and there was no variation in the macronutrient nutritional composition of *R. nitidula* between the sub-types. Results on shelf-life studies showed that the shelf life of pan fried, dried and vacuum packed *R. nitidula* that were stored out of reach of light, was over three months. They were still acceptable and microbiologically safe and only likely to be affected by the high acid value.

Conclusion

The project achievements are expected to create societal impact especially if the procedures on preservation of *R. nitidula* are followed or taken by people involved in *R. nitidula* or private food processing industries to prepare and preserve *R. nitidula* to maintain market supply during off *R. nitidula* season and this will not only contribute to food security but also increased income levels among the participating households. The generated *R. nitidula* calendar will contribute heavily in informing the society to make informed decisions on when to harness the potential of different *R. nitidula* activities to improve household income and livelihoods. The trained Master of Science student with gained knowledge in the *R. nitidula* will be asset to the society in solving their *R. nitidula* related problems. The project used feedback workshops, reports, Master of Science student's thesis and journal articles to disseminate findings to the stakeholders and public. The project has developed procedural steps and protocols for preparing *R. nitidula* using different preferred methods that passed a microbial test accompanied by sensory evaluation, sensory tests, acid value and microbial tests ran for 6 weeks

C06: Conception rates of estrus-synchronized indigenous Ugandan goats to cervical artificial insemination

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1.0 Abstract

Introduction

This study established the effects of synchronization technique, source of semen, age and body condition score (BCS) on the conception rate of does artificially inseminated via the cervical route with fresh Boer and Toggenburg semen.

Methods

A total of 160 indigenous does under the traditional management system were randomly divided into four equal groups. Two groups were treated with 45 mg progesterone impregnated intravaginal sponges. The other two groups were treated with Controlled Internal Drug Releasing (CIDR) device containing 3 g progesterone. All does received intramuscular injection of 200 IU Pregnant Mare Serum Gonadotropine (PMSG) at sponge or CIDR removal on day 17. During the period, 2% (n=80) sponges and 5% (n=80) CIDR were lost. Semen was collected from proven Boer and Toggenburg bucks. Fixed-time intra-cervical artificial insemination (AI) was performed at 48 and 56 hrs following progestagen withdrawal and estrus detected using vasectomized and apron-fitted bucks. Fresh Boer semen was used in sponge- (n = 37) and CIDR-treated (n = 36) does, and fresh Toggenburg semen used in sponge- (n = 40) and CIDR-treated (n = 36) does.

Results

Pregnancy diagnosis by observation of non-return to estrus from day 17 to 22 post-AI indicated 93 (62.4%) does pregnant. Ultrasonography 48 days post-AI showed 23 (62.2%) and 24 (66.7%) of sponge- and CIDR-treated does, respectively and bred with Boer semen were pregnant. While for does bred with Toggenburg semen, 27 (67.7%) and 18 (50.0%) pregnancy were detected by ultrasonography in sponge- and CIDR-treated does, respectively. There were no significant differences ($P = 0.287$) and ($P = 0.430$) between use of sponge and PMSG; and Boer and Toggenburg semen, respectively, on conception rates. However, age and BCS of the doe significantly ($P < 0.05$) influenced the conception rates in both methods of synchronization.

Conclusion

In conclusion, estrus synchronization using sponge/PMMSG and CIDR/PMMSG are equally efficient in Ugandan indigenous goats. The fertility to intracervical AI with fresh Boer and Toggenburg semen is satisfactory and not different, but influenced by BCS and age of does.

C07: Effect of Feeding Sun-Processed Brewer's Yeast on Growth, Feed Efficiency And Cost/Gain Of Growing Pigs

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Abstract

Introduction

Sixty four large white x Land race pigs with initial average live weight of 9.3kg were used in a 120-day feeding trial to determine the effect of replacing fish meal (FM) with brewer's yeast (BY) on growth of growing pigs. Dietary treatments consisted of maize bran as a basal ingredient supplemented with sun-processed BY at 0%, 30%, 40% and 50% as replacement for fishmeal in a CRD design. All diets were iso-caloric and iso-nitrogenous (1330kcal/kg DE and 18% CP). A 14-day digestion trial using two entire males and females per replicate was conducted and nutrient digestibility was determined. At the end of the experiment, 2 male and female pigs/pen/ replication were slaughtered and carcass characteristics determined. Data collected was subjected to statistical analysis.

Methods

The study showed that inclusion of BY affected ADFI ($P<0.05$). ADG for pig fed on 0% BY diet was highest ($P<0.05$) and 10% BY diet was lowest. FCR of pigs on 8% BY diet was highest ($P<0.05$) and 0% and 6% BY diets did not differ significantly. Digestibility of CF and P did not differ significantly with inclusion of BY. Digestibility of DM, OM, CP, EE and Ca did not differ between 0% and 6% BY diets but significantly reduced with 8% and 10% BY diets. BY inclusion across diets increased internal chest width ($P<0.05$) and lowered the carcass length ($P<0.05$). Increasing levels of BY in diets negatively affected carcass weight. Inclusion of BY in diets affected internal organ weights with liver and spleen weights of pigs fed 10% BY diet being heavier ($P<0.05$).

Results

Results showed that growth performance was not significant in pigs fed on 0% and 6% BY diets. Beyond 6% BY inclusion in the diet reduced pig growth significantly. Inclusion of BY in diets reduced feed cost and beyond 6% BY, cost per weight gain was negatively affected. Results show that sun-drying BY for 56-72 hours in-activates and reduces bitter taste. Replacement of FM by 30% BY in pig diet greatly improves performance.

xml:namespace prefix = v ns = "urn:schemas-microsoft-com:xml" / **Key words:** Brewer's yeast, Growth, Carcass and growing pigs

C08: Socio-economic factors affecting the utilization of integrated pest management strategies in hot pepper production in Uganda

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Abstract

Introduction

A survey was conducted in the five major hot pepper growing districts of Uganda in 2009 making a tally of 84 hot pepper growers, to assess their socioeconomic characteristics as well as perceptions and how these characteristics influenced level of utilization of IPM practices in hot pepper production. Semi-structured and pre-tested questionnaires were used to collect growers' information, and a logistic regression analysis used to assess the relationship between different variables and utilization of IPM practices.

Methods

Analysis of gender of respondent, ownership of land, marital status and quantity of hot pepper, household size, land size, age and education status was done.

Results

Results of the logistic analysis indicated that the independent variables of age, educational level, and gender influenced utilization of IPM practices. The status of these practices should be put in mind during implementation; Government should put in place policies that promote IPM adoption not leaving the whole process to the farmers since the problem of pesticide usage affects both the users and the non-users.

Conclusion

Also the education sector needs to put in place practical examples of how IPM can benefit the farmers and not leaving it to theory and should further integrate it with continuous learning programs at the grassroots level.

Key words: *Farmer field schools, insect pests, logistic regression, pesticides*

C09: Evaluation of tolerance levels of different groundnut genotypes from Eastern Uganda against *Aspergillus flavus* infection

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Introduction

Groundnuts are commonly infected by *Aspergillus flavus* and *Aspergillus parasiticus* during pre-harvest and post-harvest periods, subsequently resulting in aflatoxin contamination. The consumption of aflatoxin-contaminated groundnuts and groundnut-based products do not only possess health hazards such as liver cancer, kwashiorkor and stunted growth in children, immune system suppression, allergies, but also negatively impacts animal health and international trade.

Methods

In order to address the aflatoxin contamination problem, numerous approaches such as good agricultural practices, proper harvesting and storage practices, breeding for resistance, chemical control and biological control have been recommended. However, adopting resistant cultivars is considered the most effective and low-cost aflatoxin management strategy. The objective of this study was to explore *in vitro* seed colonization by *A. flavus* (IVSCAF) and pod shell resistance mechanism. Kernels and pod shells from 13 groundnut genotypes were artificially inoculated with *A. flavus* spores, incubated and evaluated for fungal infection after 10 days.

Results

The results indicated that none of the genotypes was immune to *A. flavus* infection; however, there were differences in the levels of mycelial growth surface coverage among the groundnut kernels and pod shells. These differences were probably attributed to differences in physical and chemical features of the seed-coat, pod shell-thickness and reticulation. Groundnut genotypes with the lowest mean numbers of infected kernels and the highest mean numbers of kernels and pods with invisible mycelial growth (Igola, Serenut 1, and Acholi white, Red beauty and Serenut 2) were considered to be tolerant to *in vitro* colonization and invasion by *A. flavus*.

Conclusion

We therefore recommend these commercial cultivars for use against Aflatoxin contamination. Further studies on inheritance pattern of these varieties to *A.flavus* and Aflatoxin contamination is needed. Additionally, the desired susceptible genotypes warrant improvement by research.

Key words: Groundnuts, *Aspergillus flavus*, Aflatoxin, Genotypes

C10: EFFECTS OF REPEATED FREEZE-THAWING OF BOVINE CAUDAL EPIDIDYMAL SPERMATOZOA ON IN VITRO EMBRYO DEVELOPMENT

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Abstract

Introduction

Successfully refreezing thawed semen could have important benefits to future animal reproductive technologies. Being able to refreeze mammalian sperm could improve chances for fertilization when sperm are cryopreserved in bulk, in limited supply, highly valuable or mistakenly thawed. This study examined the use of Biladyl® (BIL) and modified Tyrode s lactose medium (MTL) containing 20% fetal bovine serum (FBS) and ethylene glycol for refreezing bovine epididymal sperm for embryo production by in vitro fertilization (IVF) procedures.

Methods

Sperm collected by retrograde flushing were subjected to freeze-thaw cycle 1 using either BIL 1 or MTL 1 (50 straws/treatment). Thirty straws of each of the cryo-preserved sperm samples were thawed and motile sperm harvested by swim-up procedure before subjecting the sperm to freezing cycle 2 in the same BIL (BIL 2) and MTL (MTL 2) extenders. In vitro matured bovine oocytes were subjected to a standard IVF procedure with the sperm from freeze-thaw cycle 1 and freeze- thaw cycle 2. The presumptive 1,301 zygotes were cultured in modified CR1aa supplemented with 3 mg/ml of BSA and 5% FBS for up to 13 days. Embryo development was assessed for cleavage, morula and blastocyst formation, blastocyst expansion and hatching.

Results

Cleavage, morula and blastocyst rates were higher ($P < 0.05$) in the control (BIL 1) than in the treatments (BIL 2, MTL 1 and MTL 2). Embryo expansion and/or hatching (days 7-13), however, were not different ($P > 0.05$) in BIL 1, MTL 1 and MTL 2. However, expansion and/or hatching on the same days were lower in BIL 2 than the other treatments.

Conclusions

It was concluded that bovine epididymal sperm can successfully undergo two freeze-thaw cycles in either Biladyl® or modified Tyrode s lactose with FBS and ethylene glycol and can be used for potential embryo production.

Key words: Cattle, epididymal sperm, freezing-thawing, cryo-injury, embryo

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C11: BIOSAFETY EVALUATION OF SIGATOKA RESISTANT BANANA TRANSGENICS USING NEMATODES

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Introduction

Biosafety guidelines that govern Genetically Modified Organism (GMO) assume that the GMO bananas may have an effect on non-target micro organisms in the soil. Uganda being signatory to Cartagena Protocol on Biosafety looks forward to protect biological diversity from the potential risk of the genetically modified organisms resulting from modern biotechnology. Soil nematodes are considered to be good indicators of the soil health because nematodes constitute a diverse group within the soil fauna, feeding on bacteria, fungi, other nematodes and plant material. This intimate feeding relationship implies that GM crop effects in the soil will be reflected in the abundance and composition of the nematode communities.

Methods

Thus, differences in nematode diversity and community composition were used to assess the potential effect of a transgenic banana on non-target organisms, and thus an indication on their effect on the overall environment. Soil nematodes were sampled from around the transgenic banana lines of RCG3.21, RCG3.31, RCG3.15 and RCC2.02 and a non-transgenic control line CO3 in the Confined Field Trial (CFT) site at the National Agricultural Research Laboratories, Kawanda in Uganda. The CFT was for evaluating transgenic banana for black sigatoka resistance. The transgenic banana lines were developed for resistance to Black sigatoka diseases (*Mycosphaerella fijiensis*) by over expression of the antifungal chitinase gene from rice.

Result

Using ecological indices such as trophic diversity (proportion of the trophic group), Shannon-Weiner Diversity, Simpson's diversity and structure indices, the effect of the transgenic banana on nematode community composition and diversity was not apparent.

Conclusion

This is a preliminary analysis over a single season and therefore, continued assessment is necessary to observe if heterogeneity in nematode community composition and diversity on a field scale occurs over times.

C12: Effect of grafting with indigenous rootstocks and cultural practices on infestation of key insect pests and bacterial wilt disease of tomato in Uganda

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Abstract

Introduction

Severe infestation by insect pests and diseases, separately or together, causes significant yield loss and sometimes total crop loss in tomato production. Calendar sprays of pesticides give satisfactory control of the fungal diseases and insect pests. However, bacterial wilt disease (*Ralstonia solanacearum*), being a soil born pathogen, is difficult to manage. There are no chemicals known to be effective against the disease. As such, control strategies for *R. solanacearum* mainly rely on manipulating cultural practices. One approach which seems to hold good potential for the management of *R. solanacearum* is grafting susceptible tomato lines onto resistant root stocks.

Methods

This study aimed at assessing the effect of grafting, mulching and staking of tomato on occurrence and severity of insect pests and diseases of the crop. In trial I, five treatments were studied in a randomized complete block design with 3 replications: i) Onyx, bacterial wilt susceptible commercial variety grafted on *S. complycanthum* (Kitengotengo), ii) Onyx grafted on *Solanum indicum* (Katunkuma), iii) Onyx grafted onto *Solanum* spp (Katengotengo), iv) Onyx un-grafted, and v) MT 56 un-grafted grafted. Trial II had three treatments; i) mulching (using straw mulch) of tomato plants, ii) staking of tomato plants, and iii) untreated tomato plants as a check. MT 56, a variety resistant to bacterial wilt was the tomato used in the study. The treatments were arranged in a randomized complete block design with 3 replications.

Results

Results of trial I indicated that grafting significantly affected the incidence of *R. solanacearum* on tomatoes as well as fruit yield. In Trail II, bacterial wilt disease, boll worm incidences and fruit yield were also significantly affected by cultural control treatments. Grafting and cultural practices have potentials as components of a management package for bacterial wilt disease and insect pests of tomato.

Keywords:

Aphids; bollworm; integrated pest management; mulching; staking; thrips

C13: Sustainable Utilization and Conservation of *Vitellaria Paradoxa* (The Shea Butter Tree)

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Abstract

Introduction

The shea tree (*Vitellaria paradoxa*) is a multi-purpose savanna woodland tree species that occurs in the traditional farming systems of eastern, northern and north-western Uganda. The tree grows wild and is poorly represented in protected areas; although it is occasionally given protection most farmed fields and sometimes planted together with arable crops. The increased need for expansion of farm-land and uncontrolled exploitation of shea parklands tree resources for biomass energy has affected both yield and natural regeneration of the shea tree. Thus, an assessment of the threats and opportunities to sustainable utilization and conservation the tree would not only enhance its multipurpose nature but also promote both in-situ and ex-situ conservation of the tree in Uganda. The specific objectives of the study were to: document major uses, examine traditional management strategies analyse threats to conservation practices for the species in Uganda.

Methods

Data were collected using questionnaire, focused group discussions and key informant interviews; entered in and analysed using SPSS.

Results

Results indicate that the shea tree currently is entirely a wild resource with great economic potential. Over 90% of the respondents reported that its products are highly valued as source of edible oil that is also sold in local markets as edible fruits, building materials, firewood and charcoal for income. The major traditional tree management strategies in the shea parklands included protecting naturally regenerating individuals when opening farmlands, weeding, staking seedlings, early burning, use of taboos/bye-laws and discouraging other farmers from cutting down trees growing on their farmlands. Persistent insecurity, internal displacement and a high demand of the species for fuelwood have threatened its conservation. This has led to more mature and reproductive shea trees being cut for charcoal/firewood that are also sold to earn cash for meeting the basic household needs. Other threats included improperly defined tree and land tenure system, termite attacks, lack of shea tree planting materials and high level of poverty in the area. Improved planning and implementation of sustainable parklands' resources management would require more in-depth research on local/indigenous knowledge of other indigenous tree species and their uses in the area.

Conclusion

Thus, to enhance conservation of *V. paradoxa*, community mobilisation, execution of appropriate extension programmes, provision of market information, development of appropriate vegetative propagation methods and value addition are essential. Local communities' involvement in implementing interventions such as assisted tree regeneration coupled with protecting and stimulating the growth of naturally regenerating indigenous trees are a prerequisite in the area.

Key words: Agro forestry, dry lands, shea-butter, indigenous, on-farm management

C14: User perceptions in Bioenergy technology adoption decisions: the case of biogas cooking stove in Uganda

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Abstract

Introduction

User perceptions of a given technology often play a key role in influencing adoption of the technology because users often consider its characteristics in their adoption decisions. The history of biogas energy in Uganda is relatively old and its advantages are numerous. Despite its long history in Uganda, the numerous advantages, demonstrated experiences of biogas production and utilization as a renewable energy source and good waste management strategy and existence of favourable technical conditions for the production of biogas in form of abundant biodegradable animal and crop waste raw material, warm tropical temperatures and availability of field-tested technologies, the potential of biogas energy has not been fully tapped in Uganda. The development and utilization of this desirable, modern, ecology-oriented and friendly form of appropriate technology remains low and its adoption rates remain dismal. Household perceptions that have contributed to the low adoption rates of the technology and their effect remain largely unknown.

Methods

Based on household primary data and by use of the Tobit regression, this paper analyses the effect of household perceptions on the adoption of the biogas cooking stove (BCS) in Uganda.

Results

Empirical results show that users' perceptions of the durability of the BCS, the taste of food prepared on the BCS, initial cost of the BCS, the human drudgery burden imposed by the BCS and perception of the air pollution potential of the BCS have a significant influence on adoption and use intensity rates of the

BCS in Uganda. The user perceptions found to have a significant relationship with the probability and intensity of BCS use could be particularly targeted in campaigns to popularize the BCS over the conventional cooking devices (CCDS).

Conclusion

An effective and continuous user perceptions analysis and evaluation system for appropriate biogas technology development in Uganda is recommended.

Key words: Biogas energy adoption; User perceptions; Biogas cooking stove; Uganda

C15: Diversity and Potential of Nematodes Associated with Bacteria for Bio-control of Insect Pests in Uganda

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Abstract

Introduction

Nematodes associated with bacteria prey phoretic, commensal, obligate parasitism and pathogenesis associations with insects where they infect many different types of soil insects. A study were carried out in nine agro-ecological zones of Uganda (viz central wooden savanna, west Nile farmlands, northern moist farmlands, Mt. Elgon farmlands, Lake Victoria crescent and Mbale farmlands, southern and eastern Lake Kyoga basin, southwestern highlands, southwestern grass farmlands, western mid-altitude farmlands and the Semliki flats) with the objectives of isolating and identifying nematodes associated with bacteria, and characterize the infectivity of the isolated nematodes associated with bacteria against the important insect pests.

Methods

Nematodes were recovered by a baiting technique adapted from Fan and Hominick (1991). A total of 54 samples were found to contain nematodes associated with bacteria. These were identified as bacterivores. Highest population of nematodes was recovered from southern western highlands and lowest in western mid-altitude farmlands and Semliki flats, and Northern moist farmlands. Nematodes were not found in Mt. Elgon farmlands and Lake Victoria crescent and Mbale farmlands. On cropped fields, highest nematode populations were recovered from sorghum, sweetpotatoes and a combination of maize, cassava and groundnuts and lowest in egg plants and sunflowers. Nematodes were not recovered from soyabeans and sugarcane. Loam soil had the highest number of isolates while sandy soil and clay soil had low nematode population. Farrow fields, bare soil, soil rich in organic matter and stony soils had no nematodes. Isolates PC4, PS17, IC15, KP8, Kab20, Mas68 and Mas57 were considered for nematode characterization and testing on insect pests because they exhibited higher survival ability under laboratory conditions.

Results

The isolates were tested on sweetpotato weevils and on banana weevils to determine their infectivity. At different nematode concentrations, sweetpotato weevil mortality increased with the increase in nematode concentration. Only isolate Mas68 maintained constant insect mortality at all concentrations. Most insects were susceptible to isolate Mas57 and isolate Kab20. The pathogenicity of nematode isolates to banana weevils were. The highest mean weevil susceptibility was with isolates Mas57 and Mas68; Kab20 performed moderately and lowest with isolates PS17, KP8 and IC15. Isolate PS17 had the highest insect penetrating ability while isolates PC4, IC15 and Mas57 were unable to penetrate. The numbers of nematodes recovered increased linearly with exposure period. For sweetpotato weevils highest penetration ability was with Kab20, Mas68, IC15, and lowest with KP8.

Conclusion

No nematode penetration was recorded with isolates PC4, PS17, and Mas57. The larvae of both weevils susceptible to all isolates. The third in star stage was more susceptible. Sweetpotato larvae were highly susceptible to isolates KP8 and Mas57 and least with isolate PC4 and Kab20. All isolates had a pronounced homogeneity in infecting the banana larvae though isolate KP8 was the most pathogenic and isolate PC4 had the least pathogenic effect. Generally adult weevils were less susceptible compared to their larvae.

C16: The potential of Uganda's farmers/producer marketing organizations for training transfer and training effectiveness

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Abstract

Introduction

Despite their significance in facilitating small scale farmers exit from poverty, and despite the heavy investments made in training the human resource of these institutions, the organization typology of Ugandan farmers/producer marketing organizations (PMOs) has not been evaluated for its potential to influence on transfer training to the job and training effectiveness.

Methods

A case study of 3 PMOs institutionalized by an international development partner was conducted to establish the potential PMOs have for transferring training and what structural-contextual factors would be responsible for supporting training effectiveness. Referring to organization structure typology elements of size, span of control, hierarchy and centralization, the potential for training transfer and training effectiveness was qualitatively assessed.

Results

Results show that PMOs share a number of organization context typologies including having a simple bureaucracy, entrepreneurial, collectivist and participatory democracy structural form. The implications of this structure for training transfer is that there are likely to be high transfer of training due to the high levels of interaction in due to the small size and short hierarchy of the organization that enhance interaction with supervisors, and peers, a high chance of peer support for transfer due to the collectivity and participatory form of democracy. What stands out as new is the role of collective supervision in enhancing training transfer.

Conclusion

The study contributes to the research and practice of training transfer by revealing the different strategies that encourage training transfer among for rural member owned farmers' organizations such as producer marketing organizations particularly via collective supervision. Suggestions for improving return on training investments in such organizations are also made.

C17: Economic viability of biogas energy production from family-sized digesters in Uganda

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Abstract

Introduction

Biogas energy is among the renewable sources being evaluated to augment traditional energy sources in Uganda because of its advantages. However, its development remains low, partly because of the lack of information regarding its economic viability.

Methods

Based on primary data on households in Central and Eastern Uganda and the use of three economic decision criteria; payback period (PBP), Net present Value (NPV) and Internal rate of return (IRR), this study assesses the economic viability of biogas energy production in Uganda.

Results

The empirical results show that biogas energy production is economically viable with a PBP of 1.17, 1.08 and 1.01 years for 8m³, 12m³ and 16m³ biogas plants, respectively. The positive NPV results of UGX 11million, UGX 18 and UGX 24,000 for the 8m³, 12m³ and 16m³ plants, respectively also show that the biogas systems are economically viable. The most profitable levels of the plants were determined through sensitivity and break-even analysis. Results suggest that at standard 12% discount rate, for the biogas systems to remain profitable, the total costs for the plants should not exceed UGX 18 million for the 8m³ plants, UGX 27 million for the 12m³ and UGX 37 million for 16m³ plants with the corresponding total operating and maintenance (O&M) not exceeding UGX 5 million, UGX 8 million and UGX 11 million for the respective biogas plants. However, at the discount rate of 24%, the total costs should not exceed UGX 6 million for the 8m³ plants, UGX 15 million for the 12m³ and UGX 20 million for 16m³ plants with the corresponding total operating and maintenance (O&M) costs not exceeding UGX 5 million, UGX 7 million and UGX 10 million, respectively. The annual interest rates at which households should borrow to invest in biogas systems and remain economically viable should not exceed 36 % for 8m³ plants, 37% for the 12m³ and 39% for 16m³ biogas plants. The study also reveals that the viability of biogas plants is greatly affected by variation in discount rates and capital and O&M costs. A number of policy options that could bolster the economic viability of biogas energy production in Uganda have been highlighted.

Key words: Biogas energy; Economic viability; Fixed-dome digesters; Uganda

THEME: GOVERNANCE, HUMAN RIGHTS, CONFLICT & DISASTER MANAGEMENT

D01: Lessons from the July 11 Bomb Attacks in Uganda

BY JACOB WAISWA

Introduction:

On July 11, 2010, a tragedy struck Uganda –in what is now called the July 11th terror attacks in Uganda or the Kampala bomb attacks. Within a day, several weeks and months of psychological trauma was experienced by both people who lost their loved ones, the survivors and Ugandans who read and listened in to the news.

Objectives:

Examine the events before and after the July 11, 2010 terror attacks; the local interventions made, regional and international support; and determine lessons and actions of the future.

Methods:

Focus Group Discussions of groups (Ugandans) of three (3); five (5) and Twenty (20); review of online articles (15), local media newsprints (4), and total local expressions considered (27) and 72 globally (in total) –including Sunday Monitor interview (24) on July 17, 2010 p. 9; Online Discussions (facebook [7],

Tweeter [7]), Responses to 6386th Meeting (AM) –(4) on <http://www.internationalpeaceandconflict.org/group/>, and Ethiopian Review website (12) 2 on ekitibwakyabuganda.wordpress.com; and qualitative method was used to identify majors expressions and themes as a basis for analysis and interpretation of the July 11, 2010 bomb attacks.

Findings:

The findings were categorized into possible events leading to Kampala terror attacks or right before; and events after the national tragedy.

Before Attacks:

At a psychological conference a Somali satellite group called for a Somalia free of foreign aid and assistance to solve its problems. They had the resources to do that on their own.

And Earlier on 9 July, al-Shabaab leader [Sheikh Mukhtar Robow](#) had called for attacks against Uganda and [Burundi](#).1[v]

The Bomb Attacks:

76 people were reportedly killed: 72% males; and 28% females

84% Ugandans; 4% Americans; 0.5% Irish; 10% Ethiopians; and 0.5% Indian (s)

Most of the dead were in the prime of their years (Youths).

Conclusion:

Countries foreign policies are either weak or aggressive. Terrorism targets countries which allies with their aggressors or that aggresses them like Saudi Arabia for producing world terror personalities and financial strength, USA for its negative policies in the Middle East in which for years it has been behind Israel atrocities against Palestinians, and now Uganda for ruling indirectly over them.

D02: Is social poverty more acute near protected areas? An assessment of social capital formation around Queen Elizabeth National Park in the Albertine Rift, Western Uganda.

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Abstract

We examined the influence of the park on the social capital formation of the people in two sub counties adjacent to Queen Elizabeth National Park in Western Uganda. Data was collected from 541 households using a questionnaire and focus group discussions in a controlled and blocked household survey in the Districts of Bushenyi and Kasese. Social capital formation was examined by proxy using number of formal and informal groups to which a household was a member to. We tested the hypothesis that social capital for households adjacent to the park is less than that of households far away from the park. Results indicate that households surrounding the park have very low social capital but the causal effect is not the presence of the park. It is recommended that policy interventions aiming at mobilizing households into organized groups be put in place to increase the much needed social capital.

Key Words: Social poverty, Protected Areas, Albertine Rift, Uganda

D03: Estimating the premium for titled Agricultural land in Uganda

Alobo Sarah¹, Bashaasha Bernard² and Johnny Mugisha³

Abstract

Introduction

The study uses regression techniques to analyse important dimensions, on tenure system and the value of agricultural land in Uganda. The overall objective was to investigate and quantify the premium for titled agricultural land.

Methods

The analysis is based on 9,045 parcel level observations from a National Household Survey. The results indicate a significant premium for leasehold title as opposed to other forms of titled agricultural land in Uganda.

Results

Our results show that traditional determinants of land value such as current use, soil quality, presence of perennials and proximity to the homestead are not significant for agricultural land in Uganda. We recommend that the current land policy should promote the leasehold system in urbanising areas, since this type of tenure opens land to a wide range of users and use-options. The land policy also needs to address the double ownership structure under the mailo tenure which constrains its marketability and transferability.

Key words: Land tenure, premium, Uganda, regression analysis, mailo land.

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D04: Challenges in Combating Sexual Harassment at Makerere University

Key words: Challenges, Sexual Harassment, Makerere University

Abstract:

Introduction

There has been increasing attention to the problem of sexual harassment in higher Institutions of different African countries. (FAWE) for instance has been particularly instrumental in highlighting the vulnerability of girls and women to gender discrimination, including sexual harassment in educational institutions.

Studies have done much to lay the ground work in a continent -wide understanding of the severity of the problem of sexual harassment within educational institutions, but their scope and efficiency as broad-based policy resources has been limited.

A study carried out on sexual and reproductive health rights of students at Makerere University found that in addition to Sexually Transmitted Infections, Pregnancies and Abortions and cases of rape, sexual harassment is indeed a common problem (Okiria 2002).

University should be a place where young women and men go to explore their interests, learn and grow in a safe, nurturing environment. But for many women more than men, campus life includes sexual harassment.

Methods

The study therefore explored the extent to which sexual harassment occurs. Student's perceptions, levels of awareness to its existence at Makerere University and efforts being made to combat it were explored.

An exploratory study design was used, targeting a student population of 1000 from all faculties. Focus Group Discussions and Survey methods were employed with the support of two researchers and 14 research assistants from the student body.

Results

Students were indeed concerned with the existence of sexual harassment and knew incidents of sexual harassment (particularly male lecturers/female students). Sexual harassment takes different forms but, both male and female students reported incidents of sexual harassment at the University. Despite the existence of a University Sexual Harassment policy, the majority of students were not aware it existed. There are no clear procedures on how to handle sexual harassment cases in the University. Factors that lead to sexual harassment needed to be identified with clear definition of sexual harassment in our context.

Conclusion

There is need to include issues of sexual harassment in the Universities Tertiary Institutions Act. Mass sensitization of staff and students on the sexual harassment policy, was necessary. Mechanisms for the implementation of the policy should be put in place.

D05: Reducing Plastic Waste in the Urban Environment: A Search for Sustainable Options

A RESEARCH REPORT

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Introduction

The continued use of plastic carrier bags poses a very big environmental threat to Uganda, and urgent and decisive action needs to be undertaken to affectively address the situation. Urban environments are the most hurt because of the large populations and concentrations of commercial activities and consumption. Government declared a ban in 2007 on the manufacture, import, distribution and use of plastic bags of 30 microns and below, but this declaration has not resulted in any visible reduction in plastic litter.

Methods

This 2008/9 study examined the positions and attitudes of various stakeholders to the ban on plastics, as well as their suggestions about alternatives to plastic carrier bags locally known as *kaveera*. The study also drew on the experiences of Rwanda where a more comprehensive ban has resulted in visible changes in the cleanliness of towns. In Uganda, the study was conducted in two urban Ugandan towns of Kampala and Gulu, and in Rwanda it was in Kigali. Urban areas were especially targeted because plastic waste is mainly an urban problem. Data was collected from dealers and users of plastic bags in Kampala, as well as qualitative data from a variety of stakeholders such as environmental agencies, standards agencies, local leaders, manufacturer associations and chambers of commerce. The interviews in Rwanda were mainly qualitative.

Findings

It was established that whereas most Ugandans were aware and were sympathetic to the ban on plastic bags, they were skeptical about limiting the ban to bags of 30 microns, unlike Rwanda which imposed a near total ban. They were also unhappy about the poor sensitization about how to identify the bags of 30 microns and below. Even the officers in the implementation agencies had no capacity to distinguish the banned bags, hence the difficulty of implementation. Agencies such as the National Environment Management Authority and the Uganda National Bureau of Standards said they were not sufficiently involved in the formulation of the ban so they are handicapped when it comes to implementation. The experiences of Rwanda show that the Rwanda Environment Management Authority is very active in the enforcement of the ban, and that government has achieved remarkable success because of committed and serious leadership.

Conclusion

This study argues that government orders and declarations on plastic bags cannot achieve intended objectives unless they are backed by committed and consistent enforcement, such as is evident in Rwanda. In order to reduce the problem of plastic waste in the Uganda urban environment therefore,

government needs to more seriously enforce the ban, and to expand the ban to include bags above 30 microns. Government also needs to commit public resources to the collection and recycling of plastic waste as a public good.

Key words: plastics, urban waste, *kaveera*, urban environment

D06: Title: Re-visiting Uganda's HIV&AIDS National Response: A retrospective analysis of policies, approaches and intervention performance for prospective programme planning.

Prof. Edward K. Kirumira
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Makerere University

Abstract (Work-in-Progress)

Introduction:

Programmatic, political and cultural underpinnings have characterised the community and national response to the AIDS pandemic since the first case was officially declared in 1982 from a rural fishing village in current Rakai district. The study notes that a number of studies have been done especially in the medical field targeting at treatment and care. Other socio-behavioural studies have also been carried out to address the question of behaviour change, both for prevention and for treatment and care. At the national level we have experimented with varied combinations of the ABC strategies and the associated 3-in-One overarching philosophy for the national response (Kirumira, 2004; Adupa et.al., 2005; Uganda AIDS Commission, 2006). Such approaches have yielded varying results (Uganda AIDS Commission, 2005, Ministry of Health (Kirumira, 2003; Atekyereza and Kirumira, 2004; MoH/Uganda and ORC Macro, 2006; UBOS. 2006; Kirumira, 2008; Uganda AIDS Commission, 2009).

There is need, therefore, to take stock of the path Uganda has walked over the years, to learn and unlearn from our experiences and enrich the national response that is finding itself being played out in a situation of a mature epidemic. The study takes cognisance of the fact that implementation of even the well intentioned and well designed initiatives is always problematic and Uganda has a critical asset of experience and a proven capacity to reduce the prevalence and incidence levels that we can benefit from. Documenting and understanding the experiences, gains and opportunities is important for future planning, both for policy and programme relevance.

Methods

The study focuses on a critical analysis, with examples, the trajectories of the national response over the years and linking approaches to performance, relevance and implications for the National Strategic Framework. A combination secondary data source of programme documents over the past 25 years, key informant interviews and coordination meetings/activities participation are guiding information gathering.

Preliminary findings

There are significant shifts in the successive National Strategic Framework since the first one of 1998-2002 revised in 2000 oscillating in emphasis between prevention, treatment, care and support. The shifts are adversely affecting not only programme planning but the would-be impact on the epidemic in the country. There are indications of a globalised national response that has to constantly be reminded of and guided by and aligned to agreed national priorities (UAC, Partnership Committee, July 2010).

D07: Research Topic: The sustainability of survival strategies utilized by orphans in AIDS afflicted female headed households: A case of Masaka District.

By: Mathias Ssamula, PhD

Abstract

Introduction

Uganda is one of the countries most affected by HIV/AIDS with devastating effects more on children and female households, such as an increase in the number of orphans, a negative impact on social and family structures and increased needs of orphans that cannot be met by their caregivers alone. Although some of these needs have been met by organizations operating in their communities, sustainability of such support leaves a lot to be desired. This study investigated how coping mechanisms/support used by orphans in HIV/AIDS female headed households can be sustained in order to adequately meet their needs.

Methodology

The study adopted a case study design and was carried out in Bukulula and Bukakata Sub Counties of Masaka district. Data was collected using in-depth interviews, focus group discussions, observation, and key informant interviews. Respondents included children and female headed households who had benefited from support from organisations as well as district officials and community leaders.

Major findings

The findings of the study indicate that organisations in the study areas provide both clinical and non-clinical support. This includes material support- school books, animals for rearing like goats, cows and pigs; health support- drugs from both government and NGOs; psychosocial support-counselling from community volunteers and religious leaders. Material support is usually given once, for example, an orphan is given a goat, seeds provided for one growing season or school books for one academic term.

Some of the support is short lived because of both self-made and external factors for example beneficiaries selling off some of the items they were given like goats before they multiply and inadequate funds by organizations to continue with the support respectively. Support in terms of consumables like food rations has higher levels of un-sustainability compared to income generating activities like rearing animals and poultry.

Beneficiaries are not always prepared in case organisations end their support so they end up selling off items that were given to them to multiply for example goats, pigs, and cattle

Neighbours of the community members who benefit from support from organisations are jealousy and envy the families who get support and they do not consult or learn from the households which are supported. Local councils are not usually involved in helping households that are given support to either supervise or evaluate the spill over effects the support would cause to the community. The idea of learning from model households is not yet entrenched in most of the community members. Some of the support is directed to a single child in a household and not to benefit the entire members. This causes the other members of the household not to care or maintain whatever was given. This is one reason why such support is short lived and unsustainable.

Conclusion

Communities and households as well as OVCs therein should know that organisations providing support are only doing it in the short term therefore they should be prepared for the time when such support ends.

Service providers should form circles of partnerships, by establishing systems of referrals of orphans to each other. For example, if orphan X is receiving support from three different organizations that have formed a circle and it so happens that one of the organizations ends its support; the orphan can still get support from the other two organizations which are still in operation.

Establishing or strengthening community monitoring and evaluation mechanisms to easily keep track of the support that was extended to orphans or households. There is need for the communities to be sensitized to have some level of responsibility-though informal, to the support extended to other community members. Training of OVCs and those giving them care is equally important to the sustainability of support given to OVCs by NGOs.

Give complementary support to different families, for example if one family is given a cow, extend support to another family to grow nutritious grass that the cow can feed on or growing bananas which can use the manure from the cow.

Learning and borrowing from the experiences of the support/income generating activities that continued serving the needs of orphans after NGOs had left can contribute to the sustainability of short-term and failed support/ income generating activities.

Key words; Female-households, Orphans, HIV/ AIDS, Sustainability, Coping mechanisms/ Support

D8: Problems of Visibility and Credibility of NGOs in Uganda: Implications for Service delivery

Abstract

Introduction

The role of NGOs in the development process today cannot be underrated. They are a key development partners in developing countries, including in Uganda. Unfortunately, their credibility and visibility, which are key predictors of effectiveness, have been an issue to many development stakeholders. The study undertook to investigate the determinants of NGOs' credibility and visibility in Uganda with a view to making recommendations to improve NGOs' service delivery. The study also explored whether or not there is a relationship between credibility and viability variables.

Methods

This was a non-experimental, descriptive and exploratory study that was carried out with samples selected from all the four regions of the country: north, east, central and west. A total of 100 NGOs participated in the research. A total of 783 NGO stakeholders were randomly selected and provided the quantitative aspects of the study. A total of 100 Key informant interviewees were involved to provide the quantitative aspects. Photography/observation was another method of data collection. A factor analysis was done first to determine the key items that measure credibility. The data analysis was both qualitative and quantitative. Quantitative data was displayed using charts, tables and figures. Qualitative data was presented through excerpts and direct quotes.

Key findings

From this study, it has been established that the NGOs in Uganda have generally not credible and visible. The key variables considered were accountability, transparency, legitimacy, partnerships and ICT and this has affected their contribution to service delivery, especially in respect to poverty alleviation, where the proportion of people living below poverty level is still about 31 percent. This is still high by world standard. Poor credibility and visibility lead to ineffectiveness in accomplishment of goals due to weak partnerships, lack of trust by stakeholders, amongst others. It has also been concluded that credibility and visibility variables are not clear cut and more research need to be pursued in this respect.

Conclusion and recommendations

Social services are not being effectively delivered by Ugandan NGOs because they are less visible and credible. For services to be responsive to people's problems, these recommendations should be followed by NGOs in Uganda, including other southern NGOs.

- They should be accountable for their activities to all their stakeholders in order to create a lasting impact. They must strive to have systems and structures of accountability suitable for the different categories of their stakeholders.
- Together with accountability, southern NGOs need to be transparent in all their dealings with the stakeholders. This demand laying bare, to all stakeholders, all the activities of the organization on the basis of the guiding principles and rules.
- Legitimacy of an organization is very crucial. Legitimacy mostly involves legal issues, especially registration with appropriate authorities.
- Heavily invest in ICT. This should be made as a long-term investment by planning strategically. To enhance visibility in particular, NGOs need to generally invest in all forms of media- websites, web casting, blogs and other online modes of communication to clients, potential clients and other stakeholders.
- Networking and partnership should not be an option but a must. It is merely not enough to network in the local community. An effective NGO would ideally network at the local, national and international level.
- To enable NGOs gain good credibility and visibility, government can play a significant role in this regard. This can be done by enacting a law that makes registration compulsory at whichever level the NGOs is operating. Where such a law already exists, this can be enforced by having a government department with a strong oversight role over the NGOs.

Key words

NGOs, Credibility, Visibility, Services, Uganda

D9: Title: Negotiation between retributive and restorative justice in conflict transformation.

Dr. Paul Bukuluki

Introduction

This abstract is based on research carried out in Northern Uganda on the "negotiation between retributive and restorative justice in conflict transformation". Efforts to resolve the LRA conflict have brought a confluence of actors in international law, the national justice system rooted in retributive justice

and the stakeholders in the 'traditional' justice system which is more inclined towards the restorative justice paradigm. There is no systematic documentation of how stakeholders, especially the victims, perpetrators and agencies working for conflict transformation in northern Uganda, negotiate between both systems of justice.

Methods

Qualitative and ethnographic methods of data collection especially participant observations, ethnographic interviews, focus group discussions and documents review. Thematic and content analysis were the key strategies employed for data analysis.

Key Findings

Evidence generated shows that in the daily lives of people affected by the conflict in northern Uganda, restorative and retributive justices are constantly negotiated. People and other stakeholders in conflict and post-conflict settings pragmatically choose to apply components of each justice system at given moment in time and space to serve their goals for peace and justice. In the real life experience of these people, the two systems are interconnected and interdependent. Their boundaries seem to be porous; "places of meeting and exchange rather than walls of protection against each other. The findings accentuate the need for a pluralistic system of justice that combines legal and non-legal (contextual) elements in a pragmatic way. This helps to provide a mechanism that responds to complex social needs while at the same time reflecting a level of dynamism commensurate to transitional situations; that can neither be addressed by a purely restorative nor retributive system.

Conclusion

This study demonstrates that an ingenious hybrid of retributive and restorative justice can creatively facilitate the achievement of peace and justice. International justice institutions like the ICC need to adopt a pragmatic approach that makes an analysis of the context and adopts what works to deliver peace and justice to the affected people. Using the conceptual lenses of systems theory one can argue that that both retributive and restorative justice systems are part of the whole and since "the whole is bigger than the sum of its parts" they need to creatively interface with each other to meet the goals of peace and justice in post-conflict contexts. They need to creatively deal with the inherent antagonistic elements and make use of the complementary aspects. For example, in the context of Uganda, the ICC needs to find creative ways of supporting the government of Uganda's recently established War Crimes Court to develop its capacity to administer justice in a way that conforms to international standards, while at the same time effectively responding to the local and culturally constructed mechanisms of justice that people affected by the conflict identify with.

Key words: *Hybridity, retributive and restorative justice, Northern Uganda*

D10: Discourses of health and economic vulnerabilities at a lakeshore: The lived experiences of off-shore communities and implications for HIV/AIDS prevention in Uganda

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Introduction: Drawn from ethnographic work undertaken among a fishing community on the shores of Lake Victoria between 2008-2010, the study shows how, in the context of poverty, risk and uncertainty, the inhabitants of the three fishing villages and surrounding areas articulate the effect of the present conditions of poor health and economic hardships on their everyday lives. The study pays particular theoretical attention to people's narratives, often infused with both nostalgic remembrance of the past and a melancholic view of the ongoing societal, health and economic changes.

Methods: Influenced by phenomenology as a broad paradigm, but guided largely by social constructivism as approach, and discourse analysis as method, the study documents the lived experiences of lakeshore people, linking these experiences to the policy interventions for HIV/AIDS prevention. With an open mind, the researcher lived and interacted with lakeshore communities for a combined period of four months between 2008 and 2010, observed and participated in their everyday lives, made use of life histories of selected study participants, built extensive contacts with them, catching up with local happenings and listening to their nostalgic conversations. Thematic and content analysis was used to guide processing of data gathered through the ethnographic interactions

Findings: The study illustrates community concerns about debilitating health and a plethora of lake-related "neglected diseases", the effects of the diminished integrity of local safety nets among off-shore communities, and, generally, a poor sense of wellbeing. The discourses at the lakeshore are largely narratives imbued with metaphors such as "life is hard", "there is no more to fish in the lake", "it was not like this before" "we are not sure where this will take us" or "we are in the air" and so on. Also evident are the counter discourses of a few, especially political and administrative leaders and progressive businessmen who argue that people have themselves to blame for their plight. In between, there are those who simply say "life goes on". These alternative voices are however overshadowed by the widespread expressions of social and economic inequalities among scores of people, young and old, and feelings of deprivation that have become formulaic pronouncements to indicate a loss of community values and respect, physical and psychosocial illness, and bound up with the economic hardships. The latter are engendered by neo-liberal economic policies in the fish economy, poor fishing habits (*envuba embi*), and inaccessible health services. Overall, existing policy interventions for HIV/AIDS prevention are silent, if not irrelevant, to these lived experiences. Consequently, official HIV/AIDS interventions have been misunderstood, misinterpreted or simply ignored.

Conclusion: The plethora of vulnerabilities lakeshore people grapple with, and the scattered, impromptu ways with which their long-standing socio-economic and health challenges, including HIV/AIDS itself, have been handled makes HIV/AIDS "just another disease". It also erodes community confidence in public pronouncements and services meant to halt the spread of the epidemic. A transformed approach, one that confronts or takes cognizance of lived experiences of people and tackles the broader forces structuring their vulnerability is therefore necessary.

Key words: Ethnography, discourse analysis, nostalgia, HIV/AIDS, lakeshore communities

D11: CAN THE PRIVATE SECTOR CARRY THE PUBLIC BURDEN IN HARD TO REACH AREAS? THE CASE OF VOLUNTARY COUNSELING AND TESTING IN KALANGALA DISTRICT

By

Innocent R Kamya and Waiswa D Batega.

Abstract

Key Words: Hard to Reach Areas, Voluntary Counseling and Testing, HIV/AIDS

Introduction

The study was conceived against the background that voluntary counseling and testing (VCT) service is a key component in the fight against HIV/AIDS. Limited access thereto is well known especially in vulnerable and hard to reach areas like Kalangala. The role of alternative but complementary health providers becomes instrumental in such circumstances especially those motivated by profit or philanthropy as is the case with the private for profit sub-sector and private not for profit sub-sector respectively.

Methods

The study used an exploratory case study design, applying qualitative methods the study sought to establish the potential of the private sector through complementarily to public service for the people of island areas.

Results

The findings showed that the district had one public health facility offering comprehensive VCT services in on islands, while the presence of private sectors was low and mainly in terms of CSOs offering HIV and VCT related services mainly when funding resources allowed. The sustained collaboration between the public and private sectors was inadequate in all aspects. The capacities of CSO/NGOs to provide more complementary VCT services were generally low in terms of tools, human and financial resources.

Challenges of VCT provision included expensive water transport and inaccessibility of some Islands. The cost of service delivery was high. The district has only 11 health units for a population of 32,907 people, about 54 islands are not served by any local health facility. There is a small human resource capacity in HIV/AIDS management and VCT services delivery with barely any trained staff in the private for profit health sector in most islands. Attrition rate of medical workers is high in the district in both the public and private sectors. Owing to the transient and scattered populations across several islands, tracing clients for follow-ups and the appointment system is a challenge. For these trained counselors and other health workers are few and sometimes not fully utilized by CSOs due to funding problems and logistical challenges

Conclusion

The study hence concluded that there is need for a more comprehensive strategy for collaborating between the public health and private sector actors. Without this, even the private sector will not properly play its complementary role VCT provision.

D12: The Relationship between Decision Making, Level of Attachment, Circumstances at Conception and Environment in Healthy Child Development: A Case of Children Growing up in Kampala and Wakiso Districts.

By

Jacob Waiswa,

Dishma Inc.

Background:

The study explored parents' basis of taking on the responsibilities, quality and level of attachment, parent's ability and circumstances under which she or he conceived and the parent's nature of the environment and lifestyle.

Methods:

The target groups were young parents (18 years to 45 years) subjected to both structured survey questions and focused group discussions (FGD); and children (8 to 18 years) that participated in FGD only. The study had 52 participants of which 33% were from urban areas, 10% (urban) and 58% rural; 40% males and 60% females. SPSS tool was used for data analysis.

Results:

Correlation between decision making and quality of attachment was significant showed by $r=0.291$, sig. (2-tailed) at 0.036, where $p=0.05$. Correlation between circumstances faced at conception and quality and level of attachment was not significant when $r=0.261$, sig. (2-tailed) at 0.061, where $p=0.05$. Correlation between environment and level and quality of attachment was not significant indicated by $r=0.124$, sig. (2-tailed) at 0.381, when $p=0.05$. Correlation between environment and decision making was not significant showed by $r=0.148$, sig. (2-tailed) at 0.295, when $p=0.05$.

Conclusion:

Failure of parents to ensure child health growth and development was by and large a result of poverty. This greatly hampered decision making as observed from $r=0.291$, sig. (2-tailed) at 0.036 where $p=0.05$. In rural and semi-urban areas it is only mainly men who went to work while women stayed home to cook and bare children. In the same category, the nature of jobs determined by their level of education did not at the same time help meet children development needs as women complained of men's negligence. There is, thus, a need to start life skills education, poverty alleviation program and reproductive health (or health education) programs to help better family-life situation.

THEME: TECHNOLOGY FOR SOCIO-ECONOMIC TRANSFORMATION

E01: Stochastic Optimisation Models for Air Traffic Flow Management

By

Wesonga Ronald, PhD (Statistics)

Introduction The main globally known obstacle to the smooth flow of air traffic is the air traffic delay. Air traffic delay is not only a source of inconvenience to the aviation passenger, but a major deterrent to the airport utility. Many developing countries have not done enough to abate this otherwise invisible constraint to economic development. The overall objective of this study was to investigate the dynamics of air traffic delay, hence develop stochastic optimisation models that mitigate delays and facilitate efficient air traffic flow management.

Methods Aviation and meteorological data sources at Entebbe International Airport for the period 2004 to 2008 on daily basis were used for exploratory data analysis, modeling and simulations. Exploratory data analysis involved fitting of logistic models for which post-logistic model analysis estimated the average probability of departure delay to be 0.49 while that for arrival delay was 0.36. These computations were based on a delay threshold level of 60 percent which presented more significant

predicators of nine and ten for departure and arrival respectively. The stochastic frontier model estimates showed the average inefficiencies of aircraft operations as 0.15 and 0.20 at departure and arrival respectively.

Key Findings The ultimate output of the study were three stochastic optimization models that were developed to derive airport utility through the interaction effects of daily probabilities of delay and the airport inefficiency estimates which are outputs of post-logistic analysis and the stochastic frontier model analysis respectively. The three models measure daily airport utility at aircraft departure, arrival and the aggregated aircraft departure and arrival.

Conclusion Model sensitivity analysis adduced that the airport utility for a given time period with higher level of inefficiency was significantly less than the airport utility with lower level of inefficiency. Furthermore, lower probabilities for delay at departure and arrival resulted into higher airport operational utility. Application of the model to data from Entebbe International Airport revealed that the airport operates at almost the same utility level at aircraft departure and arrival of 92 and 91 percent respectively. The study recommended further testing of the model using datasets from other airports in the region. Further studies to extend the scope of this study are suggested to examine the effect of the interaction between multi-airport parameters at aircraft departure and arrival and the airport utility.

Keywords *Aircraft, arrival, departure, stochastic, models*

E02: Use of Cassava Starch as a Low-Cost Gelling Alternative Agent In Banana Tissue Culture Media

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Abstract

Introduction

This study aimed at evaluating the potential of cassava starch as an alternative low-cost gelling in the culture medium for *in-vitro* micropropagation of banana. Cassava starch was extracted from 100 kg each of fresh root tubers of AKENA and TM 2961 cassava varieties.

Methods

The gelling physio-chemical properties of the extracted starch were evaluated. The amount of cassava starch necessary to support TC growth of banana as an alternative to commercial agar was then evaluated. 13.5 kg and 11 kg of starch obtained from AKENA and TM 2961 cassava varieties respectively had varied gelling physio-chemical properties.

Results

A combination of 50 g/l of TM 2961 cassava starch and 2 g/l agar TC banana growth as good as 7 g/l agar. This reduced the cost of TC medium by 55.49%. Locally extracted cassava starch can potentially substitute commercial agar as a gelling agent. The physio-chemical properties of the cassava starch were within limits of other commercial gelling agents. The setting ability of cassava starch was improved by adding small amounts of agar. The regeneration potential of *in-vitro* bananas cultured on media supplemented with various types of cassava starch as gelling agent remains to be evaluated.

Key words: banana, tissue culture, cassava starch

E03: Realization of Industrial Opportunities for Cassava Starch in Uganda: Implications for Research and Development

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Abstract

Introduction

Starches have an unrivalled potential as raw materials for several food and non-food uses such as bakery, confectionary, brewing, textiles, pharmaceuticals, paper and laundry. Little attempts have been made to profile starches from different cassava varieties in Uganda. The objectives of this study were to determine: 1) botanical sources of starches on the Ugandan market and 2) functional properties of starches from cassava varieties in Uganda. The study revealed that the Uganda starch market had only two botanical sources of starches; maize and cassava.

Methods

The analysis of the starch functional properties showed that, Bamunanika and NASE10 with lower gelatinization temperatures (63.76°C and 63.60°C) respectively, were suitable for hot-setting adhesives, textiles, baby food, pie fillings and manufacturing of hydrolysis products. TME14 with a high gelatinization temperature (65.37°C) was suitable for canned foods and bread products. The low retrogradation percentage of cassava starches (14.26-18.05%) was suitable for dessert-like products, cakes and biscuits.

Results

The high final viscosities exhibited by Bamunanika and TME14 (2477.66mPa s and 2010.33mPa s) respectively, made them suitable for sauces, soups, dressings and textiles. NASE 10 with a low final viscosity (1808mPa s) was suitable in paper industries. The lower pasting temperature of cassava starches (65.23-65.45°C) made them suitable for textile, paper and food processors.

Conclusion

The study indicated that starches from cassava varieties in Uganda had numerous potential applications in food and non food industries. Quality assurance remained a key issue in the realization of any industrial opportunities for cassava starch in Uganda.

Key words: Uganda, Cassava starch, Market, Functional properties, Industrial opportunities

E04: Towards New Biologically Active Complexes: Equilibrium And Kinetic Studies Of The Stannate(IV)-Polyol Reaction.

by

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Introduction

As recently as in 2007, a report emerged regarding a patent in the US in connection with a new biologically active complex. The invention, which quotes as having hinged strongly on my earlier published work on sugar complexes of Te(VI) hydroxyanions, relates to a chelate of tellurium(IV) oxide with saturated organic polyhydroxy compounds (polyols). This has been successfully used to stimulate living cells to produce cytokines and for treating mammalian diseases and conditions responsive to increased production of cytokines. The complex may also be used for treating mammalian cancer which is not responsive to increased production of cytokines. The present study reports an extension of this work to cover similar reactions including Sn(IV) hydroxyanions with polyhydroxy ligands, in the hope that, as in the present case, it is often the basic research of today that may be the badly needed applied science of tomorrow.

Materials and methods

A Wayne-Kerr Universal Bridge and a Mullard conductivity cell were used for conductance measurements. Potentiometric measurements were made on a Corning Model 12 Research pH meter connected to a combined glass electrode. The sodium stannate(IV) and the organic compounds used were each of reagent-grade purity or better. The general procedure involved appropriate quantities of $\text{Na}_2\text{Sn}(\text{OH})_6^{2-}$ (0.008 M) and, together with requisite volumes of polyol (usually 0.40 M), thermostating them at the desired temperature ($\pm 0.02^\circ\text{C}$) so that when mixed they gave solutions with resultant oxyanion concentrations in the range $(1-5) \times 10^{-3}$ M $\text{Sn}(\text{OH})_6^{2-}$ in the presence of (10-20)-fold excess polyol. All the conductimetric runs were carried out in a carbon dioxide-free atmosphere using a glove box previously flushed with nitrogen. At ambient temperatures equilibrium was attained within 3-5 days.

Key findings

. Stability constants of the 1:1 stannate(IV)-polyol complexes were determined, found to be fairly large and lying in the range 5.3-123.0 for the ten ligands investigated. These values were subsequently used in conjunction with kinetic data to postulate a mechanism involving the species $[\text{Sn}(\text{OH})_5^-]$ as intermediate in the formation of the chelates. The stannate(IV)-polyol reaction, though taking place at higher pH values, was acid-catalysed and followed first-order kinetics in the oxyanion, but at large ligand-oxyanion mole ratios the reaction exhibited zero-order rate dependence on the polyol. These features taken together were consistent with a unimolecular nucleophilic substitution on the oxyanion.

Conclusion

This study, it is hoped, puts the $\text{Sn}(\text{OH})_6^{2-}$ species in its proper place in the wide research field of polyol-oxyanion systems. It is worthy of further investigation whether the same could be extended to cover α -hydroxyacids in which one of the donor oxygen atoms belongs to a carboxyl moiety. A higher case in this respect would be α -aminoacids, in which nitrogen would be expected to be involved as part of the chelate bridge, *i.e.*, in the Sn-N-C link.

Key words: Hexahydroxystannate(IV), Polyol, Stability constants, Conductimetric method, Mechanism

E05: Options for Improvement of the Ugandan Iron and Steel Industry

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Introduction

This paper sets out to look at the state of the iron and steel industry in Uganda, comparing and contrasting the local position with that of other steel producers worldwide with the purpose of highlighting ways to improve the production processes and quality of the steel considering the existing resources and the possibility of their reinforcement using viable modern scientific methods of exploitation as justified by current market development trends.

Methods

Data were collected through industrial visits and individual interviews at different steel mills, foundries and related metal products user industries and stakeholders. Extensive review of relevant literature has also been done.

Key Findings

Overall, the Ugandan steel industry is dominated by local small-scale industrialists and a few medium to large -scale producers. Obsolete technology, lack of proper training and appropriate technology transfer initiative and absolute lack of research and development at enterprise level have held back productivity, capacity utilization, product diversification and enterprise advancement. The major raw material is scrap iron which is also getting scarce. Quality related issues have also not been effectively addressed to ensure that only standard and reliable products reach end users.

Conclusions

The harnessing of existing raw materials and increased government significance in the exploitation of mineral resources deposits are aspects that the iron and steel industry needs address urgently.

Key words: Iron and Steel; iron ore, scrap; Steel industry; Uganda.

E06: Towards development of a whole life costing based model for evaluation of building designs

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Introduction

Frequently, procuring services is based on the notion that the least expensive technically compliant bidder is the most acceptable to the purchaser. The question today however is, "over the life of the facility, what is the comparative cost incurred?" Selection between different design and construction alternatives on the initial construction cost alone is insufficient. The research objective was to develop a Whole Life Costing (WLC) based software model for evaluating building designs of schools and health centres and to specifically; investigate the use of WLC in Uganda, develop the software model and test model performance to variances in certain pre-set parameters.

Methods

Information received from respondents and theoretical analysis provided the background for the development of the software model and was tested with three classroom block designs. Respondents intimated that they performed WLC analyses within the last four years with the primary driver being the requirement from development agencies to have low Operation, Maintenance, and Replacement (OMR) cost designs

Key Findings

On average, 25% of projects undertaken involved generating design alternatives, with the preferred tool for value engineering being cost benefit analysis. However, due to value of money differentials being dependant on cash flow timing, net present value analysis was the tool for model design. The software model, WLC, is a trial version available at, <http://applications.antsms.com/wlc>.

Conclusions

The benefits of utilising the model will be better management of OMR costs, improved professionalism at design stage and the development of a database that can be used in evaluation processes during procurement of works and services.

Keywords: Discounted Cash Flow; Evaluation Model; Net Present Value; OMR costs; Whole Life Costing

E07: The Effect of Urbanization on the Housing Conditions of the Urban Poor in Kampala, Uganda.

Authors

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Introduction

In this paper, aimed as a background for further research, the author examines the effect of urbanization on housing for the low income earners in Kampala.

Methods

The author discusses Kampala's housing environment by looking at low-income earners' access to housing in the city under conditions of rapid population rise, growing housing demand, rising land prices and growing poverty.

Key Findings

Findings show that the housing environment for low-income earners in Kampala is: far from satisfactory, characterized by sub-standard housing that is lacking both in quality and quantity. Urbanization in Kampala has led to increased housing demand, rising land prices and growing urban poverty in the city, thereby reducing low-income earners' accessibility to decent shelter.

Conclusions

The author concludes by suggesting recommendations to address the negative effects of urbanization while at the same time encouraging equitable development of all regions of the country. He also recommends review of existing land supply policies to address the existing land tenure problems arising out of the multiplicity of tenure systems in place, the establishment of strategies for developing low-cost rental accommodation and supporting the private sector to develop decent and affordable rental shelter

Keywords: Affordable housing, Low-income Settlements, Population Growth, Housing Environment

E08: Challenges to the Sustainability of Small Scale Biogas Technologies in Uganda

Authors

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Introduction

Concerns of climate change, increased greenhouse gas emissions and security of energy supply have accelerated the search for alternative energy sources both in developed and developing countries. Developing countries are now embracing utilization of biogas to meet some of their cooking and lighting needs. In Uganda, despite the introduction of biogas in the 1950's, the technology has not received considerable acceptance and as a result its penetration has remained low. Several installed biogas plants have failed and those working are not working to the expectation of the owners.

Methods

This paper presents results of study carried out to establish the performance of farm based biogas systems, to assess the challenges faced by the users and to identify the possible causes of failure for the non-operational systems. A survey of 212 biogas systems was carried out after which performance monitoring of selected digesters in the districts of Mityana, Bushenyi, Kabale, and Mbarara was done

Key Findings

. It was found that over 55% of the surveyed biogas systems were not operational and others not performing to the users expectations. Most systems monitored were operating in the temperature range between 18°C and 25°C with the gas quality ranging between 50-60% methane. Most digesters showed evidence of high organic loading rates indicated by traces of biogas at the expansion chamber.

Conclusions

The identified causes of failure were poor system maintenance, poor operation practices, availability of other cheap fuel alternatives, lack of interest from the users, lack of alternative sources of feedstock, poor workmanship and system blockages.

Key words: Biogas; Feedstock; Gas quality; Methane; pH

E09: Performance Appraisal of the Casamance Kiln as a Replacement to the Traditional Charcoal Kilns in Uganda

Authors

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Introduction

Charcoal production is an important activity in Uganda's energy mix. The Government of Uganda, through the Ministry of Energy and Mineral Development (MEMD), is advancing promotion of energy efficiency in the charcoal production process to ease on the rampant deforestation. In this research, the Casamance kiln is appraised against the Uganda traditional kilns to gauge their effective performance. The Casamance kiln is known to be one of the most adaptable carbonizers for local charcoal producers. The objective of this research was to produce an affordable and efficient Casamance, which is easy, not only for the charcoal producers to operate, but also for the local metal fabricators to manufacture

Methods

Tests were carried out under different conditions in order to come up with the most suitable operating conditions for charcoal production. The design criteria for the kiln was based on the conditions that favour the formation of organic vapours (tars) and their residence time in the flow tube (chimney). For

affordability, the kiln was produced from locally available materials. The different conditions imposed during the experimentation with the kilns included variation in kiln size and moisture content.

Key Findings

In all cases, the performance of the Casamance kiln was ahead of the traditional kilns in terms of conversion efficiency, quality of charcoal and duration of carbonization.

Conclusions

The Casamance kiln uses only half of the wood used by the traditional kiln to produce the same amount of charcoal, hence resulting in significant wood fuel savings.

Key words: Casamance, Charcoal, Efficiency improvement.

E10: Estimating Areal Rainfall over the Lake Victoria and its Basin using Ground-based and Satellite Data

Authors

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Introduction

A gridded monthly rainfall dataset having a spatial resolution of 2 km was derived for Lake Victoria basin. Such a dataset is useful for hydrological modeling in the basin aimed at resource utilization and also for estimation of catchment flow to Lake Victoria.

Methods

Using cross-validation we showed that universal kriging interpolation was slightly better than inverse distance weighting for the basin. The rainfall patterns in the dataset were assessed and shown to reflect the expected patterns. Rainfall over the lake was estimated from mean observed rainfall over the land area using a correlation between lake and land area derived for two satellite products.

Key Findings

The TRMM 3B43 product showed an enhancement of lake rainfall over basin rainfall of 25% while the PERSIANN product gave a much higher enhancement of up to 80%. Regression based on calendar months resulted in a slight increase in the estimated mean areal rainfall over the lake of 1.0% for TRMM 3B43 and 2.2% for PERSIANN compared to using a single regression equation for all months.

Conclusions

The usefulness and limitations of the two satellite products in estimation of lake rainfall are discussed.

Keywords: Arial rainfall, Lake Victoria Basin, Satellite data

E11: Saturation Flow Rate for Through-Traffic at Signalized Junctions in Kampala

Authors

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Introduction

Capacity of signalized junctions is estimated based on two parameters; allocated green time and saturation flow rate in traffic engineering practice. The allocation of green time proportion is based on traffic demand, lane and phase configurations. However, the saturation flow rate is dependent on locality, traffic intensity and driving characteristics as spelt out in the Highway Capacity Manual [HCM] (2000).

Methods

A study was conducted to determine saturation flow rate for through-traffic at two operational signalized junctions with minimal interference from traffic enforcement; Yard and Kampala-Entebbe Road Junctions in Kampala following HCM 2000 procedure. The estimated field saturation flow rate was compared with recommended value of 1900 vehicles per hour of green per lane [vphgpl] and adjusted values based on HCM 2000 model. The analysis yielded field saturation flow rates of 1579 and 1774 vphgpl at Yard Junction, and 1470 vphgpl at Kampala-Entebbe Road Junction. The adjusted saturation flow rate values were 1608 for Yard Junction and 1539 vphgpl at Kampala-Entebbe Road Junction.

Key Findings

The findings showed that design using ideal saturation flow rate results in over estimation of capacity; whereas correct adjustments using HCM 2000 model results in capacity depicting the operating conditions.

Key Words: Capacity, saturation flow rate, signalized junctions, through-traffic.

E12: Local Content in the Oil and Gas Industry: Implications for Uganda

Authors

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Introduction

It is now generally agreed that Local/National Content in the oil and gas (petroleum) industry is a key driver for value addition in the domestic economy and improvement in welfare of cities where oil has been discovered and produced.

Methods

The paper is based on various studies by various researchers and oil and gas producers' experiences.

Conclusions

It presents recommended practices to promote local content and describes implications for Uganda as the country enters midstream oil and gas activity.

Keywords: Local Content; National Content; Petroleum; Oil; Gas; GDP; HSE

E13: Hybrid E-Learning for Rural Secondary Schools in Uganda: Co-Evolution in Triple Helix Processes

Authors

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Introduction

Rural secondary schools in Uganda perform poorly in Science and Mathematics due to lack of functional science laboratories and libraries. Furthermore, it is difficult for such schools to attract and retain good, committed and qualified Science and Mathematics teachers. Arua is one such District. It has two advanced level girls' secondary schools- Muni and Ediofe. Hybrid e-learning was introduced in both schools for the benefit of 29 students who were taking either Mathematics or Physics or both.

Methods

Local content for the production of interactive multimedia CD-ROMs were developed based on the national syllabus using senior teachers from Makerere College School in Kampala. The students

effectively used the CDs for six months in 2007 and were repeatedly externally examined by Makerere College teachers, Arua District Examinations Committee and the Uganda National Examinations Board. The longitudinal data collected were analysed using multilevel methods.

Key Findings

The results showed that 41% of the students passed and were eligible for university admission. However, after extrapolation of the performance of the students over twelve months, up to 72% of the students would have passed. The paper is discussed by linking the study to its contribution towards the achievement of international and national obligations of Uganda. Co-evolutions of the study into triple helix processes and 'Mode 2' knowledge production are also discussed.

Conclusions

The paper concludes that it is possible to implement hybrid e-learning financially constrained rural secondary schools. However, when carrying out research in the context of the problem, co-evolutions in triple helix processes and Mode 2 production of knowledge are likely to happen.

Keywords: Co-evolution; Hybrid E-Learning; Mode 2; Rural Secondary Schools; Triple Helix;

E14: Application of Spatial Technologies and Field Techniques to Assess the Status of Wetlands in Lake Kyoga Basin in Uganda

Authors

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Introduction

Lake Kyoga basin is the largest basin in Uganda with a surface area of 57,233 sq km. The wetlands in this basin are faced with degradation resulting from conversion to agricultural use. This research was undertaken to assess the current status of wetlands in Lake Kyoga basin and mainly the water quality function.

Methods

The methodology included field measurements on water quality parameters, soil and vegetation. Interviews were conducted with local people living around wetlands and wetland officers in the region. Data generated from field measurements, Global Positioning Systems (GPS) and satellite imagery was entered into a Geographical Information System (GIS) database for further analysis.

Key Findings

Results from the analysis indicate that wetlands are still performing the water quality function at varying levels. The capacity of wetlands to perform this function is however affected by the growing number of activities such as rice growing and industrial development.

Conclusions

The above results could also indicate the low level of opportunity for wetlands to perform this function given that agricultural methods in the area do not employ inorganic fertilisers and other chemicals such as pesticides.

Keywords: Wetland Assessment, Lake Kyoga Basin, Uganda, Wetland Functions, GIS

E15: An Innovative Intervention by a Multiplicity of Surface and Underground Interlinked Dams/Weirs, Sand Storages, and Sub-Geological Engineering to Solve Karamoja's Perennial Water Stress

Authors

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Introduction

If Karamoja has sufficient water to cause devastating floods that resulted in 50 fatalities and many more homeless in 2007 means that it has the potential to save its situation by turning the disaster around with application of interventions that target self-healing by innovative application of geological science and water engineering at surface and subsurface levels. Karamoja's problems of drought, despite the region being apparently highly "irrigated" with a vast network of (perennial?) rivers/streams, raises a question of what is really wrong? The fact is that most rivers and streams are simply seasonal and a sustainable solution to soil moisture management (retention and strategic utilization) does not exist.

Methods

In this paper, it will be indicated that the water resources of the region are sufficient to sustain a normal non-drought prone lifestyle. The apparent problem is inherently indigenous and hence has more to do with the physical layout of the terrain criss-crossed by numerous stream-mini-valleys that provide quick drainage of any water that would come in contact with it. It is a situation of over drained landscape, which easily explains the devastating floods from rainfall that cannot be described as extreme.

Key Findings

With the intervention suggested, there will be no more devastating floods and instead the potential flood water will be slowed down till it infiltrates thus recharging the surface, underground, and sand storages. These will be a base for building up groundwater reserves that, by capillary action, will raise water even above the stream level thus proving needed soil moisture for normal growth of vegetation.

Conclusions

If these interventions proposed, underground dams, sand storages, and interlinked systems were adopted and executed, they would be engineered locally with minimal external consultation and from three years of the start of the project, visual manifestations of greenery will start occurring.

Keywords: groundwater engineering, floods intervention, subsurface dams, sand storages

E16: The Architectural Transformation of Makerere University Neighbourhoods during the Period 1990-2010

Authors

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Introduction

This paper is based on a field study of the neighbourhoods of Makerere University Main Campus since the liberalization of the higher education sector in Uganda (1990-2010). The background to the study was the apparent urban transformation that has occurred in the environs of Makerere University campus in areas that were formally informal settlements characterized by shanty-town conditions. The problem under study was the apparent 're-informalisation' (moving from informal to some kind of formalization and yet returning to an informality situation) of the neighbourhoods of Makerere University main campus. The main objective of the study was to explore the link between the liberalization of the higher education sector in Uganda, a policy which allowed private sponsorship of students at public universities, and the rapid transformation of these environs, as well as the urban and architectural character of that transformation.

Methods

The study was conducted through physical field observations and study of archival documents, including photographic records and maps. Key person interviews were also conducted with technocrats in Kampala City Council, architects and planners.

Key Findings

The study revealed a direct connection between the policy of liberalization of the higher education sector in Uganda and the rapid transformation of Makerere's neighbourhoods.

Conclusions

The urban and architectural transformation of these neighbourhoods was found to be eclectic in nature and devoid of any consideration of the urban typologies that characterise the City of Kampala.

Key Words: Architectural transformation, environment, liberalization policy, urbanisation

E17: On the Contribution of Victoria Nile River Discharge to the Hydrological Performance of East Africa's Lake Victoria

Authors

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Introduction

This paper presents an analytical re-appraisal of Lake Victoria's water balance, against a background of persistent, worldwide claims in the media that the sharp decline of the Lake's water level observed between 2003 and the end of 2006 was primarily the consequence of excessive and unscrupulous abstractions of water by operators of Owen Falls Dam Power Stations at Jinja, Uganda, allegedly in sheer contravention of the so-called "agreed curve" that was adopted purportedly to uphold the hydrological health, and hence the natural water levels, of the Lake

Methods

An equation that facilitates quantification of the contribution of Victoria Nile to the depletion of the waters of Lake Victoria during times of falling water levels is derived. An analogy is established between the derived equation and the equation of state of perfect gases of thermodynamics that provides a framework for treatment of the two sets of variables in the two equations in similar ways.

Key Findings

With aid of the equation, evaluations of the contributions of the agreed curve releases and over-abstractions, as components of the overall contribution of Victoria Nile to declines of water levels of Lake Victoria, are undertaken for the hydraulic data statements of December 2005 - the worst month in terms of the recent Lake level fall. The results reveal that the "famous" 55% responsibility level for the declining Lake levels observed then and attributed to over-abstraction in the various media claims could only have arisen out of a flawed prescription of what the 55% actually measured. It is shown thereafter that even with as much as 55% contravention of the agreed curve, the overall contribution of Victoria Nile to the declining Lake water levels could not have exceeded 15%, except if the Lake water level happened to fall at rates of 3 millimeters or less per day during the observation period. In such a case, the paper argues, there would hardly have been so much outcry and accusations as propagated in the media.

Conclusions

Finally, the paper questions the efficacy of the agreed curve to uphold the "natural" hydrological health of Lake Victoria, other than to simply guarantee water supply for irrigation requirements of riparian Countries downstream.

Keywords: Agreed Curve, Lake Victoria, Fluctuation, Over-Abstraction, Riparian Countries, Victoria Nile, White Nile.

E18: Integrating Science, Technology and Innovation in National Development Planning Process: the Case of Uganda

Authors

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Introduction

Science, technology and innovation (STI) plays a critical role in enhancing economic growth and contributing to national development. It is the means by which new products and services are developed or improved and brought to the market. However, to make this contribution, STI must be integrated in the national development planning process.

Methods

Over the years, the integration of STI in Uganda's national development planning has been implicit. Intentions to use STI as the vehicle for economic growth are evident in the country's comprehensive development framework such as the Poverty Eradication Action Plan (1997 - 2008/09) and the National Development Plan (2010/11-2014/15). However, strategies of how to use STI to bring about the desired outcomes of economic growth were lacking.

Key Findings

The recent designation of STI in the National Development Plan of Uganda as a sector that provides institutional and infrastructural support to the production of goods and services demonstrates that integration of STI in development planning could be accomplished through endogenous efforts.

Conclusions

But such inclusion of STI in the Plan should not be taken as an end in itself; rather it should be seen as a process. And implementation of the STI provisions of the NDP ought to be undertaken within the context of the national innovation system.

Key words: Innovation, Innovation System, Science, Technology, Uganda.

E19: Exact Large Deflection Analysis of Thin Rectangular Plates under Distributed Lateral Line Load

Authors

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Introduction

Research on large deflection of thin rectangular plates to date has focused on plates under uniformly distributed load. There is need to extend the theory to other forms of loads that are encountered by practicing engineers. Exact analysis of large-deflection of thin rectangular plates under distributed lateral line-load is presented in this paper.

Methods

The analysis is based on solving Von Kármán equations, which relate lateral deflection to applied load and stress. The exact solution is one where the load, deflection, and Airy stress functions are represented by double Fourier series and both x and y coordinate axes are along the plate edges.

Key Findings

The functions are substituted into the Von Kármán equations to get third degree polynomials describing relationships between load and deflection coefficients. The resulting polynomials are solved using MATLAB function solver, fsolve to get deflections caused by different loads.

Conclusions

Results are plotted to show the trends of relationships between loads and deflections, and deflections and number of coefficients.

Keywords: Airy Stress; Exact analysis, large deflection; Line load; Von Kármán equations.

E20: Beneficiation and Evaluation of Mutaka kaolin

Authors

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Introduction

Kaolin is an important industrial mineral which often needs upgrading for special applications. The upgrading process, commonly known as beneficiation, is aimed at removing impurities like feldspar, quartz, iron oxide, etc. In this study, a kaolin sample was collected from a deposit located at Mutaka, South-Western Uganda, – the biggest kaolin deposit in the country. With the aim of upgrading this sample, it was processed by a laboratory hydro cyclone to produce a kaolinite concentrate and this has been characterized to ascertain its use as an industrial raw material.

Methods

Characterization of the beneficiated sample was carried out by XRD, SEM, particle-size distribution, density and volume measurements, chemical analysis, whiteness index test, thermal analysis (DTA/TG) and surface area measurements.

Key Findings

Results show that the laboratory beneficiation exercise improves the kaolin sample to a very high grade with a chemical composition close to that of ideal kaolinite. The major impurity after beneficiation, iron oxide, was further reduced by acid leaching.

Conclusions

Results show that the properties of the final product are close to that of ideal kaolin.

Keywords: Beneficiation, Kaolin, Mutaka kaolin, Particle size distribution

E21: Title: Gender Relations and ICT Adoption in Contemporary Uganda: A Case of Computers and Mobile Telephones.

BY ARAMANZAN MADANDA

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ABSTRACT

Introduction

The thesis is about gender relations and adoption of computers and mobile phones in Uganda. The main objective of the study is to assess how gender relations relate to diffusion and adoption of ICT and women's empowerment under liberalized ICT policy. Specific objectives are to: analyze accessibility and utilization of computer technology and mobile telephony by gender; examine the influence of gender relations on diffusion and adoption of computer technology and mobile telephony by women and men; assess how adoption of computer and mobile telephone technology influences gender relations at household and community levels; and analyse apparent benefits and opportunities of computer technology and mobile telephony to women and men.

Methods

The study that eclectically draws on feminist, neoliberal economic development and diffusion of innovations theory is exploratory and cross-sectional in design. Fieldwork was conducted in two districts of Uganda namely Iganga and Mayuge using qualitative and quantitative methods. Results indicate that gender relations namely gender roles, power relations between men and women and emotional relations have a bearing on a number of aspects that relate to diffusion and adoption of computing and mobile telephony. These aspects include: the diffusion channels or ways, through which women and men access the technology; accessibility to technology which is not automatic even when women could afford to buy

them; use which is mediated by considerations of safety especially for women and use which can result into desirable and undesirable outcomes at household or community levels.

Results

Findings show that existing gender structures have been dented and that patriarchy is stressed by adoption of the technologies especially mobile phones leading to transformation of gender relations to an extent. However underlying gender structures though fractured remain largely intact and limit the beneficial impact of ICT, in this case computing and mobile telephony particularly to women. The study finds a strong intersection between use of especially mobile phones and escalation of gender based violence. Further, it is noted that the overall ICT policy regime that is based on a free market ideology bears benefits to women and men as well, but these benefits are limited by the exclusion of certain sections of society particularly women engaged primarily in the agricultural sector which ostensibly is the mainstay of Uganda's economy.

Conclusion

The overall conclusion is, therefore, that ICT diffusion and adoption and its benefits can be meaningfully enhanced if attention is paid to gender relations at family, community and policy levels. This should involve ensuring that ICT policy is gender responsive and that elements of gender relations that stand in the way of leveraging ICTs for women's empowerment are attended to by all actors including government, private companies, communities and individuals.

E22: Identifying and Fixing High Traffic Crash Locations in the Road Network in Uganda

Authors

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Introduction

This paper presents findings of the first part of a research to develop a procedure to identify and fix high crash locations in Uganda using crash data.

Methods

The paper comprises of a review of literature on best practices and methods in traffic crash analysis, evaluation of existing data collection and storage systems, vehicle and crash statistics, procedure to identify high crash locations, and improvements to crash data collection process in Uganda.

Key Findings

Preliminary findings show that existing crash data records are inadequate in both quantity and quality making it impossible to carryout meaningful engineering safety studies. Consequently, an improved data collection instrument has been designed for awaiting stakeholders' input and approval.

Conclusions

The study recommended major investments in robust data handling, storage and retrieval systems for the country.

Key Words: Crash data collection, Traffic crashes, Road Traffic Safety

E23: Estimating the Critical GAP and FOLLOW-UP Headway at Roundabouts in Uganda

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Introduction

This paper presents the findings of a research to estimate the critical gap and follow-up headway at five selected roundabouts in Uganda.

Methods

Research data was collected using video technology and reduced by recording time positions of vehicles into MS Excel. Accepted and rejected gaps of individual entry drivers were determined. The maximum likelihood estimation technique proposed by Troutbeck (1992) was used to estimate the critical gap from a pair of accepted and largest rejected gaps of individual drivers. The follow-up headway was estimated assuming a log-normal distribution and the computation accomplished by MS Excel.

Key Findings

The findings show the mean critical gap values at the all locations as 3.25, 2.67 and 3.18 seconds for vehicles, motorcycles and a combination respectively. The mean follow-up headway 1.90 seconds and standard deviation 0.60 seconds with lower and upper follow-up bound values of 1.79 and 2.01 seconds at 95% confidence level. It was observed that motorcycles consistently chose shorter gaps than vehicles although this did not significantly affect the overall critical gap values in combination with the vehicles. Drivers were found to be homogeneously aggressive; a fact explained by very short critical gaps, follow-up headway and a small coefficient of variation of 23-percent for a combination of vehicles and motorcycles.

Conclusions

The study recommended adoption of critical gap of 3.50 seconds and follow-up headway of 2.00 seconds for operational analysis in the Uganda.

Key words: Critical gap, Follow-up headway, Log-normal, Maximum likelihood estimation, Roundabout

E24: A Tree Model for Diffusion of Spatial Data Infrastructures in Developing Countries

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Introduction

The scope of implementation of Geographical Information Systems (GIS) has in the recent past shifted and exceeded the limits of corporate boundaries, primarily out of the need and desire to exchange spatial data across GIS systems installed in various institutions. Consequently, Spatial Data Infrastructures (SDI) have been developed to facilitate efficient and easy accessibility to geospatial datasets in an attempt to remove barriers to utilisation of Geographical Information Systems. From Global, through regional to national and local levels, interconnected SDIs have been developed mainly in developed economies. Developing countries in the process of developing SDIs are faced with a challenge of using models from the developed world and yet the operational environments significantly differ

Methods

This paper examines SDI Implementation models in developed regions and evaluates the underlying assumptions in the models.

Key Findings

The paper indentifies that most of the assumptions in the models do not efficiently reflect the reality of the SDI implementation environment in developing countries such as Uganda.

Conclusions

The paper final proposes an alternative SDI implementation model that is localised to the SDI implementation environment in Uganda. For simplicity, this model is referred to as a Tree Model so as to reflect the inter-dependence of SDI components at various levels of government. It is characterised by national institutions initially taking up the central role in the core activities of the SDI in the early stages of its diffusion.

Keywords: SDI, Tree Model, Uganda, GIS, Developing Countries

E25: Examination of the Management of Grey Literature in Selected University Libraries in Uganda

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Introduction

Grey literature constitutes one of the important sources of information in university libraries. It is a very useful source of information, covering all segments of knowledge and serves the information needs of people from different disciplines. However, university libraries in Uganda have had problems making grey literature accessible.

Methods

This study examined the management of grey literature in selected university libraries in Uganda in order to provide a framework for effective management of grey literature in university libraries in Uganda. The specific objectives included: to examine the state of grey literature management in university libraries in Uganda; to establish the challenges of managing grey literature in university libraries in Uganda; and to provide strategies for effective management of grey literature in university libraries in Uganda. The study covered libraries of seven universities including Makerere University, Mbarara University of Science and Technology, Uganda Martyrs University, Kyambogo University, Gulu University, Uganda Christian University and Islamic University in Uganda. While the study was descriptive and evaluative, both qualitative and quantitative approaches were used to and data collected from 27 grey literature managers using interviews plus 704 questionnaires administered to 704 grey literature users.

Results

Findings revealed that university libraries do not have clearly documented policies and guidelines for acquisition of grey literature; they face a number of challenges in processing grey literature; there are no uniform standards used while managing grey literature and consequently no effective mechanism to allow satisfactory access to the collection. Libraries hold very few copies of grey literature resulting into limited access and high chances of wear and tear. Both the managers and users of grey literature managers are of the view that the way grey literature is managed should be modified for improved access.

Conclusion

Strategies proposed to facilitate improved management and access to grey literature include development and adoption of grey literature collection development policies, adoption of cooperative ventures among university libraries, centralized control over the management of grey literature, standardization, use of specialized classification and subject heading lists for grey literature, preservation, conservation and digitization of grey literature, building grey literature digital institutional repositories based on a common standard, publicity, user education and inclusion of grey literature studies in the library and information science curriculum.

POSTERS

Theme: Natural Resources Utilization, Conservation and Environmental Sustainability

Poster 1

Community Education for the Preservation of Medicinal Plants for Poverty Reduction and Sustainable Development

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Abstract

Introduction: Traditional medicine (TM) occupies a central place in the management of diseases in Uganda. Although many people rely on TM, the traditional knowledge (TK) associated with TM is getting steadily eroded. To slow down the loss of this TK it is necessary to document and conserve as much of it as possible. We undertook a project conducted with four objectives, 1) to record important aspects of TM 2) catalogue medicinal plants 3) to raise awareness about the importance of TM and 4) to establish demonstration botanical gardens.

Methods: The project was conducted between October 2008 and January 2009 in the districts of Mukono, Nakapiripirit, Kanungu and Pallisa. Field data was collected through key informant and household interviews. 171 respondents, belonging to the Karamojong, Bakiga, Bagwere and Baganda ethnic groups were interviewed in household interviews. Feedback workshops were held in all four districts where fieldwork had been conducted. Medicinal botanical gardens were established in collaboration with Nabalanga Primary School, Kaucho Primary School, San Geovani High School Makiro and St. Theresa, Nabilatuk Parish Church. These institutions provided land and labor while they were given support to clear plots of land for establishing the gardens, acquire planting material, sow seedlings and maintain the gardens for the first four months. Fences and signposts were also provided. The District Forestry Officers of Pallisa and Kanungu participated and provided expert advice on the establishment of the gardens.

Key findings: The common diseases and conditions in the four districts included malaria, cough, headache, diarrhea, abdominal pain, common cold, backache and eye diseases. Respondents stated that when they fall sick they self medicate themselves using plant medicines or consult western doctors. Self medication using medicinal plants was reported mostly by respondents of Nakapiripirit and Mukono. Respondents had knowledge of how to treat 78 ailments using plants. People sometimes used animal parts, soil, salt and water from a grass roof, in traditional medicines. The knowledge to treat ailments was acquired from parents and grand parents. Respondents' age, level of formal education, occupation

and tribe significantly affected knowledge on medicinal species ($p < 0.05$). Gender on the other hand did not affect this knowledge. 262 different plant species used to treat ailments in the four districts have documented. 155 of were identified to species level. Out of these, 44 species were prioritized basing on the number of respondents who mentioned them and the number of districts from which they were reported. The most frequently used part in herbal medicines was the leaf, followed by the stem and root.

The workshops generated confidence from the participants and created goodwill. Participants stated that the feedback had improved their trust with the research team and promised better cooperation in future. Participants were interested to know whether laboratory tests had been conducted to determine whether the medicinal plants that had been inventoried had medicinal activity and also whether doses had been determined.

This survey has indicated that traditional medicine is still important in Uganda because many people use it as a first line of health care when they fall sick. The many plants that are used in herbal medicines or remedies should be prioritized by focusing on those remedies believed to be efficacious and/or for which a high consensus exists. Feedback workshops are important in generating confidence among respondents.

Poster 2:

Tourism, Power and Partnerships: Investigating a new approach to Conservation and Development in Uganda

Wilber Manyisa Ahebwa, V. René van der Duim & Chris. G. Sandbrook

Abstract

Nature-based tourism is well recognized as a neoliberal approach to wildlife conservation. Proponents argue that such tourism can provide revenue for conservation activities, income generating opportunities and other benefits for local people living at the destination. Private-Community Partnerships are a particular form of intervention in which local benefits are claimed to be guaranteed through some form of shared ownership of the tourism venture. However, questions have been raised about power imbalances between local and non-local stakeholders, and how these might influence outcomes. In this paper we evaluate a new Private-Community Partnership in a high-end tourist eco-lodge at Bwindi Impenetrable National Park, Uganda. We examine the introduction, development and implementation of this partnership using the policy arrangements approach. This is done through analyzing the actors involved and excluded in the process, the emergence of coalitions and forces, the governing rules and the claims of non-local partners that it was a participatory and community owned process. The case study is used to portray ways in which unequal power relations can allow non-local actors and discourses to shape the nature and distribution of benefits and costs of tourism and conservation for local people.

Poster 3:

Bridging Conservation and Development through Community Involvement in Tourism enterprises; an assessment of the BUHOMA- MUKONO Model at Bwindi Impenetrable National Park (BINP), Uganda

Wilber Manyisa Ahebwa & V. René van der Duim

Abstract

Community reliance on Bwindi forest for timber, charcoal, game meat, firewood and other forest resources had caused serious threats to the existence of biodiversity and to safeguard this rich biodiversity area, Uganda Wildlife Authority (UWA) declared it a National Park in 1991. This ignited serious community aggression as access to the forest resources was interfered with, complicating conservation efforts even further. Given the unique biodiversity value of BINP, the search for a conservation solution in face of stiff community resistance attracted the attention of several international conservation organizations such as African Wildlife Foundation, World Wildlife Fund through International Gorilla Conservation Programme and donor agencies such USAID through US Peace Corps. Tourism was introduced at BINP in 1993 as a conservation and development tool. Direct community involvement in tourism business was the first direct policy intervention aimed at enabling communities benefit from tourism with hope that it would address livelihood concerns as well as negative attitudes that had threatened conservation in the area. Using data collected through extensive documentary review, focus group discussions, participant observations and key stakeholder interviews, this paper uses the four dimensions of the Policy Arrangement Approach (PAA) to analyze the Buhoma - Mukono direct community involvement model at BINP. The paper discusses the enactment and implementation processes of the policy intervention and goes further to show the implications of this intervention on community livelihoods and conservation.

Poster 4:

ETHNO-NOMENCLATURE OF THE SHEA TREE (*Vitellaria paradoxa* C.F. Gaertn) AND ITS PRODUCTS IN THE SHEA ZONES OF UGANDA

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Abstract

Assessment of ethno-nomenclature of the shea tree (*Vitellaria paradoxa*) and products was conducted in the north-eastern shea zones of Uganda. A total of 275 respondents in the area were interviewed and questionnaire responses qualitatively analysed. Results showed a wide variability in ethno-names of the shea tree/products among the different ethnic groups. Even within the same ethnic group, enormous differences in the ethno-names exist. For instance, the Alur ethnic group call the shea tree as *yao*, *yen*, *danyu* or *awa* and the shea nut as *pok yao*, *apoka yao*, *awakorongo*, *dend yao nyinge* or *pok sundri*. Such variability could productively inform research and partly may be due to the differences in languages spoken by or dialectical differences across the ethnic groups. It could also be a reflection of extensive range of occurrence of the shea trees. The few similarities in ethno-names especially among the Acholi and Lango and those among Lugbara and Madi ethnic groups could be attributed to the shared historical background, migration, intermarriages or trade among them. Further investigation on the meaning of the various ethno-names of the shea trees/products would ascertain whether these names are in anywhere linked to prototypes or conservation issues of the shea tree resources.

Key words: *Indigenous knowledge, local names, nomenclature, shea tree, Vitellaria paradoxa, parklands, Uganda*

Theme: Governance, Human Rights, Conflict and Disaster Management

Poster 1:

ABSTRACT

Introduction

Governance, Human Rights, Conflict and Disaster Management are concepts that are intertwined and related in that they all have a contingent element where one leads to the other and visa versa.

Governance according to World Bank is the exercise of political authority and the use of institutional resources to manage society's problems and affairs. Governance however is categorized as good governance, bad governance, global governance, corporate governance, project governance, information technology governance, non profit governance and Islamic governance.

Human Rights according to Badru Kateregga is the claim that have achieved a special kind of endorsement or success by the legal system through wide spread sentiment or an international order, they are legally binding since in most cases they enjoy the backing of the law, both municipal and international. Important to note is that, this has been as a result of the 1948 Paris Universal declaration of Human rights that was adopted on 10th December 1948 and they include freedom of speech, freedom of Assembly, freedom of fear and freedom from want, as their basic war aims.

Conflict is seen as, part B is in conflict with party A if efforts purposely made by party A to offset the efforts of B by form of blocking that will result in frustrating B from obtaining their goals or furthering their interests and disaster management is the approach that is taken to reduce, minimize and handle the a disaster or the effects.

The contingent effects of the concepts above are in a way that, a form of governance is very crucial to determine human rights, conflicts and disaster management. If a particular state, organization, corporation, project experiences bad management, then there is likely hood that human rights will be abused, conflicts will escalate and disasters may be poorly managed and visa versa.

Objectives

This study will asses and examine the relationship between governance, human rights, conflicts and disaster management and see how one leads to the other.

Methods

Qualitative and quantitative study design techniques will be used so as to supplement and complement each other and the qualitative approach will be employed since most facts will be from opinions, responses and attitudes and quantitative approach will be employed to represent the numerical data.

Unit of study

This study will help in understanding and providing an insight to the relationship that exists between governance, human rights, conflicts and disaster management.

Theme: Agricultural Productivity, Food Safety & Security, and Value Addition

Poster 1:

Abstract

Farmers' perceptions of orange-fleshed sweet potatoes as a food security crop in central and eastern Uganda

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Introduction: The sweet potato (*Ipomoea batatas* L.) is a common staple food grown and consumed world over. In Uganda, sweet potato highly contributes to the daily caloric intake of the population. National Agricultural Research Organisation in Uganda in collaboration with the International Potato Centre (CIP) have continuously made efforts to step up sweet potato nutritional value, production and consumption so as to make a contribution to the livelihoods and health of the population in Uganda. Orange Fleshed sweet potato (OFSP) varieties were specifically enriched with vitamin A to minimize Vitamin A Deficiency (VAD) related illness that was observed by UDHS (2001) to be a danger to Ugandans.

In the effort to promote production and consumption of the new OFSP varieties among the farming communities, change agents and development partners tended to put emphasis on the nutritional value. What farmers take into account in taking up a new variety into their farming and food systems was neither considered nor thought about (ignored). Little had been done to find out what and how OFSP variety had made a contribution to the lives of the farming communities where it was introduced.

Approach used in the study (methodology): The descriptive study was conducted (2009 and 2010) in the districts of Soroti, Kamuli (Eastern), Mukono, and Kampala - Kawempe division (Central). Farmer groups that worked with the OFSP projects were the entry points. Data collection was phased into two: exploratory and in-depth. Sampling of both the farmer groups and individual farmers in the groups was largely purposive. Data was collected from a total of 12 groups and about 300 farmers. Focus group discussions, individual interviews, participant and direct observations were the main data collection methods used. Qualitative data was analysed by emerging patterns and themes while quantitative data on acreage was analysed using excel. Weighted ranking was used to ascertain OFSP varietal preferences.

Key findings

Sweet potato was one of the major crops across the study districts. Both the local and the OFSP varieties were cultivated though to most farmers, the local varieties were reportedly more superior and most preferred. Kakamega, Kabode, Vita and Ejumula were the OFSP varieties grown. Kawempe allocated the least land while Soroti and Kamuli allocated the biggest land to OFSP. Most of the farmers cultivated utmost two OFSP varieties but with more land to the most preferred variety. The status of OFSP varied across districts. In Soroti, OFSP was more of an income-generating crop than a food crop while in Kamuli, Mukono and Kawempe OFSP was more of a food crop than an income-generating crop. Although preferences of OFSP varieties varied across individuals and districts the overall picture revealed that majority of the respondents (more than 60%) across the study area preferred Kakamega to the rest of the varieties for both food and income generation. The preference was based on relativity in: in-ground storability, ease of acquiring the vines after a dry spell, canopy establishment, shelf-life and susceptibility to drought and pests (and diseases), hardness and sweetness. Undesirable smell of the cooked tuber, lack of tastiness and soft texture of boiled tubers reportedly rendered OFSP less superior to the local sweet potato varieties as food.

Conclusion: The findings show that the local sweet potato varieties were most preferred and perceived to be more superior to the introduced vitamin-A rich OFSP varieties. This gives the implication that OFSP currently has very low potential of being perceived to play a role in ensuring food security.

Key words: Orange-fleshed, sweetpotato, perception, farmer,

Poster 2:

Factors influencing tastes and preferences of consumers of chicken meat in Kampala

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Abstract

A survey was conducted to assess the consumer tastes and preferences of chicken meat in Kampala in February 2009. A total of 20 public eating-places from Central division and Kawempe division were randomly selected for this study. Eighty respondents inside and eighty respondents outside the eating places were interviewed using a structured questionnaire. Over 80% of the chicken consumers preferred local chicken meat to that from the exotic strains of chickens. Gender and residence of the consumers during childhood did not have much influence on the tastes and preferences for chicken meat. Preference for local chicken was mainly due to perceived taste, toughness and freedom from chemical contaminants. Only 7.6% of the consumers preferred broiler chicken meat and the main reason for its preference was its tenderness. To many of the consumers, meat from spent hens served as an alternative to local chicken. Consumers who preferred local chicken had a misconception that meat from exotic chickens are loaded with residues of poultry drugs. The study also revealed that about 43% of the consumers prefer the leg (thigh and drumstick) of a chicken to any other parts while 16.3% preferred the breast, because of the

fleshiness of these cut-ups. Approximately 24% of the consumers preferred the back, and 14.4% preferred the wings, mainly due to perceived good taste associated with bony meat. Over 87% of respondents had not changed their preferences for the type of chicken since childhood. The high cost of local chickens was the major reason given by consumers who had changed their preferences. Consumers' income had an influence on the frequency of eating chicken and the amount of meat consumed per sitting. This study indicates a potential niche market for local chicken meat in Uganda.

Key words: Chicken, meat, consumption, tastes, preferences, Uganda

Poster 3:

Germplasm Collection and Cultivation Trials of Selected Indigenous wild Edible saprophytic Mushrooms of the genus *Pleurotus* and *Auricularia* from the forest reserves of Uganda

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Abstract

Mushrooms are reported to be of high nutritive and medicinal values and commercial potentials, which benefits remain largely unexploited particularly in sub-Saharan African countries like Uganda due to seasonal collection from the wild. We collected germplasm from wild edible mushrooms of the genus *Pleurotus* (species P1, P2, P3) and *Auricularia* (wood ear), and carried out cultivation trials on agricultural waste substrates that included cottonseed husks (CSH), dry banana leaves (BL), dry grass (DG) and groundnut husks (GH). The polythene bag technology was employed in the cultivation trials carried in a mushroom growing house. We recorded the time periods for spawn running and fruit body formation; the number of flushes per growing bag; and mushroom yield per kg of fresh substrate used. Germplasm was successfully collected for all the study species. However, only *Pleurotus* spp were able to grow on the agricultural wastes used in the cultivation trials. The time taken for pin head formation following inoculation varied among the species and substrates, spanning from 11 to 12 days. Similarly, the entire crop cycle varied spanning 25 to 50 days. Generally, P1 had the shortest entire crop cycle from inoculation to final harvest of 25-28 days on GH and P3 the longest on BL and DG of 48-50 days. The number of flushes per growing bag spanned 0-5 for the different species and type of substrate, with cotton seed husks recording the highest and dry grass the lowest. Mushroom yield varied among the species and the substrates used. For example for *Pleurotus* sp (P1), the highest yield on a dry weight basis recorded for dry grass (272.2g/bag) and lowest for dry banana leaves (85.4g/bag). Whereas for P3 the highest yield was for cotton seed husks (43.4g/bag) and the lowest for dry grass (26.0g/bag). The amount of mushrooms harvested from each bag decreased with subsequent flushes, with the first flush having the highest and last flush the lowest. The studied revealed that wild edible *Pleurotus* sp mushrooms in Uganda's forests can be domesticated and cultivated using the commonly available agricultural wastes in households. Hence they have a potential to contribute to household food security and nutrition if their cultivation is up-scaled to households level. Further research is required for the indigenous wild edible

Auricularia sp to clearly understand the conditions it requires to colonise cereal grains and to grow on agricultural wastes.

Acknowledgement: The research was supported by a Research Grant from the NORAD under Phase II of continued Government of Norway support to Makerere University Institutional Development Programme. This research was part of a major project titled: *Developing strategies to sustainably utilise indigenous edible Auricularia and Pleurotus mushrooms for food security and household incomes around Uganda's forest reserves.*

Theme: Health and Health Systems Research for National Development

Poster 1:

Title

Luganda Translation, Adaptation, Validity and Reliability of the SRQ-20 questionnaire among HIV positive individuals in a Rural ART program in Uganda.

Authors: Nakimuli-Mpungu E , Bass J, Katabira E, Musisi S, Nachege J

Abstract.

Background: HIV treatment programs are in need of a brief, valid instrument to identify common mental disorders such as depression. Many studies support the Self-Reporting Questionnaire 20 (SRQ-20) as a cost-effective instrument with which to measure depression symptoms, but there have been no previous studies performed to describe the cross-cultural adaptation and determine the validity of the Luganda version of SRQ-20. In this paper, we describe the translation and adaptation into Luganda the SRQ-20 screening instrument for depression and investigate its psychometric properties.

Method: Initially, we translated the SRQ-20 from English to Luganda. Key informant interviews and focus group discussions were used to adapt the instrument, which was used to evaluate 200 HIV positive individuals in a rural ART program in southern Uganda. Thereafter, all study participants were evaluated with the MINI diagnostic interview. Receiver operating characteristic analysis was used to examine the sensitivity and specificity of the SRQ-20.

Results: Five items of the SRQ were modified. Of 200 subjects enrolled, 48 met DSM-IV criteria for major depression or other depressive disorder. The SRQ-20 scores discriminated well between subjects with and without current depression, with an area under the curve (AUC) of 0.917, as well as between subjects with any versus no depressive disorder (AUC= 0.75). A score of 6 or more had 84% sensitivity and 93.14% specificity for current depression and 75% sensitivity and 90.13% specificity for any depressive disorder. The AUC was similar regardless of age, gender and education status. Cronbach's α coefficient for the SRQ-20 was 0.84. Test-retest reliability was moderate with 85% agreement between the first and second assessments (Kappa=0.483)

Conclusion: The SRQ-20 appears to be a reliable and valid screening measure for depression among rural HIV positive individuals in southern Uganda.

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Poster 2:

Rates of anti-tuberculosis drug resistance in Kampala-Uganda are low and not associated with HIV infection

Abstract

Background: Drug resistance among tuberculosis patients in sub-Saharan Africa is increasing, possibly due to association with HIV infection.

Methods and Principal Findings: We studied drug resistance and HIV infection in a representative sample of 533 smear-positive tuberculosis patients diagnosed in Kampala, Uganda.

Among 473 new patients, multidrug resistance was found in 5 (1.1%, 95% CI 0.3-2.50) and resistance to any drug in 57 (12.1%, 9.3-15.3). Among 60 previously treated patients this was 7 (11.7%, 4.8-22.6) and 17 (28.3%; 17.5-41.4), respectively. Of 517 patients with HIV results, 165 (31.9%, 27.9-26.1) tested positive. Neither multidrug (adjusted odds ratio (OR^{adj} 0.7; 95% CI 0.19-2.6) nor any resistance (OR^{adj} 0.7; 0.43-1.3) was associated with HIV status. Primary resistance to any drug was more common among patients who had worked in health care (OR^{adj} 3.5; 1.0-12).

Conclusion/significance

Anti-tuberculosis drug resistance levels in Kampala are low and not associated with HIV infection, but may be associated with exposure during health care.

Theme: Technology for Socio-economic Transformation

Poster 1:

Transferring Best Practices for Uganda Technological Innovation and Sustainable Growth

Authors

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Introduction

Uganda, like many other African countries has not been developing primary science, technology and innovation Indicators and to make them accessible to public and private sector decision makers for social economic development and investment purposes. Indicators have not been given serious attention as engines of long-term development

Methods

This paper reports the results of a research undertaken to develop a set of relevant science, technology and innovation Indicators for Uganda. From a population of 7,336 firms, 300 firms were sampled for innovation surveys and 200 institutions for the Research and Development survey. The data collected were represented in tables and was grossed up. Data entry was taken in CSPRO and the analysis was done using STATA statistical software

Key Findings

There is a global perception that businesses in developing countries like Uganda are generally dominated by Small and Medium enterprises; and that is where most innovations were happening. This paper will discuss the core indicators of Research and Development (R&D) and Innovation; the empirical data of the state of Uganda's Science, Technology and Innovation Indicators. The paper further explores the potential benefits and the best practices in incubation process.

Conclusions

The major conclusion is that prioritizing science and technology policy will create more opportunities and build capabilities for innovations and technology. The monitoring of industry, government and university R&D programs is crucial to successful policy making and analysis.

Keywords: Business Incubation, Innovation Indicators, Research and Development Indicators, Triple Helix, Uganda

Poster 2:

User Participation in the Eyes of an Architect and Gendered Spaces

Authors

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Introduction

In Kampala City, the high rate of urbanisation has led to sprawling informal settlements which are characterised by substandard housing conditions. Urban sprawl wastes valuable land and makes services and infrastructure delivery expensive. Several housing projects were undertaken by government to provide affordable, adaptable and convenient housing solutions to low-income households. Most of these projects adopted a "top-down" approach in design, which seems not to have considered how the low-incomes households actually used. The paper shows that considerations for space use would lead to the

development of more appropriate housing designs. It also shows that outdoor space use, which has been insufficiently addressed in government housing projects, is both functional and a resource to the low-income households.

Methods

The paper utilises a combination of methods such as literature and document searches and reviews, in-depth interviews and systematic sketching. It illustrates that involving housing users in the preliminary stages of architectural design, as well as studying the way they use both indoor and outdoor space can be a solution towards attaining more suitable housing designs for low-income households.

Key Findings

The paper argues that to low-income households, the house as external and internal space is not only a home but a space for subsistence and sustenance. It further argues that the provision of houses with considerations for how gender is enacted spatially could lead to the development of houses that can be user friendly to low-income households.

Conclusions

The paper ends by suggesting that developing house designs that adapt to the way low-income households use space while preventing urban sprawl in the informal settlements is an important step towards the development of more effective housing designs.

Keywords: Gender; Indoor Space, Low-income housing; Outdoor Space Use, Urban Sprawl

Poster 3:

Contractors' Perspective on Critical Factors for Successful Implementation of Private Public Partnerships in Construction Projects in Uganda

Authors

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Introduction

Developing countries like Uganda are in dire need of infrastructure development and some countries are venturing into Private Public Partnerships (PPPs). In Uganda for example, the ministry in charge of finance has been trying to find ways of implementing projects funded using PPP arrangements. PPPs are risk sharing investments in the provision of public goods and services, seen by governments as a means to launch investment programs, which would not have been possible within the available public-sector budget, within reasonable time. However, there is no in-depth analysis of the critical factors that are likely to affect the success of PPP projects in Uganda. The objective of the present paper is to address the aforementioned gap and contribute to the knowledge base of success factors for PPP projects in developing countries using Uganda as a base for data collection.

Methods

Success factors were identified from the literature and validated using interviews with the relatively big contractors. Using a questionnaire survey on managers of construction firms, the factors were rated. The factors were then ranked using the Coefficient of Variation on availability and ease of improvement of the factors for their ratings.

Key Findings

Lack of projects that are technically, economically and socially viable are the most critical factors to address.

Conclusions

The PPP policies being proposed and about to be implemented should take into account the major factors identified.

Keywords: Factors, Infrastructure, Private Public Partnerships, Uganda

Poster 4:

Modeling the Dynamics of Housing and Population Growth in Kampala City

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Introduction

Kampala city is experiencing rapid population growth of 5.61% per annum largely due to rural-urban migration and high fertility rates. The city's resident population increased from 774,221 in 1991 to 1,208,544 in 2002 and to 1,600,000 in 2008. Meanwhile, records by Uganda Bureau of Statistics show that by 2008, Kampala had about 274,000 housing units with a housing deficit of 100,000 dwellings. This large deficit in the housing sector resulted from continued growth of the city's population without matching housing facilities. The aim of this study was to develop a computer model to forecast the city's population and housing needs in the medium term period of 27 years (i.e. 2008-2035).

Methods

The model was developed using system dynamics methodology and validated using historical population and housing data.

Key Findings

The results of the study show that by 2035, the city's population will be 5,284,664 and the housing stock will be 700,858 units resulting into a deficit of 148,081 housing units.

Conclusions

This paper recommends policies that preserve the life-cycle of houses and therefore increase the housing stock, and those that control rural-urban migration rates especially through developing regional mini-cities, as a step towards containing the housing crisis in Kampala city.

Keywords: housing, modelling, population growth, system dynamics.

Poster 5:

An Evaluation of Factors that have Influenced Housing Policy Development in Uganda

Authors

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Introduction

The development trends of Uganda's housing policy have been erratic right from the time before independence. However, much of the housing policy development can be ascribed to the colonial period. Under this era, the provision of public housing was found to be unsustainable, especially in the 1970s. In the late 1980s, Government of Uganda adopted the enabling approach as a strategy to improve housing conditions in the Country. This approach was the basis for formulating the National Shelter Strategy in 1992. Nonetheless, a number of challenges are still being experienced in the struggle to develop an appropriate housing policy for all citizens in the Country.

Methods

The paper examines factors that have influenced housing policy development in Uganda since the colonial time to date based on politics, socio-economic environment and international interventions. This was done by analyzing secondary data and interviewing key stakeholders.

Key Findings

Findings revealed that, housing policies in Uganda have been changing basing on the political orientation of the day. Institutionalization of the housing policy framework has not been realized in the country. Existing socio-economic environment in the country have also influenced housing policy formulation.

Conclusions

The paper concludes with the recommendation of integrating and harmonizing the various policies influencing housing development. It also advocates the development of a holistic policy for the housing sector while taking in consideration the peculiar circumstances of the housing delivery system in the country.

Keywords: housing provision, human settlements, policy development

Poster 6:

Analysis of Some Existing Erosion and Deposition Models

Authors

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Introduction

This paper analyzed the following models: The Universal Soil Loss Equation (USLE), the Griffith University Erosion System Template (GUEST), the Water Erosion Prediction Project (WEPP), the Unified WEPP and GUEST Model (UWGM), and the Wind Erosion Equation (WEQ).

Methods

Some of the models predict simultaneous erosion and deposition were represented mathematically. The main parameters were identified as rainfall detachment, sediment deposition, and soil entrainment like in GUEST. Others looked at the transport capacity alone. A total of 13 models identified from literature and desk review was done. Finally a sample of 5 was analyzed.

Key Findings

The models analyzed do not specifically look at the features formed on erosion paths, and the unsteady state terms are ignored when it comes to numerical examples. So the models were compared on how well they predict erosion and deposition and possible improvements were suggested. They included the use of the boundary element method (BEM).

Conclusions

This is in addition to other robust techniques like the finite element method, and finite difference methods. Similarly, a new approach of looking at the features formed after a series of erosion processes was suggested. It was also noted that the simplification of some models and their analysis by numerical examples should consider the unsteady state in addition to the steady state as well, for better results.

Keywords: BEM, Deposition, Erosion, Models, Soil.

Poster 7:

Algorithmic Incorporation of Geographical Information Technologies in Road Infrastructure Maintenance in Uganda

Authors

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Introduction

Geographical Information Technologies (GITs) are underutilized for Road Infrastructure Maintenance (RIM) in Uganda, thus the necessity to rationally incorporate their use as decision support tools in the participating organizations. GITs herein include: Remote Sensing, Global Positioning Systems (GPS), Geographical Information Systems (GIS) and web based tools such as Google earth.

Methods

This paper is rooted in research undertaken to assess the use of GITs as decision support tools in RIM in Uganda. Basing on results from interviews, field visits & measures and participant observations, the gaps and limitations to the usage of GITs for RIM in Uganda are discussed. Data requirements for RIM are stipulated.

Key Findings

The paper suggests an algorithmic approach to accentuate the usage of GITs in the RIM process. This involves: a policy on data collection guidelines emphasizing the use of GPS, satellite imagery and GIS, capacity building in the theory and use of GITs, establishment of local spatial data infrastructures for road maintenance data and setting aside yearly budgets for the defined activities.

Conclusions

The dynamic segmentation data model is considered a superior data storage strategy within the GIS.

Keywords: Geographical Information Systems (GIS), Geographical Information Technologies (GITs), Road infrastructure Maintenance (RIM), Uganda

Poster 8:

Perspectives on City Planning of Post Independence Kampala: The Emergence of the Metropolitan Growth Model and the Hexagonal Cell

Authors

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Introduction

The United Nations experts invited to plan Kampala-Mengo Region in 1963 had noted that past development in Uganda provided little knowledge and guidance and therefore no comparative models were available, but contact with developed countries, would offer solutions to the various urban and peri-urban problems that had emerged. In that era of modernist planning, dealing with city regions was popular and various ideas and models to deal with urban growth were formulated.

Methods

Through a descriptive and exploratory approach, this paper attempts to discuss how metropolitan area growth model and the hexagonal city form that emerged in the early twentieth century and after World War II served as the dominant scholarly and professional response to the development problematic in the metropolitan Kampala.

Key Findings

The empirical findings reveal that models generated were aimed at keeping down the total cost of urbanization by concentrating developments in new cities surrounding a major urban centre. The growth model was linear and open-ended, and capable of accommodating a continuously increasing population, an expanding economy and a rapidly changing technology. The Hexagonal cell form was proposed for the new towns, to be limited by maximum acceptable walking distance of approximately two-thirds of a mile to the centre, school and public transport.

Conclusions

Despite all the effort put into planning, all idealized geometrical schemes and plans remained on paper and Metropolitan Kampala continued to grow and expand on adhoc basis, a trend similar to or even worse before the involvement of the United Nations team.

Keywords: Hexagonal cell, Kampala-Mengo, Metropolitan area, Metropolitan growth model,

Poster 9:

Geoid Determination in Uganda: Current Status

Authors

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Introduction

Many professionals e.g. surveyors, engineers and GIS specialists are increasingly using Global Positioning System (GPS) or some other Global Navigation Satellite Systems (GNSS) for positioning and navigation. One of the greatest advantages of GPS is its ability to provide three-dimensional coordinates (latitude, longitude and height) anywhere in the world, any time irrespective of the weather.

Methods

The GPS latitude and longitude can easily be transformed from the WGS84 reference system to a local reference (e.g. Arc 1960). However the GPS-determined heights, i.e. ellipsoidal heights, are geometrical heights which have no physical meaning and therefore cannot be used in surveying and engineering projects.

Key Findings

Their conversion to more meaningful orthometric heights require knowledge of the geoidal undulations, which can be determined from high resolution geoid models. Its absence in Uganda means that the full potential of GPS cannot be fully realized.

Conclusions

This paper gives an overview of the need for an accurate geoid model in Uganda, the current status of the geodetic network in Uganda and different methods of geoid determination. Pending further investigation, preliminary findings indicate that in Uganda, the EGM2008 is the best geoid model for GPS/leveling projects

Keywords: Geoid model; Global Positioning System; orthometric heights.

Poster 10:

Longitudinal Analysis of Performance of Ugandan Rural Advanced-Level Students in Physics Practicals

Authors

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Introduction

Hybrid e-learning was applied in two typical rural girls' advanced-level secondary schools (Ediofe and Muni) in the rural district of Arua. The intervention was meant to support the learning and teaching of Physics and Mathematics. Multistage sampling was done to identify 19 participants from both schools in advanced-level Physics Practicals.

Methods

As the project progressed, the students sat four repeated external examinations in May, June, July and September 2007. Individual growth models were used to analyze the performance data. The intra class correlation was found to be 32% which meant that 68% of the variability in scores is attributable to within-person factors.

Key Findings

The hybrid e-learning was found to contribute 64% of a student's scores, making it a very viable proposition for disadvantaged rural schools.

Conclusions

These results were discussed in light of the Ugandan national policies on science education.

Keywords: Advanced -Level Physics; Gender; Longitudinal Data; Multilevel Analysis; Rural Secondary Education;