Mount Kenya University

Book of Abstracts

FIRST INTERNATIONAL RESEARCH AND INNOVATION CONFERENCE

TOWARDS ACHIEVING A KNOWLEDGE ECONOMY THROUGH RESEARCH AND INNOVATION

28-30 August
Safari Park Hotel
Nairobi, Kenya

Mount Kenya University is ISO 9001:2008 certified
Preface

Mount Kenya University (MKU) is a chartered and ISO 9001:2008 certified not-for profit institution of higher learning. Besides the main campus at Thika, the University campuses located in different regions of Kenya and a campus in Kigali, Rwanda. The vision of the University is “To be a Centre of Excellence in Training, Research and Innovation in Science and Technology in Africa”. Our mission is “To attain world class standards in training and innovation for sustainable individual prosperity and social development”.

The national socio-economic development aimed at achieving goals set out in Vision 2030 must be driven by technologies derived from research and innovation. Mount Kenya University holds its First International Conference to provide a platform to exchange ideas on drivers of a knowledge-based economy.

The theme of the International Conference is “TOWARDS ACHIEVING A KNOWLEDGE ECONOMY THROUGH RESEARCH AND INNOVATIONS”. The brings together over 300 researchers and innovators from the industry, academia, research institutions and policy makers to disseminate and exchange their scholarly knowledge. Thematic areas covered include Human health, Pure and applied sciences and Socio-economic. Mount Kenya University is committed to be a driver of change in socio-economic transformation of our society and the region through a knowledge-based economy.

We wish a productive time as you participate in the conference.

God bless you.

Francis W. Muregi, PhD
DIRECTOR, RESEARCH AND DEVELOPMENT
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Mat Rehabilitation of Banana Xanthomonas Wilt Infected orchards in Epidemic Areas of Western Kenya

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Abstract

Bananas Xanthomonas Wilt (BXW), a devastating bacterial disease caused by Xanthomonas campestris pv. musacearum attacks all banana varieties. The disease causes 100% loss of affected plants. The disease was first reported in 2006 in western Kenya. This study was designed to rehabilitate affected orchards and determine the best optimal period needed (after BXW infected orchard destruction) to replant with bananas. The first experiment had five different rouging options namely single stem removal by uprooting the affected plants, cutting at the base the affected plants, injecting with herbicide glyphosate of the affected plants, uprooting the whole mat of the affected plants and control. The second objective was to determine the best optimal period needed after BXW infected orchard destruction to replanting. Five different banana varieties namely; Ngombe, Nusu Ngombe, Exera, Gold Finger and Gross Michel were used in three replanting bananas periods at 3, 4 and 6 months after destruction. Evaluation was done on severity, incidence and yields loses due to BXW for one year. The two experiments were set in a RCBD in February and March, 2010 respectively in Bumala, Busia county in Western Kenya. Cutting the the affected banana stems at the base, uprooting the affected plants and herbicide treatments controlled BXW. The disease was controlled after six months. The affected plants were able to start generating income from six months and significant yields were obtained after one year. Fox effective control other intergrated cultural practices must be carried along. Farmers can control BXW within six months and have returns from their affected orchards. Complete uprooting of infected plants is the best option for managing Xanthomonas wilt but laborious. However, herbicide application is efficient and labour saving but has some economic and technical requirements that may not favour low resource endowed farmers.

Keywords: Banana Mat rehabilitation rouging options, replanting period, Xanthomonas wilt control
Assessment of Competiveness of Farmer Varieties as Opposed to Officially Released Potato Varieties in Kenya

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Abstract
In Kenya, officially released potato (*Solanum tuberosum* L.) varieties normally compete for popularity with farmer varieties. To identify the basis of this competition, five parameters including emergence, plant vigour, late blight resistance, maturity and tuber yield were used to compare 3 popular farmer varieties alongside 11 released varieties. Emergence of the 3 farmer varieties, namely; Cangi (96.4 %), Nyayo (79.9 %), Meru Mugaruro (90.0%) and Ex-Shinyanga (88.7 %) were significantly (P=0.05) higher at 30 days after planting. There was no clear difference in plant vigour amongst the two groups of varieties. Two released varieties; Kenya Mpya and Sherekea were rated as highly resistant to late blight and five including Kenya Mavuno, Kenya Karibu, Kenya Sifa, Tigoni and Asante as resistant. Among the farmer varieties, Cangi was moderately resistant while the rest were susceptible. Farmer varieties, Cangi and Ex-Shinyanga matured significantly (P=0.05) earlier (85 DAP and 82DAP respectively) compared to 94 DAP in variety Asante, was the earliest among the released varieties. The latest released varieties; Kenya Mpya and Sherekea yielded significantly (P = 0.05) higher (44.2T/ha and 47.3T/ha respectively) than the highest yielding (38 T/ha) farmer variety, Cangi. Early emergence identified in farmer varieties was attributed to short dormancy common in farmer varieties thus enabling farmers to plant well sprouted tubers in time in response to erratic rainfall pattern. Utilization of early maturing varieties identified in this study would mean quicker response to food insecurity over a shorter duration of time. Future breeding should focus on combing both the desired traits in the farmer varieties in addition to higher yields and late blight resistance in improved varieties.

Keywords: Potato varieties, *Solanum tuberosum* L.
Efficacy of Ricinus Communis and Azadirachta. Indica Against Leishmania Major Infection in Balb/C Mice.

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Abstract
Leishmaniases are endemic in over 88 countries in the world, and 350 million people are considered at risk. Antimonial drugs for leishmaniases are toxic, faced with increasing drug resistance and require protracted administration. Currently, there is no vaccine. This necessitates the search for alternative cheaper and easily accessible drugs. The main objective of this study was to determine the efficacy of combined therapy of R. communis and A. indica crude extracts against L. major infection in BALB/c mice in vivo. BALB/c mice were inoculated with 10⁶ L. major infective promastigotes and 28 days after, the animals were treated with different drug combinations of daily doses for 28 days. Pentostam and amphotericin B were used as the reference drugs. The results showed that L. major infected BALB/c mice had spleen and splenoso-matic index significantly larger when treated with R. communis followed by A. indica while those treated with combination of A. indica + R. communis was significantly lower. In those treated with standard drugs, differences in spleen weight were not significant (P > 0.05). Parasites loads decreased in the order: R. communis>A. indica>A. indica + R. communis>pentostam/amphotericin B. Spleen weight of the untreated controls was the highest. The low parasite loads in spleen shows the potential antileishmanial activity of the extracts. The study confirmed that a combination therapy of A. indica and R. communis had better antileishmanial activity than monotherapies. Their effect in combination also showed additive effects of the combination therapy. The active ingredients of both R communis and A.indica should be fractionated and fortified to be highly active against Leishmania parasites. The two plant extracts should also be further tested on non-human primates that are susceptible to leishmaniasis such as vervet monkey, Cercopithecus aethiops.

Keywords: Leishmania, Combination therapy, R. communis, A. indica
Mobility-Aware Algorithm: A Resource Allocation Scheme in Femtocell Networks

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Abstract
Macrocels’ coverage deteriorates in indoor environments, such as homes, offices, airports, and schools where most data traffic originate. To fend off this weakness, operators make use of femtocells to enhance indoor coverage and network capacity. However, user mobility facilitation becomes a barrier to a successful deployment of this type of network. In this paper, resource allocation in femtocell network with special attention to impact of user mobility so as to achieve required quality of service is considered. Specifically, user mobility dynamics are incorporated in terms of connections considering the variation in time of their positions, demands as well as network load.

Keywords: Femtocell, user mobility, resource allocation, quality of service
Fiscal Policy and Unemployment in Kenya: An Empirical Investigation

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Abstract
Unemployment is one of the greatest and most complex challenges facing Kenya. Just like most developing countries, Kenya has been using the fiscal policy framework as a tool to alleviate the high rates of unemployment. This study examined the impact of fiscal policy on unemployment in Kenya using annual time series data for the period 1980 to 2012. The research adopts a vector error correction model (VECM) technique and macro-econometric model of simultaneous equations to determine the effects of fiscal policy aggregates on unemployment in Kenya. The fiscal policy aggregates considered in this study were government investment expenditure, government consumption expenditure and tax. The estimation results reveal that government consumption expenditure and tax have a positive impact on unemployment while government investment expenditure negatively affects unemployment in Kenya. The main policy implications are the catalytic effect of government consumption expenditure and tax on unemployment. However, the negative significance of government investment expenditure implies the non productive spending that should be minimized and reallocated to productive spending.

Keywords: Fiscal policy, Unemployment, Vector Error Correction Modeling.
The Impact of Networking on Access to Finance and Performance of SMES in Kakamega County, Kenya

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Abstract
This study investigates the impact of networking on access to finance and performance of small and medium enterprises (SMEs) in Kakamega County. The objectives of this study are to examine (1) whether entrepreneurial characteristics of the SME owner and the firm characteristics of the SME are related to networking by SMEs, (2) whether networking is related to access to bank loans and trade credit by SMEs, (3) whether networking is related to the performance of SMEs and (4) whether access to debt finance by SMEs mediates the relationship between networking and performance of SMEs. Descriptive cross-sectional survey research design was adopted for the study. The sample size for the study comprised 153 entrepreneurs. The results revealed that the gender and education of SME owners and the age, size and legal status of SMEs are the entrepreneurial and firm characteristics that are positively related to networking by SMEs. In addition, the results indicate that there is a positive relationship between networking and access to finance and performance of SMEs. The results of this study further reveal that access to debt finance partially mediates the relationship between networking and performance of SMEs. The study recommended that SMEs should network more to gain access to information, resources and contact sharing. This will increase the likelihood of SMEs obtaining finance, and will also improve the performance of SMEs. Finally, the study recommended that SMEs, commercial banks and the Kenyan government take measures to improve access to capital by SMEs. Such measures included government intervention in reducing discrimination from the banks as well as encouragement of SMEs training and education so that they are empowered with business and financial management skills.

KeyWords: Networking, Performance, SMEs, Finance, Innovation
Improvement of the Kenyan Universities’ Curricula to Make Kenya an Information Technology (IT) Hub

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Abstract
Information Technology has become one of the driving forces of the fastest growing economies of the world. It has been a desire for many of the countries in the world to become Information Technology hubs, Kenya being one of them. This paper underscores the measures to be undertaken to propel Kenya to the pinnacle of Information Technology. The study has been conducted over a period of time by observing and comparing, with a particular concentration on the curriculum of one of the Indian universities (Bharathiar University) and those of two Kenyan Universities (Mount Kenya University and The Technical University of Kenya) to find out how much time or credit is given to technology based units. Also, a group of students from Mount Kenya University and The Technical University of Kenya were sampled into two groups of two different semesters, one group was given a practical continuous assessment test (CAT), and another one was given only theory continuous assessment tests. We find that having more contact hours especially for technology related subjects is key to placing a country on the path to realizing the goal of becoming an Information Technology (IT) hub. In addition to the theory examinations that students sit for at the end of the semester in a particular unit, it’s of vital importance for them to write a practical examination on the same. Our findings suggest that with an improvement on the Kenyan universities’ curricula, especially on the two areas, Kenya stands high chances of becoming an Information Technology hub within a short span of time, and with this realization, the economy will also tremendously grow.

Keywords: Curriculum, Information Technology, Economy.
Monde System of Governance

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Abstract.
Governance for centuries has been a challenge in the world. The numerous coups experienced most notably in modern Africa attest to this. All this crippling governance has led to formation of autocratic governance which are less popular amongst the citizens in Africa and across the world at large. Democracy has been downplayed by granting it lip service. This has resulted to some countries plunging into war, experiencing unnecessary demonstrations for example the underwear demonstrations in Russia, and coups as well as tribal animosities. It is with this in mind that we carried out a study on 15 democracies across the world some of which included Uganda, Kenya, Tunisia, Nepal, Tunisia, Britain and Swaziland. A desktop review of the system of governance in these countries was carried out using publications, literature available online and books accessed in MKU library. In addition a descriptive study of 8 monarchies across the world was carried out. The results of this review will be presented at the conference. In summary, both democratic and monarch system of governance have strengths, limitations and weaknesses. The review will demonstrate that merging the two systems i.e. democracy and monarchy into a hybrid system ‘MONDE’ will lead to better governance.

Keywords: Monde, Democracy, Monarchy, Governance.
An Evidence-Based Strategy in the Fight against HIV/AIDS among People Who Inject Drugs in Kenya

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Abstract
HIV infections in sub-Saharan Africa increasingly occur among people who inject drug (PWIDs). Evidence-based services for PWIDs including Needle and Syringe Exchange Program (NSEP), Opium Substitution Therapy and PWID-specific Antiretroviral Therapy are non-existent. Kenya is conducting PWID size estimation in preparation for first-ever NSEP. Test and Link to Care for Injecting Drug User (TLC-IDU) study seeks to leverage on Kenya’s new NSEP to seek PWIDs, deliver rapid HIV testing, point of care CD4 count and link to ART. TLC-IDU aims to seek, test, treat and retain (STTR) PWIDs. TLC-IDU will provide world’s first data regarding the STTR paradigm with PWIDs in sub-Saharan Africa. Participants were recruited by Respondent Driven Sampling (RDS). Behavioral questionnaire were administered using tablet computer for data confidentiality. Eligible participant were tested for HIV and blood samples collected to establish community viral load for HIV positive. 1,947 participants recruited with 1,785 eligible males 86.8% with 15.5% married or living as married. Age ranged 18 to 77 years (median = 30). 39% had sex without a condom in the past 12 months and of these only 21% of their main sexual partners were PWIDs. 22% have ever traded sex for goods. Most injected 2-3 times a day. Clients used a syringe 2-6 times. One in every five (19.5%) were HIV-positive. Prevalence ranged from a low of 7.9% to a high of 33.5%. 30.1% of the HIV positive were newly diagnosed. 37.3% tested HIV positive within the last 6 months. 13.4% had tested HIV in the past. 61.8% previously diagnosed HIV positive were diagnosed more than nine months ago. TLC-IDU pre-intervention findings unmasks threat PWIDs pose to the spread of HIV and the need for an intervention phase seeking, testing, treating and retaining PWIDs.

Keywords: HIV/AIDS, People who inject drugs (pwids), Needle and Syringe Exchange Programme (NSEP)
Burn Wound Healing Using Chitosan and Miramistin Gel

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Abstract
The skin is the largest organ in humans and accounts for 15% of body weight and 10-25% of whole-body protein turnover in animals. Burn injuries are among the most devastating of all injuries and a major global public health crisis. Burns are the fourth most common type of trauma worldwide, following traffic accidents, falls, and interpersonal violence. Approximately 90 percent of burns occur in low to middle income countries like Kenya, regions that generally lack the necessary infrastructure to reduce the incidence and severity of burns. Burns involving more than 20% of the body surface area, results in extensive inflammatory, endocrine, metabolic, and immune responses. These lead to substantial changes in body composition and tissue function. In this study, chitosan gel and miramistin gel was selected for construction of wound dressing. 24, 3-month-old male rats were used for the in-vivo study. The burn wounds were made by using boiled water (95°C). After the formation of standard second-degree burn wound, the gels were applied two times in a day to the burned areas for 14 days. The animals were divided into three groups; 1st Control group with no drug, 2nd Chitosan gel group and the 3rd chitosan and miramistin gel group. Each day, materials from surface of wounds were taken for microbiology studies. Full skin biopsies were collected at the 3rd, 6th and 14th days after wound formation for the histological studies. The histological results indicated that in 2nd and 3rd groups, healing was better and more rapid when compared with the control group. Microbiological investigation revealed the high bacteriostatic action of gels against the most species of burn surface microflora, which reduced infectious complication. Therefore, the use of Chitosan and miramistin gel can be of great help in the treatment of burns and other wounds of the skin.

Keywords: Chitosan, Miramistin, Gel, Burn
Evaluating the Performance of Different Potato Cultivars On-Station and in Farmer’s Field in Kenya

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Abstract
The aim of this study was to evaluate and select the desirable cultivars in the major potato growing regions in the country. The different cultivars were evaluated in respect to stability, yield levels, adaptability and farmer acceptability thus trials were carried out at quarantine station and in farmer’s fields for comparisons. The performance of farmer’s varieties against newly released varieties and advanced potato clones were carried out in four regions; KARI-Tigoni (on-station/quarantine station) Molo, Nyandarua and Meru during short rains 2012. A total of nine varieties (Asante, Tigoni, Kenya Karibu, Kenya Mpya, Dutch Robyjn), two pre-released clones (39511.36 and 393077.54) and two farmer’s varieties (Shangi, Meru Mugaruro) were arranged in a Randomized Complete Block Design (RCBD) replicated three times. Plots consisted of four rows of ten tubers each at a spacing of 75 cm x 30 cm. Data collected included days to emergence, canopy cover, number of stems/hill, plant height, tuber yields, tuber size and distribution. Comparison of varieties was performed using Fischer’s protected Least Significant Difference (LSD) mean separation procedure at $P \leq 0.05$. There was significant difference in the number of stems/hill within the different varieties with the results showing high significant difference ($P = 0.001$) on performance of different cultivars in the three different regions. There was interaction between cultivar and site as it was significant ($P \leq 0.05$). The highest performing varieties were; 59511.36, Shangi, and Asante with mean value of 55.08 t/ha, 56.08 t/ha and 38 t/ha respectively. Dutch Robyjn was the least performing variety with mean yield value of 6.21 t/ha. There was increase in farmer acceptability levels at the hosting farmer’s fields between some of the cultivars vis-à-vis others. This information can be used to recommend to farmers the best performing variety for all the different regions to boost potato production and improve food security in the country.

Keywords: Cultivar, Potato, Tubers, Vigour
Effect of Different Fertilizers Regimes on Yield of Two Potato Cultivars

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Abstract
The potato national average yields for Kenya have been reported as 7.5 t/ha, this figure has been fluctuating in the recent past due to an accelerated decline in soil fertility as occasioned by continuous cultivation due to small sizes of land without adequate replenishment of mined nutrients. To attain optimum potato yields, the agricultural system qualitative knowledge of all inputs and outputs is fundamental. Their efficiency, efficacy and impact on potato production system on the environment and end users both long and short term audit is needed. Therefore, a Study to determine the response of potatoes to different fertilizer regimes was carried out in Nyandarua during short rains 2012. Treatments consisted of two varieties Kenya Mpya and Sherekea. Seven different fertilizer application methods (Manure, Diammonium Phosphate (DAP), Biovertilizer, Manure + DAP, Biovertilizer + DAP, Biovertilizer + Manure, DAP + Biovertilizer + Manure) and control. The experiment was carried out in a Randomized Complete Block Design (RCBD) replicated three times. Each plot measured 3 m x 3 m. Data collected included days to emergence, canopy cover, tuber yields, tuber size and distribution. Comparison between treatments was made using Fischer’s protected Least Significant Difference (LSD) mean separation procedure at $P\leq0.05$ using Genstat statistical package. The results therefore indicated that the fertilizers application was highly significant on ware yield and on the total yield. Among the 7 different fertilizer evaluated, results indicated that DAP had the highest yield (40.1 t/ha). Biovertilizer, manure, manure + Biovertilizer had lower yields (25. t/ha, 26.03 t/ha, 26.22 t/ha) respectively). Interestingly, when DAP was combined with Biovertilizer higher yields were achieved (44.1 t/ha).However the experiment will be repeated to come up with useful recommendations.

Keywords: Biovertilizers, Fertilizers, Potatoes, Regimes
Synthesis of Quinoline-Trioxane Hybrid Drugs

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Abstract
The global malaria situation is being exacerbated by emergence of drug resistance to conventional antimalarials, necessitating search for novel drugs. A recent rational approach of antimalarial drug design characterized as “covalent bitherapy” involves linking two molecules with individual intrinsic activity into a single agent, thus packaging dual-activity into a single hybrid molecule. This study therefore aimed to synthesize a dual-drug based on quinoline and trioxane pharmacophoric scaffolds of quinoline and artemisinins respectively. In an attempt to surmount CQ-resistance, a novel chimeric quinoline-probenecid molecule was also synthesized. The synthetic design involved introduction of a linker to 4,7-dichloroquinoline and subsequent coupling with artesunate or probenecid to form the desired molecules. The reactions were monitored by TLC and the compounds purified through silica gel column chromatography and/or recrystallization. The yield for the dual drug was 51-76% depending on the coupling reagent used. The chemical structures of the synthesized compounds were confirmed by ¹³C NMR and MS analysis. Success of this study is expected to make available alternative arsenal in the war against malaria.

Keywords: Dual drugs, combination therapy, quinoline, trioxane, chemosensitizer
Potential Food Safety Concerns in Fried Potato Products in Kenya

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Abstract
Fried potato products, mainly French fries and potato crisps are consumed across all age-groups and socio-economic status. These products are sources of energy and provide between-the-meal snacks to many consumers all over the world, Kenya included. There exist different food preparation set-ups that process these products under different conditions while using a variety of additives. A number of safety issues have, however, risen in the past that can be linked to glycoalkaloids in raw potatoes used during processing. Quality and content of oil used for frying are increasingly being blamed for obesity and heart diseases in the changing lifestyles currently witnessed in Kenya. Presence of acrylamide, excessive use of flavor enhancers, colorants and food additives in general are some possible contributory factors under sharp focus as cases of cancer and high blood pressure spiral. Increased consumption of these products can as well lead to higher exposure of the population to possible carcinogens such as acrylamide and packaging migrants. This review analyzes the potential hazards in French fries and potato crisps processing chains taking into account the Kenyan context. The possible impact of these hazards to the general consumer is also discussed and potential areas of research and evaluation are indicated.

Keywords: Toxicity, Glycoalkaloids, additives, acrylamide, oxidation products
Assessment of Heavy Metals and Nutrients Loads in Water Soil and Sediments Samples along Sosiani River, Kenya

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Abstract
Pollution loads from heavy metals, nitrates and phosphates along river Sosiani was investigated. The aim of this study was to investigate the extent of pollution in river Sosiani and to obtain data on the nature and level of contaminations of heavy metals, micro pollutants and nutrients. Three samples of soil, sediments and water were collected from five sites and analyzed. Nitrates in water samples were determined using UV spectrophotometric method, in soil and sediment by colorimetric method. The phosphates content in water was determined using ascorbic acid method, in soil and sediment by Olsen method. The chemical oxygen demand was determined using titrimetric method. The nitrate values ranged between 0.0002±0.0001 and 0.1501±0.0025 ppm, below EMC recommended value of 3.0 ppm. Sediments had highest phosphate values during wet season ranging between 1.824±0.320 and 1.564±0.000 ppm below the KEBS recommended value 10.0 ppm. The COD ranged between 22.42±2.84 mg/L and 45.12±3.24 mg/L, below KEBS recommended value of 50.0 ppm. Heavy metals were analyzed using wet digestion method. At site 3 values obtained were: Iron (3.562±0.012, 3.033±0.131, 0.033±0.013 ppm), Lead (4.891±0.030, 1.39±0.030, 1.89±0.000 ppm), Cadmium (0.065±0.003, 0.103±0.002, 0.013±0.002 ppm), Zinc (2.372±0.031, 0.410±0.003, 0.310±0.033 ppm) and Copper (0.728±0.000, 0.113±0.000, 0.213±0.000 ppm) for soil, sediment and water, respectively. Concentrations exceeded KEBS permitted levels of 0.005 ppm (Iron), 0.005 ppm (Lead), 0.01 ppm (Cadmium) and 0.005 ppm (Copper). Zinc values were above the WHO standards recommended for drinking water of 0.50 ppm. This confirmed the deterioration of the water. For the parameters studied it can be concluded that river Sosiani water (downstream) is not safe for domestic use.

Keywords: Contamination, Heavy Metals, Water, Soil, Sediments.
Dual-functional micelles based on $d$-$\alpha$-Tocopherol acid Polyethylene Glycol 1000 Succinate and phospholipids technology for oral bioavailability enhancement

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Abstract
Experimental design to evaluate the effect of packaging the flavonoid Apigenin (Ap), in TPGS modified Ap-Lecithin complex micellar system, demonstrated the enhanced permeability of Ap. The phospholipids complex technology was exploited alongside TPGS’ stabilizing effect by PEG chain steric hindrance of the phase II enzymes. This prevented extensive metabolism of Ap while inhibiting P-glycoprotein’s exocytosis. TPGS modified micelles of Ap-Le complex were prepared by thin film hydration method. Ap-Le complex was confirmed by FTIR and NMR spectroscopy while Apigenin (Ap), Lecithin (Le) and TPGS interactions were studied by surface tensiometry. Dynamic Light Scattering techniques were utilized for characterization while Single Pass Intestinal Perfusion experiments and Pharmacokinetics analysis were employed for Ap absorption enhancements investigations. TPGS-Ap-Le micelles achieved 87.35% drug encapsulation and 12.6% drug loading showing spherical morphology 137.1±3.4 nm particle size and -12.94 mV surface charge. The negative zeta potential confirmed computer simulation predictions that PEG moieties of TPGS were at micelles surface, while hydrophobic part inserted to the phospholipid hydrophobic core by electrostatic interactions. Comparing to free drug, the micelles increased intestinal absorption of Ap 2.4 fold, illustrating apparent permeation ($P_{\text{app}}$) and absorption constant ($K_a$) of $7.9 \times 10^{-4}$ and $2.05 \times 10^{-4}$ ($p < 0.001$) respectively. In the in-vivo pharmacokinetics study carried out to evaluate bioavailability improvement after oral administration (50mg/kg) of Ap-Le complex and TPGS-Ap-Le micelles solution comparing to intravenously administered (2mg/kg) Ap solution to rats, a HPLC method was developed and validated with good precision and repeatability for successful determination of Ap. The $\text{AUC}_{0-12h}$ of Ap was enhanced 4.9-fold that of the I.V. The results also showed that the bioavailability of Ap improved from previously reported 6.9% to 23% of this study. The results presented the designed micelles as a new and feasible way to improve oral bioavailability of such extensively metabolized pharmaceutical agents.

Keywords: Apigenin; Phospholipids; In-situ Perfusion; Anticancer.
Genetic Determinants of Asexual Proliferation in 

*Plasmodium Falciparum*

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Abstract
Malaria parasites undergo a mitotic replication in red blood cells (RBCs) of their mammalian hosts. Clinical malaria, especially with *P. falciparum*, is associated with this asexual phase of the parasite’s lifecycle and the severity of disease has been associated with higher parasite proliferation rates. The molecular mechanisms controlling parasite growth are still largely unknown. Asexual growth of malaria parasites can be influenced by the time that parasites take to complete the asexual cycle and also the number of merozoites produced per schizont. The erythrocytic cycle time (ECT) and merozoites per schizont (MPS) have been measured for 20 progeny clones from the 3D7 x HB3 genetic cross. These clones have also been sequenced to generate a genetic map. We have used a quantitative trait locus (QTL) approach to map the parasite loci contributing to differences in ECT and MPS. Here we present data showing that a major locus on chromosome 8 controls the cycle time of *P. falciparum* and is responsible for 61% of the variation observed in ECT. This locus contains 19 open reading frames (ORFs). We also present data showing that two major loci on chromosomes 6 and 13 control the number of merozoites per schizont. The locus on chromosome 6 contains 22 ORFs and is responsible for 46% of the observed variation while that on chromosome 8 has 24 ORFs and explains 42% of the observed variation in MPS. Further details of the loci involved in these two phenotypes will be presented.

Keywords: Malaria, *Plasmodium falciparum*, Genetics, Asexual Cycle
Diversity of Insect Pests and Natural Enemies on Cultivated Amaranth in Meru County, Kenya

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Abstract
Production of amaranth is hampered by insect pests which reduce the yields considerably. The control of these pests is mainly through the use of pesticides, but their intensive usage has resulted in major environmental pollution and direct toxicity to humans, non-target insects and other mammals. Therefore, there is need to develop a pest control strategy that poses little or no risk to environment, man and other non-target organisms. The focus of this research was to identify pests and natural enemies of amaranth since correct pest identification forms the basis of any efficient integrated pest management. Surveys of insect pests were done on randomly selected farms from farmers who were growing amaranth in Meru County between April 2012 and April 2013. The insects were collected by hand, sweep nets, knock down and pit-hole techniques depending on the type of insect. A total of 1256 specimens were collected, stored in alcohol, pinned on boards, identified and archived at National Museums of Kenya, Nairobi. Insect pests were classified into 5 orders, 15 families and 33 species with the most damaging insects being Cletus sp. (Heteroptera) which attacks the grain causing up to 40% loss, Hepertogramma bipunctalis (Lepidoptera) which feeds on stems and leaves resulting to 27% yield loss and Hypolixus nubilosus (Coleoptera) which also causes stem and leaf damage. The important natural enemies were grouped into 2 orders, 5 families and 8 species.

Keywords: Amaranth, Insect pests, Natural enemies, Economic damage, Yield loss
Management of Cowpea Weevil in Stored Cowpea (*Vigna Unguiculatus* L. Walp) Grains Using Botanicals

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Abstract
The cowpea weevil (*Callosobruchus maculatus* F) is a pest of economic importance to stored cowpea grain. Farmers who cannot afford the cost of insecticides often sell their cowpea shortly after harvest to minimize postharvest losses. These early sales often attract low prices and compromise food security at household level. To control the pest smallscale farmers have been using botanicals with varying levels of success. The main objective of this study was to assess the effectiveness of a locally available botanical, wild basil (*Ocimum americanum* L), in the management of the cowpea weevil. Varying levels of *O. americanum* at 0.5, 1.0, 2.0, 4.0 and 8.0 g of dried leaf, flower and whole plant were compared for their effectiveness against the weevil in stored cowpea seed. For each treatment, 10 g of cowpea seeds were placed in plastic vials containing ten cowpea weevil adults. The experiment was conducted at 28 ± 2 °C and 70 ± 5 % relative humidity in incubators. Data on mortality of the weevil was taken at intervals of 24, 48 and 72 hours of exposure. Weightloss of treated cowpea grain was compared with the untreated grain after three months. There was significant different *p*<0.05 between treatments in postharvest weightloss of cowpea. Lowest post harvest weightloss of cowpea was recorded when seed was treated with 8 g leaf powder to 10 g seed. Highest postharvest seed weightloss was recorded for flower and whole plant extracts. Results from this study indicate that *Ocimum americanum* leaf powder at the ratio of 8 g to 10 g cowpea seed is effective in reducing postharvest weight loss in stored cowpea grain.

**Keywords:** Cowpea, Postharvest Loss, Botanicals, Cowpea Weevil
The Level of Adequacy of Sanitary Facilities for Girls in Primary Schools of Nakuru Municipality, Nakuru County, Kenya

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Abstract
The adequacy of sanitary facilities is a critical issue in a girl’s life. Studies have shown that most aspects of a girl’s life are affected by lack of sanitary facilities thus lowering the girl’s esteem and confidence. The study sought to establish the level of adequacy of sanitary facilities for girls in primary education in Nakuru Municipality in Nakuru County, Kenya. A descriptive survey design was used as the preferred research design. The study targeted the 59 public primary schools in Nakuru Municipality comprising of 1100 girls, 59 Head teachers and 271 female teachers. Simple random sampling was used to select the 18 Schools and purposive sampling to get a sample size of 428 respondents comprising of 330 girls and 80 female Teachers. The Main research instruments used in this study were questionnaires, interview schedules and an observation check list. Piloting was done in two schools which were not included in the sample. The findings would be useful in establishing the level of adequacy of sanitary facilities. The study found out that although the primary schools in Nakuru municipality own variety of sanitation facilities they are highly inadequate and greatly affect girls’ participation in education. Most of the schools cannot cater for the high number of pupils and the few available are old or below the recommended and acceptable standards. School administrations need to prioritize the aspect of sanitation and hygiene. Proper legislation by the government officers and introduction of penalties to defaulters is vital. Offering incentives and rewards to pupils, teachers and head teachers for keeping good sanitation will also help in maintaining high standard of adequacy, in addition to building new and modern sanitary facilities.

Keywords: Sanitary Facilities, Girls in Primary Schools, Level of Adequacy
Effects of Televised Sports on Restaurants Sales in Nakuru Town

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Abstract
With the high cost of living, inflation and unemployment, the country is experiencing an economic hardship period. Majority of the citizens spend large amounts of their hard earned money to provide basic wants leaving little or no amounts for leisure. Stiff competition among businesses offering similar products brings about the necessity for uniqueness in the products offered and the modes of supply to achieve customers’ satisfaction. The paper adopted Michael E. Porter’s theory of Techniques for Analyzing Industries and Competitors (1980) in which screening the televised sports is viewed as a competitive advantage in providing market. The sports command a large fraternity of fans globally. The existence of television stations covering and airing the sports as they take place enables the fans to watch and follow the events as they unfold. This is entertaining. The fans gather at restaurants where they climax their entertainment with the luxurious services offered. This provides a large market to the restaurants raising the sales and hence the profits. The research used ex-post facto descriptive survey design. A stratified purposive sample of restaurants within Nakuru town was selected. A simple random sample of customers in the identified restaurants was selected while management representatives were selected purposively. Questionnaires were used to collect data. Sales were investigated on days when famous matches were televised and days when there was no match aired and compared using descriptive statistics data analysis. The findings indicated that during a match of teams with large number of fans, sales are high. Recommendations emphasizing on the need to invest in televising sports given are significant to the restaurants as a strategy of increasing their competitive advantage so as to increase sales.

Keywords: Televised, Competitive, Sales
Globalization and Education in Africa: A Review on the Trends and Developments between 1990-2010

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Abstract
Globalization defines our era. While it has created a great deal of debate in economic, policy, and grassroots circles, many aspects of the phenomenon remain unexplored territory. Education as an instrument of economic productivity, politicization, and enculturation can play an important part in the humanization of the process of globalization. As has been noted in the reviewed articles, globalization is not necessarily a homogenizing force, but also provides considerable opportunities for heterogeneity of cultural traditions to exist side by side. Much depends on how Institutions engage with the forces of globalization - understand them, work with them, mitigate their worst consequences and use them to their advantage. African universities can neither afford to blissfully ignore the new forces of transnational education nor embrace them blindly (Zeleza, 2005). In Africa, ongoing globalization in higher education has put on the agenda issues of increased cross-border provision, new modes and technologies of provision, new types of providers and qualifications, and new trade imperatives driving education (AAU, 2004). This study carried out a review of literature on globalization & education in Africa from 1990-2010 and the results established the trajectory of the concept ‘Education and Globalization’ pointing out the change in the subject through the years. Over 20 publications were used to determine the trends and developments as well as inform future projections. Some of the striking issues raised in the debate on globalization and education in the last 20 years revolve around the degree to which Africa is involved in the globalization process, the possibility of adapting African Education System to globalization as well as discussions on whether globalization looms as a threat to continuing African cultural diversity (Marginson, 1999; Oduaran, 2000; Waghid, 2001; Ayoo, 2009 & Jowi, 2009). Notably, globalization has become one of the major driver of change in Education across the world including developing economies such as Africa (Sawyerr, 2002; Some & Khaemba, 2002; Kishun 2006), hence, while it may be possible to ameliorate the most negative aspects of globalization, it may not be practical to opt out of the global knowledge system.

Keywords: Globalization, Education, Transformative Education, Africa
Spread and Establishment of Exotic Parasitoid *Cotesia Plutellae* on Diamondback Moth and Parasitoid Guild on Kale in Semi-Arid Areas of Kenya

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**Abstract**

*Cotesia plutellae* was introduced to Kenya from South Africa in 2002 for the control of diamondback moth in semi arid areas of Kenya. The parasitoid was released in Yatta and Athi River in Machakos district, in 2004 in farmer managed fields. To evaluate the impact, spread and establishment of *C. plutellae*, a survey was conducted between October 2011 and April 2012 in Matuu, Yatta/Mwingi, Kitui and Loitokitok Counties. Monthly data collections were done on DBM populations, damage score, parasitism rates and parasitoid guild from farmer managed kale farms. Twenty plants were sampled from each field and the number of small DBM larvae, big larvae and pupae recorded, placed in containers and taken to the laboratory for DBM, parasitoid or hyper-parasitoid emergence. The number of DBM/plant and damage score ranged from 0.4 to 2.5 and 1.2 to 1.6, respectively. The larval parasitoids *C. plutellae*, *Diadegma semiclausum* and *D. mollipla*, *Apanteles hal fordi* and *Chelonus* sp., larval-pupal parasitoids *Oomyzus sokolowskii*, the pupal parasitoid *Itoplectis* sp., and hyper parasitoids, *Mesochorus* sp., *Pteromalus* sp. and *Notanisomorphella* sp., *Eurytomarosae* and *Eurytomas*, *Brachymeria* sp., *Pediobius* sp., and four unidentified species were recorded. *Cotesia plutellae* was the most dominant followed by *D. semiclausum* and *O. sokolowskii*. Parasitism rate of 50% by *C. plutellae* was recorded in all the regions. The parasitoids *Itoplectis* sp., *Apantelessp.*, and *D. Mollipla* accounted for less than 5% parasitism. Highest species diversity and evenness of (1.149, 0.630), (1.285, 0.798) and (1.076, 0.467) was recorded in Loitokitok, Kitui and Yatta/Mwingi, respectively. In conclusion, *Cotesia plutellae* had spread and established in the semi arid regions as evidenced by the high parasitism rates in all the study sites. Thus, there is need to sensitize more farmers in the semi arid areas on the role parasitoids play in controlling DBM and the need to adapt integrated pest control strategies in order to reduce on pesticides.

**Keywords:** Plutellaxylostella, *Cotesiaplutellae*, species evenness, kale, semi arid areas
What a Miracle!: Successful PMCT Intervention in Kenya”

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Abstract
Anti retro-viral therapy (ART) has significantly reduced risk of HIV transmission as proved by retrospective studies done this being one of them. It is therefore, evident that those infants who received PMTCT intervention, the results were 100%. As a result of the presidential directive concerning free maternal delivery; it is obvious that, PMCT will be important. Full PMTCT interventions and other policies should therefore be mandatory for the process to be a blessing. On the other hand, if no strict measures are put in place, MTCT will be like a bomb blast! Prevalence of HIV in women (8%) is almost twice that of men (4.5%), as per KDHS 2008/2009. In addition, more than 90% of pediatric HIV infection is as a result of MTCT. In the absence of any intervention, the risk of MTCT is 15 – 30%, in non-breastfeeding population while among women who practiced prolonged breastfeeding without ARV prophylaxis, it is 20-45%. A retrospective follow up study was carried out at AHF Kongowea and CBHC Chaani satellite clinic. Six sites which were providing PMTCT intervention were identified; CBHC Mikindani, CBHC Mbungoni, CHHC Chaani, AHF Mikindani, AHF Kongowea and AHF Mtongwe out of these two sites were randomly selected. PMTCT register 2010 – 2013 used and PCR results formed analyzed and mothers files used to assess PMTCT intervention. In total, 45 children were born by HIV positive mothers between the study periods in the site. 10 (22.2%) with a positive PCR, but none of them had received PMTCT intervention. 26 (57.8%) had a negative PCR result with full PMTCT intervention too. Similarly, 9 (20%) awaits PCR result and 6 had full PMTCT intervention, 1 had intervention after delivery and 2 had no PMTCT intervention.

Keywords: Prevention, Mother, Child HIV (Human Immunodeficiency Virus)
Sustainable Supply Chain Management as a Strategic Tool for Competitive Advantage in Tea Industry in Kenya

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Abstract
It is assumed that companies that utilize sustainable supply chain management as a strategic tool in business management are likely to have a competitive edge over others. However, this is contrary to the Tea Industry in Kenya. The main purpose of this research was to establish the role of sustainable supply chain management as a strategic tool for competitive advantage in the tea industry in Kenya. The specific objective was to find out to what extent the supply chain collaborative strategy as a tool for competitive advantage is used by the companies in tea industry in Kenya. The mixed research design was used in the study. The target population was the tea companies in Kenya and the sample size of six Tea Companies were purposively selected for the study. Data collection was done by use of both structured questionnaires and oral interview to get the primary data while the secondary data was obtained by documentary analysis. The results finding indicated that sustainable supply chain management as a strategic tool contributes to the competitive advantage of Kenyan tea companies in the global market. The results provide information to the tea companies to come up with sustainable strategies in their supply chain management in order ensure the Kenyan tea remains competitive in the global market.

Keywords: Supply Chain Management, Tea Industry, Strategic Tools
Technology Transfer Legislations and Economic Development in Kenya

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Abstract
Technology Transfer, also called Transfer of Technology (TOT) and Technology Commercialization, is the process of skill transferring, knowledge, technologies, methods of manufacturing, samples of manufacturing and facilities among governments or universities and other institutions to ensure that scientific and technological developments are accessible to a wider range of users. It is a subset of knowledge transfer which can be developed into new products, processes, applications, materials or services. Kenya through signing, acceding to and being party to various international conventions, treaties and agreements that have a technology components in it has been able to benefit thereof. The Country has been a party to various initiatives on technology transfer in Africa. Through domestication of the international commitment and other local initiatives Kenya has enacted various legislations and established institutions to facilitate technology transfers. An environment for collaboration and partnership for the private sectors with international institutions has been supported to access superior technology from developed nations through government guarantees. Other initiatives are in the pipelines and there is need for various government agencies and private entities and stakeholders to work together for maximum economic development in Kenya.

Keywords: Technology, Commercialization, Legislation, Institutions
A Critical Analysis of Outsourcing in East Africa

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Abstract
Globalization has transformed cultural and strategic orientation of organizations. Dynamic global environment being shaped by changes in the economy, technology, politics, and social dynamics have forced organizations to be creative and innovative for survival and competitiveness. Organizations with the ability to streamline functions deliver quality services and yet stay competitive with various challenges. In a bid of enhancing creativity and innovation companies outsource operations and business activities in order to exploit opportunities and benefits. The paper will highly rely on the review of literature on the concept of outsourcing together with its implementation in Kenya, Uganda and Tanzania. This paper examines forms of outsourcing, benefits, challenges and recommendations for effective outsourcing.

Keywords: Globalization, Outsourcing, Creativity, Innovation, Environment
Microbicidal and Contraceptive Studies of Unipron Vaginal Gel

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Abstract

Vaginal contraceptive products have been available for many years. Studies have found that frequent use of some of these formulations caused micro-ulceration of the vaginal mucosa which may enhance transmission and increase women vulnerability to infection with Sexually Transmitted Infections (STIs) including Human Immunodeficiency Virus (HIV). Limited availability of woman-initiated non-hormonal contraceptive programmes is a hindrance to successful contraceptive programmes in resource-constrained countries. We have established that UniPron is safe as a vaginal product in the baboon model. In this study we assessed the microbicidal effect of UniPron on some STI causing pathogens, baboon sperm functions in vitro and its effectiveness as a contraceptive in female olive baboons (Papioanubis). Cultures of the microbes were treated with placebo, UniPron 0.4g, 0.8g and 1.2g. We observed that UniPron has microcidal effects on Neisseria gonorrhoeae, Haemophilus ducreyi, Gardnerella vaginalis, Candida albicans and Escherichia coli, with larger inhibition zones of 18mm, 21mm, 16.5mm, 23.5mm and 23mm respectively in cultures treated with UniPron 1.2g. When mixed with baboon semen volume by volume, spermatozoa became less progressive and then immotile. During treatment intravaginally with UniPron no conception occurred in the UniPron treated animals, except when treatment was stopped. UniPron inhibits growth of some STI causing pathogens and is effective as a reversible contraceptive in the baboon model. Further studies should be conducted to assess the effects of UniPron on human sperm function in vitro and its safety and acceptability as a vaginal product in women.

Keywords: UniPron, Microbicidal, Contraceptive, Vagina, Papioanubis
Emerging Trends in Multimedia Applications

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Abstract
Multimedia refers to the use of computer systems to present text, graphics, video, animation, and sound in an integrated way. It has been long touted as the future revolution in computing, multimedia applications were, until the mid-90s, uncommon due to the expensive hardware required. With increases in performance and decreases in price, however, multimedia is now commonplace. Nearly all PCs are capable of displaying video, though the resolution available depends on the power of the computer's video adapter and CPU. Multimedia can be used for entertainment, corporate presentations, education, training, simulations, digital publications, museum exhibits and so much more. With the advent multimedia authoring applications like Flash, Shockwave and Director amongst a host of other equally enchanting applications, your multimedia end product is only limited by your imagination. This paper explores the emerging trends in multimedia applications, multimedia standards and the technical components needed to deliver multimedia services effectively. An in depth analysis on multimedia formats and technical components was done and based on that, recommendations were made on how to deliver multimedia services effectively.

Keywords: Multimedia services, Cellular standards, Video standards, Technical components and Market outlook.
The Relationship between Mathematical Language and Students’ Performance in Mathematics in Nairobi Province, Kenya

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Abstract
Students’ poor performance in mathematics in Kenya has been blamed on factors such as poor attitudes towards the subject, shortage of teaching aids (Mwangi, 1983; Thuo, 1985), poor teaching technologies (KNEC, 1995), shortage of qualified teachers, school ethos and overloaded curriculum (shiundu, 1987) among others. The Ministry of Education in Kenya through its various organs has made considerable efforts to curb the above causes. However, poor performance in mathematics persists. This shows that the problem has not all been adequately addressed. While the above factors, identified by various studies, may contribute to such performance, there could be another factor that contributes to the phenomenon. The Study investigated the relationship between mathematical language and students’ performance in mathematics as a factor. The study was a correlational design to investigate the relationship between mathematical language and students’ performance in mathematics. It was conducted in Nairobi province and targeted public secondary schools. The sample size comprised 384 students, and 12 mathematics teachers. Students’ Mathematics Language Test (SMLT) and Mathematics Teachers Questionnaire (MTQ) were used in collecting both qualitative and Quantitative data. Pearson product-moment correlation coefficient was used to determine the relationship between mathematical language i.e scores in terminologies test and scores in SMLT. The study found out that there was a relationship between mathematical language and students’ performance in mathematics \( r=0.3608, \alpha=0.000 \). It also found out that girls (Mean score= 5.0444) performed better than boys (mean score= 2.8166) in the Mathematics Language Test. The study recommended that a simplified mathematical language in communicating mathematical ideas is fundamental and hence a pre-requisite to the successful pursuit of learning mathematics in secondary schools. It further recommends a course in mathematics language be designed to demystify mathematical language and hence improved students mathematics performance.

Keywords: Mathematical language, student performance, Language, vocabulary
Organization Design Is Imperative for Creativity and Innovation in East Africa

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Abstract
The success of any organization depends on its ability to respond to environmental dynamics. Dynamic Political changes, economics, social-cultural, technology and globalization, influence business environment. These increase velocity of change, bend shapes of organization, and competitiveness. The major challenge today is to design an organization architecture which is flexible and adaptable with ability to perform effectively in the face of uncertainty not just for today but for a great time in the future. The paper argues that an appropriate organization design in this century is responsible for creativity and innovation. The paper specifically looks at the environmental dynamics, proposes strategic imperatives and appropriate organization designs for creativity and innovation in East Africa.

Keywords: Strategic imperatives, innovation, Organization, Environment
Assessing the Impact of Incarcerating Women offenders on Community Development in Kenya

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Abstract
Community Development Movement has been one of the most outstanding in this millennium with the underlying point being people and community action and aiming at facilitating the participation of people in development programmes. In Kenya, women are the backbone of many families and they often struggle to provide basic survival necessities. This has led to some women choosing to engage in economic crimes as an alternative to hunger and homelessness, and as a result they are incarcerated. The paper tries to interrogate the role of women in community development, the challenges women ex-prisoners face in regard to participation in community development, and the impact of women imprisonment on community development. Data for the study was collected by interviewing women prisoners and key informant within the prison facilities in Kenya. A total of 70 women prisoners and 5 key informants were randomly selected for the interviews. The findings of the study revealed that women are involved in social, political, and economic spheres of community development, which are greatly affected by their incarceration. Imprisonment leads to destruction of social and economic ties between the prisoner and the outside world. During incarceration, women are not provided with meaningful training to help them participate in the social, economic, political and cultural development of the community after release; this jeopardizes their ability to take part in community development projects. Therefore, there is need for penal policy change to embrace alternative to incarceration for women offenders.

Keywords: Incarcerating, Women, ex-Prisoners, Community Development
Applying the Prohibition of Inhuman and Degrading Treatment to Socio-Economic Rights in Kenya: An Appraisal of the Asero Case

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Abstract
While baring in mind the theme, this paper has focused on the Justiciability of socio-economic rights in Kenya. The main objective of the paper is to call for the extension of the prohibition of inhuman and degrading treatment enshrined in Article 25(a) of the Constitution of Kenya to socio-economic rights. It criticizes the High Court of Kenya for failing to utilize the opportunity presented in the case of Patricia Asero Ochieng and 2 others v. the Attorney General & Another, to extend Article 25 (a) to the right to life, human dignity and health under articles 26(1), 28 and 43 of the Constitution. Properly tackled, the paper has been divided into five major parts. The first part will lay down the substance of the work. Part two will discuss human rights under the Constitution of Kenya while highlighting the socio economic rights. Part three will discuss the Patricia Asero Case by looking at two things. First the outcome of the decision and its enforcement and secondly the significance of the decision to HIV/AIDS patients and other quarters. Part four will discuss whether the notion of inhuman and degrading treatment can be applied to socio-economic rights by the Kenyan Courts. This will be achieved by looking at the European Court of Human Rights case of D v United Kingdom where the Court extended the article 3 to cover conditions of impoverishment and social decay in non-Convention states.

Keywords: socio-economic, rights, asero, prohibition
Application of Indigenous Knowledge System on Wildlife Conservation: A Case Study of the Samburu Pastoral Community in Kenya

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Abstract
Samburu indigenous community culture is characterized with rich knowledge that can be bolstered in the management of wildlife resources. Nonetheless, limited studies have been done to elucidate the relevance of indigenous knowledge on wildlife management particularly among the Samburu community. This study was aimed at evaluating the prospects of integration of the Indigenous Knowledge Systems of the Samburu pastoral community into conservation and management of human wildlife conflicts. The specific objective of the study was to describe the characteristics of Samburu pastoral community Indigenous Knowledge Systems related to wildlife conservation. The study was conducted among three communities in Wamba Division of Samburu East District. Stratified – simple – random sampling was used to identify households for the study. The three conservation areas were taken as the strata for sampling of which 72 respondents were interviewed. Key Informant Interviews and FGDs were conducted to consolidate information from interviews. The study identified different facets of Samburu indigenous knowledge including nutritional values, ceremonial wears, wildlife body part usage, medicinal values and aesthetic values. The findings showed that Samburu customs are characterized with different ceremonies using wildlife products; including marriage rituals (Nkiyama), fertility rituals for sterile women, warriors naming ceremonies (Ilmuget Ikarna), initiation and circumcision ceremonies (Ilmuget lengwenyi or lolbaa) among others. This has created a close attachment between the community and different wildlife species. The study concluded that Samburu Pastoral Community has rich indigenous knowledge systems which can be harnessed into the betterment of wildlife management. It therefore recommends for allowing of full participation of community in the co-management of wildlife resources through their indigenous knowledge in a way that would not affect or undermine the objectives for the protected area sustainability.

Keywords: Traditional Knowledge, Kenya, Wildlife conservation, Samburu, human-wildlife conflict
Effect of Diatomite as a Partial Replacement for Sand in Concrete

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Abstract
This paper presents an experimental investigation on the use of the DIATOMITE in concrete. The diatomite used in this study was obtained from Gilgil. Kenya has access to a diatomite reserve estimated at over 6 million tonnes. This study seeks to satisfy the following hypotheses: Use of diatomite will offer the industry a partial alternative material to sand and reduce the effect of sand harvesting on the environment. The diatomite was used to partially replace sand at 0, 5, 10 and 15% by mass. Comparison of the compressive strength of diatomite mortars was then performed with control mortar. The tests carried out included slump testing on fresh concrete and destructive tests on the concrete in its hardened state. Strength testing was conducted up to an age of 28 days. The construction industry in Kenya is faced with the global problem of trying to economize the limited resources and at the same time not compromise on the quality of the products. As a result of indiscriminate sand mining, the river bed zone is getting lowered at an alarming rate. This causes severe damages to the physical and biological environments of these rivers. The country has no guideline to check sand harvesting especially in arid and semi-arid areas, a practice that has compounded the problem of drought. The methodology used to arrive at the stated objectives was: secondary sources, lab experiment and observation. The findings indicate that the optimum proportion of sand to diatomite replacement without change in strength is one part sand to 0.69 parts diatomite for up to 5% replacement of sand and diatomite does not have any other negative impact on concrete apart from a higher water demand. Whereas the use of diatomite at 10% and 15% although resulting in strength lower than the control mix, falls within the target compressive strength and can therefore be used without compromising the strength of a structure while still attaining lightness.
Sexual Perversions: A Socio-Psychological Crisis in Kenya

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Abstract
The greatest social crisis in the world today is sexual and Kenya is one of the developing countries whose social and economic institutions have been adversely affected by sexual perversions. The media, religion, academic, police and legal reports indicate shocking revelations about the extent to which sexual perversions have engulfed Kenyans. Rape, beastiality, pedophilia, incest, sex-oriented violence and insults characterize the social landscape of the country, with dire implications on the family, health, religious, economic, political and other vital institutions of the society. Cases of priests/pastors/imam defiling their ‘flock’; teachers sexually assaulting their students; prostitution and promiscuity; fathers raping their daughters; jobs being awarded on sexual advances, are not uncommon. Consequently, people are dying of sex-oriented diseases; hospitals are full of sex-based health problems; families are breaking because of sex and sex-based challenges; streets are full of abandoned children; leaders have lost to their enemies because of sex; companies have been run down because of sex; professionalism has waned because sex has replaced merit; students are passing examinations because of sexually transmitted marks; the environment is polluted because of sex; even religious books warn that many may miss the Kingdom of God because of sex-based sins. Sex is everywhere. It is not limited to the bedroom anymore, but to the television, movies, billboards, office buildings, hotels, kitchen, cars, classrooms, in the field, corridors, in conferences, toilets, churches, mosques, streets, and in bush, just to name a few of the spaces. This paper provides some empirical and conceptual observations, which suggests ‘a sex crisis’ that is reflected in the kind of sexual patterns observed in the Kenyan society today. The current social and moral policies emphasize equity, human rights and freedom. However, there is lack of or little on self control and morality mechanisms in social control systems especially in relation to rapid socio-cultural changes that have led to identity and personality crisis. This has led to the prevalence of sexual patterns that advance egocentrism rather than common good. Consequently, the paper recommends a reflection on what actually happened to the sex moral values in Kenya and suggests what the society’s leadership should do to inform policy-oriented strategies that can tame the current situation.

Keywords: Sexual, Perversion, Crisis

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Abstract
The vulnerability of children in most Kenyan communities is evident. Its manifestation in different spheres is an implication of widespread disorders in the society such as poverty, family breakdown, wars, displacement, sexual exploitation, HIV/AIDS, among others. The categories of children exposed to these vulnerabilities include street children, orphans, abandoned, abused, neglected and those exploited hence posing challenges to their survival and development. This has led to development of several interventions to address child protection concerns at national and local levels. One of these interventions is the adoption of community based child protection mechanisms. Academic evidences from various studies on child protection in developing countries worldwide and particularly Kenya have shown how these mechanisms can effectively address child protection issues. This paper is an upshot of the participatory studies done by the authors and other researchers and interrogates the disconnect that exist between the local and national child protection mechanisms, which threaten the future of vulnerable children. The paper argues that not much has been done to strengthen community child protection mechanisms, which play the role of prevention and coordination of resources at the community level in addressing child protection issues. Moreover, interventions employed by various stakeholders to establish and/or strengthen child protection systems, have achieved little and are not sustainable without full support from the national government. Further, the interventions have been blamed on employing approaches that are not reflective of the needs of children hence fail to make impact. The paper concludes that community based child protection structures are fundamental instruments in prevention of children vulnerabilities and bridge the gap that exists between children, community and national structures. The paper recommends that for community based child protection structures to be effective, a creation of linkages, ownership by the local people and coordination of these structures in addressing children vulnerabilities is paramount.

Keywords: Community Child Protection Mechanisms, Orphans, Vulnerable Children
Bayesian Hierarchical Spatial Modeling and Mapping of Adult Illiteracy in Kenya

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Abstract
Literacy level in Kenya has been on the rise. However, the 2007 Kenya National Literacy Survey crude rates showed that on average 38.5 percent (7.8 million) of Kenya’s adult population was illiterate with significant regional and gender variation. Therefore regional disparity in literacy levels must be addressed if Kenya is to achieve its international goals such as Education for All (EFA) and Millennium Development Goals (MDG). Kenya National Adult Literacy Survey (2007) data that was obtained from sampled 18000 households, 4782 in urban and 10914 in rural areas. There were 15734 successful interviews that were comprised of 6493 were male and 9241 female. Bayesian binary logistic models (with and without CAR spatial and unstructured random effects) were applied to the Kenya National Adult Literacy Survey (2007) data, to investigate spatial variation of illiteracy levels in Kenya. The best fitted model was found to be the CAR model with age, sex, disability and awareness of adult literacy programs as the significant explanatory variables. Smoothed map of illiteracy from the best fitted model was then produced together with its corresponding confidence interval maps for regional variation in Kenya, in order to capture visual uncertainty in estimation. These maps can be used by policy makers to identify the pattern and tailor make programs appropriate for each region.

Keywords: Illiteracy, Bayesian Hierarchical Models, Spatial modelling
Tomato (*Solanum Lycopersicum* L.) Protection with Agronets Affects Pest Population and Yields under Kenya Growing Condition

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Abstract

Tomato (*Solanum lycopersicum* L.) is an important economic and food security crop in Kenya, providing important vitamins and micro nutrients and anti-carcinogen compounds. Its production is hampered by many challenges including pests and diseases. This study was carried to determine pest infestation levels on tomatoes protected with insect proof nets agricultural nets (Agronets). The study was carried out on-station at Kenya Agricultural Research Institute Kabete and Practical Training Centre Thika, Kenya from May to October 2011. A complete randomized block design with 5 replicates was used. The treatments included insecticide impregnated and non-impregnated Agronets, and control (no net). The findings show highly significant difference (P<0.05) in pest infestation across the treatments, with both sites showing similar results. Aphids and whiteflies were significantly lower (P<0.05) on tomatoes covered with Agronets compared with those under no protection. Treated and untreated nets showed significant differences in aphid and whitefly control. The natural enemies were not affected by the treatments. African bollworm damage was significantly lower (P<0.05) under treated nets compared to other treatments. It is concluded that Agronets, insecticide-impregnated or not, offer good protection against important pests of tomato, and also enhance yields of the crop. Therefore, farmers should consider using these products as potential tools to improve tomato production systems.

**Keywords:** Aphids, whitefly, African bollworm
Comparing Efficiency of Cover Duration and Mesh Size of Pest Exclusion Net Covers Against Cabbage (Brassica Oleraceae Var. Capitata) Pests in Kenya

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Abstract
Cabbage (Brassica oleracea var. capitata) is an important vegetable crop in Kenya both in production and income provision to smallholder farmers. Pests are serious hindrance to the crop production and most farmers rely on synthetic insecticides. Such reliance has negative effects on non-target organisms, environment, animal and human health. This study was carried out to compare effectiveness of insect proof low cover nets of different mesh size in reducing cabbage pest infestation and hence increase production. The study was conducted at Kenya Agricultural Research Institute Kabete and Practical Training Centre Thika using randomized complete block design with five replicates. Treatments included Agronets of fine and large mesh covered over the crop permanently or temporarily (opening three times a week from 9am to 3pm) and control where no Agronet was used. The results show that the mean number of Diamondback moth larvae was significantly (P<0.001) lower on cabbages protected with Agronets compared to those not protected. However, both the large and fine mesh sizes were not effective in reducing the smaller insects such as aphids and thrips infestations. The marketable cabbage yield was highly significant (P<0.001) with higher records on cabbages grown under the Agronets. The study concludes that use of low lying pest exclusion nets, either fine or large mesh would provide an important component of integrated pest management strategy for cabbage production in Kenya. However, further studies on cost benefit analysis may be required to ascertain the real cost of using the Agronets in smallholder farming systems.

Keywords: Agronet, Diamondback moth, aphids, thrips
Differences in Resistance against Sweet potato Weevil (Cylas Sp) Among Sweet potato (Ipomoea Batatas Lam.) Germplasm in Kenya

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Abstract
Sweetpotato (Ipomoea batatas Lam.) is an important crop in Kenya. It can survive through unfavourable weather conditions, making it a good food security crop. The improved orange fleshed varieties contain Beta-Carotene which is a precursor of Vitamin A, making it a good nutrition security crop. Production in Africa is however limited due to pests and diseases. The sweetpotato weevil (Cylas sp) is the most destructive pest of sweetpotato. It feeds on leaves, stem and tubers. Damaged tubers are inedible and not marketable. This study was carried out to identify resistance in a pool of Kenyan sweetpotato germplasm sourced from the National Gene Bank, KARI. The study was carried out in 2011 on-station at KARI Kabete and in Kibirwa location, Muranga County in 2012 for two seasons. It was done in a completely randomized design with 3 replicates. 112 genotypes were tested. The findings show that there was highly significant difference in terms of sweetpotato weevil infestation and damage across the genotypes and sites. The mean values of vigour, yield and loss at harvest were significantly different across the genotypes and the sites as well. These results indicate that there are possible sources of resistance among the sweetpotato genotypes, knowledge that can be used to develop acceptable varieties to prevent weevil attack. This will result to increased food security in areas where the crop is grown and increase market value for the tubers. Further studies may be required to identify resistant genes for possible use in genetic improvement of the sweetpotatoes.

Keywords: IPM, tuber-crops, orphan crops
Identification of Native *Bacillus Thuringiensis* (Bt) Isolates Effective Against Spotted Stem Borer (*Chilo Partellus* (Swinhoe) In Kenya.

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Abstract
The spotted stem borer (*Chilo Partellus* (Swinhoe.) is one of the most serious pre-harvest pests of maize, causing direct losses of 20-40%. It is difficult to control due to its cryptic habit and challenges in the use of pesticides as most farmers do not use pesticides. It is also resistant to most available pesticides. Over years, *Bacillus thuringiensis* (Bt), has been tested and used to manage the pest through conventional means (packaged as a pest control product), and recently through incorporation of its genome to maize (GM product). Due to resistance development and extension of information, this study was carried out to determine effective native Bt that can be used to manage *C. partellus*. The isolates had been collected from different parts of the country and preserved at Biotech Centre, KARI. Twenty isolates were multiplied and tested at KARI Kabete Pathology laboratory. The method included subjecting (through treated maize leaf disk meal) each isolate to 40 *C. partellus* neonates and observing mortality on 24h period for 3 days. *Bacillus thuringiensis* aizaiwai (Bta) was used as positive control while untreated maize discs were the negative control. The findings show that there was significant difference in the response of *C. partellus* to the isolates. In addition, there was significant interaction of mortality caused by isolates and exposure of the neonates to the meal. Native isolates causing higher mortality compared with Bta within 48 hours include 63, and 59 The study shows that there are local isolates of Bt that can be used in biological management of the pest and thus various methods can be optimized to provide the best package that can reduce infestation and cost effective to ensure wider use by farmers.

**Keywords:** Stem borer, Bt isolates, Biological control, Genetically modified organisms
Pest Infestation of Cabbages under Different Agronet Deniers and Structure Height

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Abstract
Cabbage is one of the most commonly and widely grown vegetable in Kenya and a major consumer of pest control products targeting mainly diamondback moth and aphids. These pests are responsible for high crop losses and reduction of cabbage market quality. This study was carried out in two cropping seasons (January to August 2012) at Kenya Agricultural Research Institute, Kabete, to compare effectiveness of height (no net, 30, 45 & 60 cm from ground) of holding pest exclusion nets and density (80 & 120 deniers) in reducing pest infestation of cabbage. The study was laid out in a randomized complete block design with three replicates. The findings show that there was highly significant difference (P<0.05) in terms of pest infestation and yield of cabbages under Agronets and those not protected. The latter had highest pest infestation and lowest yields. There was no observable significant difference in pest infestation across the different Agronet heights. However differences existed in different Agronet densities. Cabbages protected with 80 denier Agronets gave more yields compared to those under 120 denier. Results of this study suggest that Agronets can be customized not only for pests and diseases control but also for improvement on crop growth and yield. Farmers are advised to employ the use of Agronets to enhance their crop yields.

Keywords: Denier, Aphids, Diamondback moth
Prospects for Effective Native *Bacillus Thuringiensis* Isolates against Maize Stalk Borer (*Busseola Fusca* (Fuller)) in Kenya

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**Abstract**

*Busseola fusca* (Fuller) (Maize stalk borer) is a major pest of maize and other cereals, causing significant yield losses of up to 13.5%. Poor timing of control measures and inability to acquire effective products makes the pest control difficult for small scale farmers. Negative effects on environment, health, and non-target organisms as well as resistance development by the pest are also common. In this study, native *Bacillus thuringiensis* (*Bt*) isolates were tested to identify possible candidates for use in managing *Busseola fusca*. Crude broth of 44 native Bt isolates was prepared and applied on fresh leaf discs from two-weeks old maize, dried and placed on petri dish lined with soft paper towels before introducing *B. fusca* neonates. Positive (*Bacillus thuringiensis aizawai* (*Bta*)) and neutral (non-treated leaf disks) controls were included. For each treatment, 10 neonates were used per petri dish, replicated four times. Pest mortality was recorded on 24-hour intervals for five days. The findings show that mortality of *B. fusca* across the *Bt* isolates was significantly different. Isolates 25, 30, and 52 caused significantly higher mortalities compared with the rest, at 73.5%, 69.5%, and 67.5% across the time period, respectively. There was significant increase in mean mortality with exposure time for all the isolates (p = 0.001). Apart from isolates 14, 16, 19, 48, 49, 56, and 60, all isolates had higher mortalities than the neutral control. It is important to investigate further the most effective isolates to determine their potential for development of biocontrol products for managing this pest.

**Keywords:** Toxicity, *Bacillus thuringiensis*, Mortality, Maize

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Abstract. Quality Assurance Schemes of HIV globally are conducted through Proficiency Testing. It has a myriad of challenges that we intend to address using our innovative idea. The Classical External Quality Assurance Scheme of HIV through Proficiency Testing involves testing of panel sera to evaluate the testing competencies of individuals who perform HIV testing in different testing facilities. Our approach involves Proficiency Interpretation of the Rapid Test results online. It provides a platform where a second opinion of a test result can be sort directly and immediately from the HIV Testing personnel available online. Our objectives includes developing a Software, scaling up quality assurance of Rapid HIV Testing in Resource Limited Settings using a mobile phones and developing an electronic prototype gadget that can be used for HIV Self-Testing. Quality Assurance of HIV within Nairobi County (ireri et al, 2012 unpublished M.Sc Theses) indicates that 53.6% of HIV Testing facilities are not registered by the National HIV reference Laboratory. The result suggests the development of a mobile application that utilizes an SMS platform and web-based External Quality Assurance Scheme (EQAS) software. These will increase the enrolment of HIV testing sites in Kenya into regular EQAS and narrow the existing enrolment gap. They will also enhance monitoring and evaluation of individuals testing competencies automatically, and give their monthly progressive reports. We recommend an online service approach that can allow for replication and scalability of the service in Kenya and other countries especially in Sub-Saharan Africa, where Rapid HIV test kits are used in limited resource settings.

Keywords: Quality Assurance, HIV Proficiency Testing, VCT, NHRL, EQAS.
Effects of Agronets on French Bean (*Phaseolus Vulgaris L.*)
Pollination in Nairobi Kenya

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Abstract
French bean (*Phaseolus vulgaris* L.) is an important export vegetable in Kenya contributing to economic and nutrition security. Apart from pest problem, pollination is a challenge since farmers are not aware of this service. This study was carried out to determine the best pollination management practice for farmers using insect exclusion nets (Agronets) to manage French bean pests. The Agronets have small mesh sizes unlikely to allow bees to the crop causing pollination deficit. The study was on-station at Kenya Agricultural Research Institute Kabete in Nairobi County, from September 2012 using factorial design. Two factors were tested: factor 1 included opening Agronets on a day interval at 20% flowering period. (Six levels: open daily, after 2, 3, 4, 5 and 7 days). Factor 2 included opening Agronets on hour interval (five levels: no opening, open from 6am-6pm, 6am-10am, 10am-2pm and 2pm-6pm). Data collected included the number of buds, flowers produced, and yield. The findings showed significant difference (P<0.001) in day interval but there was no significant difference (P>0.05) in hour opening. French beans opened five or seven day interval recorded highest yield. This provides choice for farmers can choose the most suitable day and hour interval for Agronets to maximize French bean pollination and yields.

Keywords: Pollination, Agronets, Honey bees, Wild bees
Driving With Single Deformable Poly-Line Tentacle and Velocity Obstacle

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Abstract
Intelligent transportation systems are emerging as the approach to dramatically improve efficiency while at the same time leading to the goal of zero accidents. Autonomous driving is now possible but still greatly limited to low speed driving. This is mainly due to computational load in detecting the road and objects, path planning and limited controller cycles. The focus of this work is to develop faster trajectory planning scheme given the sensed environment map (occupancy grid). This work utilizes interaction of single projected trajectory from the non-holonomic vehicle kinematic model with the objects in the road. Furthermore, the planned trajectory is made sensitive to car speed. Simulation results with non-linear vehicle kinematic model shows that the proposed combination of single trajectory and velocity objects gives faster satisfactory trajectory with safe obstacle avoidance while following prescribed way points.

Keywords: Deformable poly-line tentacle, Velocity, Trajectory planning, non-holonomic constraints.
The Use of ICT by SME in accessing Business Information Services in the Hospitality Industry in Kenya

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Abstract
In order to enhance operational efficiency, improve service quality, have a competitive advantage and reduce costs, practitioners in the hospitality industry have adopted and implemented information and communication technologies (ICTs) in their businesses. The purpose of the paper is to present current state of the use of information and communication technologies (ICTs) in Kenya’s small and medium-sized enterprises (SME) sector in the hospitality industry. Understanding how ICTs have been utilized in SMEs could assist practitioners and researchers in identifying research gaps and formulating future plans. The survey methodology using both qualitative and quantitative approaches was employed to collect data. Questionnaire and interview methods were used to collect data. The data was collected from 100 SME operators in the hospitality industry in Kenya. The utilization of ICTs by SMEs was investigated in order to assess the current levels of use and the potential of the technologies in increasing information dissemination and increase enterprises’ competitiveness. The study provides data on which future developments in ICTs in the SME sector in Kenya could be based. Through their effective use, ICTs will help SMEs to capture global markets, sell to international customers, and compete favorably with large corporations. The most widely used communication tools in enterprises were indicated as: cell-phones (92.3%), telephones (61%), fax (30.8%) and e-mail (20%). Most of the enterprises owned less than three Personal computers (76.9%). The computers were mostly used in the finance section and the other sections were mostly using manual systems. Use of information systems was indicated as 38.4%. Data showed low usage of the internet for booking purposes (25%). Some SMEs are not effectively using the newer technologies especially the internet to explore business opportunities and there are many reasons cited for the low usage of ICTs including costs of the technologies, and most importantly lack of awareness of what the internet offers.

Keywords: ICT, SME, operational efficiency, Kenya

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Abstract
Barbs (genus Barbus) form a complex polyphyletic group of Old World Cyprinidae, their morphological plasticity makes them ideal models for studying evolutionary phenomenon in freshwater fishes. It is generally acknowledged that this cyprinid taxon requires a complete taxonomic reorganization of its status. Morphological characterization based on 21 morphometric characters was carried out on rivers Nzoia, Nyando, Yala and Sondu-Miriu of Barbus altianalis from Lake Victoria catchment, Kenya. Principal Component Analysis (PCA) showed separation of Rivers Yala from Nzoia, Nyando, and Sondu-Miriu populations. Factor loadings established that 11 characters were morphologically informative. PCA1 accounted for 43.25% of the difference while PCA2 accounted for 19.44% of the difference. Mann-Whitney U Test (P<0.05) indicated lack of significant difference in morphological characteristics between Sondu-Miriu and Nyando, but significant intra-specific morphological difference in comparisons between the other pairs of rivers. Growth variability analysis based on 15 characters indicated negative allometric growth of Barbus altianalis in all the four populations. Our results suggest presence of intra-specific morphometric variation between the four populations.

Keywords: Barbus altianalis, Lake victoria, Principal Component Analysis, Intra-specific, morphometrics.
Disease Manifestation and Management on Nursery Tomatoes (*Solanum Esculentum* Mill.) Protected From Insect Pests Using Agro Net in Kenya

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Abstract

Tomato (*Solanum lycopersicon* L.) is an important crop for income and good source of micro-nutrients. It is widely grown all over the world. In Kenya and other African countries, it is grown both in large scale and small scale production system as a rain fed and irrigated crop. Despite its importance, tomato production is constrained by a myriad of disease and pests largely affecting its yields and market value. This on-station study was carried out at Kenya Agricultural Research Institute, Kabete from August to September 2012 and repeated from February to March 2013 to determine disease development and management on tomato seedlings protected from insect pests using insect exclusion nets (Agronet), which is a new technology in Kenya. The study was carried out using a factorial design with two factors, Agronet( five levels; insecticide impregnated nets of 0.9mm mesh size, non impregnated 0.9mm mesh size net, non impregnated 0.4mm mesh size, shading representing farmers practice and non covered used as the control) and integrated pest management (three levels; seed dressing plus monitoring, seed dressing and no seed dressing). The findings showed that there was significant difference observed across the levels of the management strategies. Seed dressing plus monitored pesticides use had the least disease infection severity followed by seed dressing and no application for damping off, early blight, tomato yellow leaf curl virus and late blight. However there was no significant difference across the different Agronets but these were significantly (p<0.05) different from control. The 0.9mm mesh size of both insecticide-impregnated and un-impregnated nets showed least infection severity compared with 0.4mm mesh Agronets. From the study, it is evident that Agronet technology should be complimented with other integrated management to realize full gains of the technology.

**Keywords:** Damping off, Tomato yellow leaf curl virus, Agronet, Powdery mildew, Blight.
Creating Pest Free Area in Kenya to Access and Sustain External Fruit Markets

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Abstract
Trade embargo based on phytosanitary aspects are described as non tariff technical barrier to trade and can devastate a whole commodity value chain if not well handled. Through the World Trade Organization (WTO), this challenge has been discussed and negotiated, resulting to development of guidance documents for use by a country to access markets after satisfying required steps based on the target phytosanitary question. Kenya in 2007 lost South African Avocado market due to presence of the Asian fruit fly (Bactrocera invadens) in the country. Other countries such as Seychelles also banned fruits from Kenya since the pest is of quarantine importance. To salvage the continued loss of external markets for Kenyan fruits, the National Horticulture Taskforce created a National Fruit Fly Taskforce to help in opening the market. This led to creation of area of low fruit fly (B. Invadens) prevalence since at Kandara, Muranga County, which has the highest avocado production in Kenya. The study involved mapping of areas for export as well as buffer zones that would ensure B. invadens is fully prevented from reaching the target areas. The findings show that farmers are willing to invest in the management of this pest and thus secure and sustain their fruit markets. Though they were not aware of the pest, farmers and stakeholders have will to learn and implement recommended farm practices to manage the pest. With support of farmers and grass root leaders the project is headed to success, opening opportunities to export avocados, and providing evidence that the country can be able to meet international regulations to facilitate trade.

Keywords: Bactrocera invadens, Fruit fly, Avocado
Infestation of Tomatoes (*Solanum Lycopersicon* L.) by Pests When Protected With Agronets in Central Kenya

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**Abstract**

Tomato yields in smallholder cropping systems in Africa are generally below the potential recorded in other parts of the world largely due to pest attack. Farmers often rely on pesticides, which have not been effective due to resistance build up and elimination of natural enemies. In this study, low lying agricultural nets (Agronets) were tested to determine their efficiency against tomato pests in an on-station experiment at Kenya Agricultural Research Institute (KARI)–Kabete and Practical Training Centre (PTC) Thika, from May to November 2011. Treatments included Agronets mesh size 0.4 mm and 0.9 mm placed permanently or opened three times a week (from 09:00-15:00h) throughout the growing period, and control (without Agronet covers). Results showed significant differences (P<0.05) across the treatments in relation to pest pressure. Tomatoes covered with Agronets had generally lower pest infestation compared to control. Tomatoes under permanent covers had significantly lower (P<0.05) pest infestation compared with those under temporal covers. Aphids, whiteflies and leaf miners populations were significantly lower (P<0.05) on tomatoes covered permanently with Agronets. Significantly higher (P<0.05) tomato yield losses were realized on unprotected plots as a result of African bollworm damage. It is recommended that Agronets should be used to manage tomato pests. However, further work may be required to optimize Agronet use, through incorporation of an Integrated Pest Management IPM system where Action Threshold levels of key pests are determined. This would further guide on best pest control product use schedule when using Agronets on tomatoes.

**Keywords:** Aphids, Whiteflies, Leaf miners, African bollworm
Childhood Obesity in Kigali: A Three-Level Approach for Cost-Effective Reduction Interventions

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Abstract
Childhood obesity refers to children who have higher body fat and weighing about 25% more than the normal body weight for what is thought to be a healthy height. Overweight in children occurs whenever children weigh much higher than normal. Childhood obesity has more than doubled in children, and tripled in adolescents, globally: in developed, developing and medium income countries, in the past several decades like Rwanda. Although overweight affects more than 1.2 billion people, with about 300 million clinically obese; this rising epidemic is under-diagnosed, undertreated and growing side by side with malnutrition in low- and middle-income countries, thereby contributing to their growing health burden. Although there are little statistical data on childhood obesity in Rwanda, available evidence indicates that childhood obesity is growing among children and adolescents in Kigali city, due to fast and rapid urbanisation. Consequently, Kigali city children are exposed to city culture of eating less nutritious energy dense snacks/soft drinks, fast foods, sedentary lifestyles and little or no physical exercises. Extensive literature search and review, coupled with the three-level approach, which entails: screening all children, intervene early for children with body mass index (BMI) greater than 25 but less than 30, and provide intensive intervention for children with BMI greater than 30, were used for this study. The results show some ten-year old children weighed 60kg because of diet and sedentary lifestyles, predisposing them to higher morbidity and mortality. Furthermore, healthy eating and exercising decrease BMI, waist girth, adiposity, and impact positive behavioural changes. Conclusively, the proposed three-level approach for childhood obesity would drastically reduce multiple risk factors for chronic diseases, premature mortality in adult life, cardiovascular diseases, high blood pressure, cardiomyopathy; pancreatitis; orthopaedic, respiratory and psychosocial disorders; low self-esteem; depression, anxiety and declined academic performance.

Keywords: Body mass index, city culture, screen, sedentary, urbanisation
Evidence of Cabbage-Pest Suppression Using Low-Cost Exclusion Nets at Kabete and Thika, Kenya

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Abstract
This study was conducted to evaluate effectiveness of pest exclusion nets (Agronets) against pests of cabbage, a major income generating crop for smallholder farmers in Kenya. The study was set at Kenya Agricultural Research Institute (Kabete) and Practical Training Centre (Thika), from March to September 2011 for both nursery and field experiments. Treatments included 1) insecticide (alpha cypermethrin) impregnated Agronets, 2) Un-impregnated Agronet (0.4 & 0.9 mesh size) 3) grass shading, and 4) control where there was no Agronet used. Agronet mesh size 0.4 and grass shading treatments were only used in nursery trial. Treatments were replicated five times in a completely randomized block design. Sampling started immediately after germination (nursery) and one week after transplanting (field). The results showed that mean number of immature diamondback moth (DBM), P. xylostella was significantly (P<0.05) lower on cabbages covered by Agronets compared with those uncovered, both at nursery and field level. At nursery, aphids were significantly (P<0.05) lower on seedlings covered by treated nets compared with seedlings covered by untreated net. The marketable yield in was significantly (P<0.05) higher on cabbages grown covered by Agronets compared with those uncovered. There was no significant difference in performance of Agronets based on their mesh size. The study shows that insect exclusion nets can reduce infestation of major cabbage pests and thus increase crop yields. For nursery, impregnated nets performed better compared with non-impregnated and thus they could be promoted for use to produce clean seedling material. In absence of impregnated nets, non-impregnated performed better than control and farmer practice and thus should be promoted.

Keywords: Insecticide-impregnated Agronets, DBM, Aphids, Natural enemies
Diurnal Diversity and Activity Density of Bees on French Bean Flowers (*Phaseolus Vulgaris L.*) At Laikipia County, Kenya

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Abstract

French bean (*Phaseolus vulgaris* L.) is an important crop in Kenya with high impact on rural employment and livelihood. Amongst the known constraints, pollination has not featured amidst many farmers, a fact associated with lack of knowledge on the same. The crop benefits from bee pollination through improved pod set and pod quality. In this study, bees were observed from morning to evening (06 00h to18 00h) on hourly basis to determine their diversity and abundance on flowers of French beans at Laikipia County. Six small scale farms with French beans Var. Julie were randomly selected from 50 GPS already selected farms, along a transect of 1km from the forest. Three farms were each at 200m, 800m, and 1000m from Mt Kenya National Reserve forest edge. Sampling was done at the onset of 50% flowering. Results showed presence of *Apis mellifera*, Megachile spp and *Xylocopa* spp on the crop flowers. *Apis mellifera* had the highest visitations with peak visits from 1000h to 1100h and 14 00h to 1500h. *Xylocopa* spp visitation peaked from 12 00h to 13 00h while *Megachile* spp visits peaked at 1400h. No visitations of these bees were observed between 06 00h - 08 00h and after 17 00h. However, *Megachile* spp visitations started past 09 00h and ended at 16 00h. Generally French beans in farms near the forest recorded higher frequency of visitation compared with those in farms far from the forest. In addition, *Apis mellifera* visitation frequency was higher on French beans near the forest while this was in the reverse for *Megachile* spp and *Xylocopa* spp. The findings show that it is possible to incorporate bee friendly pest and water management plan at blooming stage by utilizing window hours when bees are not expected to be on the crop.

**Keywords:** *Xylocopa* spp; *Apis mellifera*; *Megachile* spp
Factors That Affect Cloud Computing Adoption by Small and Medium Enterprises in Kenya

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Abstract:
The number of Small and Medium Enterprises in Kenya have increased tremendously over the last ten years. They have played a profound role in providing employment to the population besides growing the Kenyan economy. Cloud computing is a new entrant to the technology arena which in form of Platform as a Service, Software as a Service and Infrastructure as a Service promises profound reduction in cost of operations in a business. It offers immense benefits as the business enterprise utilizes the pay per use model availed by the cloud service providers as per the needs of the business enterprise. This eliminates the need to purchase expensive software, development platforms and setting up complex ICT infrastructure. This is akin to renting what they need instead of purchasing and owning it. However, the SMEs in Kenya have not taken up the cloud computing benefits to maximise their competitive advantage. This research paper focuses on the factors that affect the adoption of cloud computing by SMEs in Kenya. The research process involves a descriptive research design. The research findings have shown that technological, organisational and environmental factors have affected the adoption of cloud technologies.

Keywords: cloud computing, technological, organisational, environmental.
Challenges to Business Process Automation in Public Universities

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Abstract
The rapid development of information and communication technologies has resulted in the wider availability of the latest technologies at very affordable costs. These resources can be found in most public offices indicating some form of automation. However, according to research carried out in one of the public universities in Kenya, the acquisition of these resources has not translated into business process automation. The study revealed that most of the employees used the resources for their own benefit and not the organization. Viable interventions are recommended to ensure that these resources added value to the institutions.

Keywords: business process, process automation, ICT resource deployment
**Antiplasmodial Activity of Some Kenyan Medicinal Plant Extracts**

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**Abstract**

The emergence and spread of parasites resistant to standard drug therapies has necessitated the search for new and novel antimalarial drugs, especially from plants with ethnomedically known antimalarial properties. Organic extracts of six plants (*Caesalpinia volkensii*, *Ficus sur*, *Maytenus heterophylla*, *Artemisia annua*, *Rhamnus staddo* and *Ekebergia capensis*) were screened for their in vitro antiplasmodial activity against chloroquine sensitive (*D6*) *Plasmodium falciparum*. Activity was expressed as the concentration of the drug that inhibits 50% parasite growth (IC₅₀). This was determined using the semi-automated micro-dilution assay technique which determines the ability of the drug to inhibit integration of radio-labelled hypoxanthine into the parasite’s nucleic acids. The results showed that all six plants were active with IC₅₀ ≤100μg/mL. The most active methanol extracts were from *Caesalpinia volkensii* leaves, *Artemisia annua* siftings and *Ekebergia capensis* stem bark with IC₅₀ ≤10μg/mL which represents 37.5%. Of these, the most active was the *Ekebergia capensis* stem bark extract with IC₅₀ of 1.8μg/mL. 25% of both ethyl acetate and petroleum ether extracts had IC₅₀ ≤10μg/mL. The most active were the petroleum ether extract of *Artemisia annua* siftings and ethyl acetate extracts of *Ficus sur* root bark with IC₅₀ of 1.6μg/mL and 5.8μg/mL respectively. These results support the use of traditional herbs for anti-malarial therapy and demonstrate their potential as sources of novel drugs.

**Keywords:** Plant Extracts, Anti-plasmodial Activity, Antimalarial, Organic Extracts, Ethnomedicine
Abstract
This paper looked at deaf learners English literacy in Kenya. Deaf learners, a category of persons living with disabilities popularly known as special needs Education (SNE) have continually performed poorly in National examinations which bars them access to institutions of higher learning and later to successful employment opportunities later in life. With the enactment of the constitution that provides for integration of all persons in all social, political and economic activities irrespective of race, gender, religion or disability, this paper sought to make an enquiry into English Language Literacy which is key to the Education of deaf persons as education is an integration tool. The paper specifically focused on reading for comprehension and writing for communication competences in deaf learners. The study was guided by the functional language theory by Halliday further developed by Cooter and Reutz (2004). The theory states that children acquire language in order to function comfortably in society. The study used five schools for the deaf in central region of Kenya. Eight deaf learners from each school were selected purposively. These gave a sample size of forty (40) respondents. The learners were subjected to written exercises, written composition to test writing for communication and a reading passage where learners were to respond to questions derived from the passage that tested reading for comprehension. The study settled on standard four learners because this is where reading for comprehension and writing for communication begins. Findings indicated that deaf learners at standard four cannot read for comprehension or write for communication. The study therefore recommended that strategies for teaching English language to deaf learners should be improved. Specially trained teachers who understand these kind of learners should be posted to deaf schools especially to handle English language. Finally, technologically oriented programmes designed to teach the deaf learners English language should be put in place.

Keywords: Special Needs Education, Deaf Learners, English Language, Literacy, Comprehension, Communicative Writing.
Screening of Plant Extracts for Antifungal Potential against *Colletotrichum Lindemuthianum* Causal Agent of Bean Anthracnose

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**Abstract**

*Colletotrichum lindemuthianum* is an important plant-pathogenic fungus that causes bean anthracnose. Anthracnose is wide spread and constrains the production of quality farm saved seeds which eventually lead to low bean yield in Western Kenya. The objective of the present investigation was to evaluate the antifungal potential of extracts of eight plants in management of bean anthracnose in Western Kenya. Water extracts of *Allium cepa* L., *Allium sativum*, *Azadirachta indica*, *Cleome gynandra*, *Lantana camara*, *Daturastramonium*, *Aloe vera* and *Eucalyptus globules* were screened in vitro for their antifungal activities against *C.lindemuthianum* using poison food technique. *A. vera*, *A. sativum*, *A. cepa* and *D. stramonium* extracts were then tested for antifungal activity in vivo as foliar treatments against anthracnose disease. All the in vitro tested extracts were active against *C.lindemuthianum* at inhibitory concentration of 30%. *A. vera* (90.6%) had the highest inhibitory activity followed by *D. stramonium* (65.9%), *A. sativum* (65.5%) and *A. cepa* (65.0%). *A. indica* had 58.3% while *E. globules* had 54.3%. *C. gynandra* and *L. camara* had the lowest inhibitory activity of 34.0 and 28.7% respectively. In vivo tests showed that Plants treated with *A. vera* extracts had a lower anthracnose incidence and severity (23% and 15% respectively) and compared well with disease reductions due to the application of the synthetic fungicide Mancozeb applied at 2gm l⁻¹ (11.1% and 10% respectively). The result indicated that the water extract of *A. vera* had significantly greater inhibitory activity against *C.lindemuthianum in vitro* and also reduced anthracnose disease of bean. The easy foliar treatment process and accessibility of these plants used in the present study could lead to high adoption of the use of the plant extracts as foliar treatments by resource-poor, small holder farmers to obtain quality farm saved seeds.

**Keywords:** Extracts, *Colletotrichum Lindemuthianum*, Antifungal, Yield
Factors Associated With Cardiovascular Disease Conditions among Patients Attending Outreach Clinics in Two Nairobi Slums and Thika Level 5 Hospital

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Abstract
Diabetes and hypertension are still largely ignored as public health problems in most Low and Middle Income Countries (LMIC). However, the quickening pace of change and adoption of western lifestyles by people in LMIC has led to a sharp rise in morbidity and mortality from cardiovascular diseases (CVD), particularly those related to diabetes and hypertension. The study sought to determine the socio-demographic factors, awareness, and practices associated with CVD conditions among diabetic and hypertensive patients. Descriptive cross-sectional study design was used on 412 randomly selected participants from two Nairobi slums and Thika Level 5 Hospital (TL5H), 206 respondents from each study site. Quantitative voluntary administration of questionnaires was used for data collection and results analyzed using SPSS. The two Nairobi slums had 73 (35.4%) respondents with CVD while TL5H had 120 (58.3%) respondents. In multivariate logistic regression, the sex of the respondents was significantly associated with CVD (p<0.05, Adjusted OR=0.395) among respondents attending the two Nairobi slums. Awareness on the prevention of diabetes/hypertension (p<0.05, Adjusted OR=1.694) and the frequency of adding salt to food (p<0.05, Adjusted OR=1.691) were significantly associated with CVD among respondents attending TL5H. Adherence to management instructions and close regular follow up of patients living with diabetes/hypertension is necessary in prolonging the quality of life and productivity. This may further prevent or delay the development of CVD.

Keywords: Cardiovascular Diseases, Diabetes, Hypertension
Molecular Detection of Mycotoxigenic Fungi Contamination In Mursik; Traditionally Fermented Milk

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Abstract
Mursik is traditionally fermented milk prepared from freshly milked cow milk. Fungi of the genus: Penicillium, Aspergillus, Fusarium and Alternaria are the major contaminants of this milk product. Some of these have been known to have genes responsible for mycotoxin production. Additionally, fermented milk undergoes a process which is traditionally practiced, providing favorable conditions for milk contamination with mycotoxin producing fungi. In Kenya detecting these microorganisms has not been done in this milk product. To detect the mycotoxigenic fungi responsible for mycotoxin production in mursik. Mursik samples were collected from different households. The samples were used directly as the template to extract fungal DNA. The fungal genes of beta-tubulin and ITS was amplified by PCR using fungi DNA extracts as templates as per the Dragan et al., (2010) technique. Of 45 samples run, all were positive for Beta-tubulin and ITS genes. This showed that the fungi responsible for mycotoxin production were present, thus contamination of mursik with mycotoxins. Mycotoxin contamination should be quantified in these milk products and also education should be done on the milk handlers to avoid fungal contamination.

Keywords: Mursik, Fermentation, Fungi, PCR
Antiplasmodial Activity of Selected Kenyan Medicinal Plants Used in Kenya

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Abstract
Despite the significant strides made in the fight against malaria, the disease continues to inflict enormous toll on human health, particularly in Africa. This is due to the emergence and spread of multidrug resistant *P. falciparum* (the spp. responsible for 90% of all global malaria cases). Reports from South East Asia indicate that resistance to artemisinin (the only fully effective antimalarial drugs) is imminent. There is need to develop new drugs with novel mode of action, and plants have always been a rich source for drugs. The study evaluated the in vitro antiplasmodial activity of aqueous and organic extracts of *Azadirachtaindica* (AI), *Albiziagummifera* (AG), *Vernoniaasiopus* (VL), *Rhamnusprinoides* (RP), *Maytenusaccuminata* (MA) and *Maytenussenegalensis* (MS). The plants parts that were screened were leaves (L), stem bark (SB) and root bark (RB). These plants were collected from Central and Rift Valley parts of Kenya, where they are used to treat malaria. The in vitro activity of the plant extracts was expressed as the concentration that inhibits 50% parasite proliferation (IC$_{50}$). This was determined against CQ-sensitive *P. falciparum* isolates (D6) using the semi-automated micro-dilution assay technique which determines the ability of a drug to inhibit integration of radio-labelled hypoxanthine into the parasite’s nucleic acids. Of the tested plant extracts, ethyl acetate extracts of MS (L) and AG (L) showed high antiplasmodial activity against D6 *P. falciparum* strain (IC$_{50} \leq$ 10μg/ml). While 21 extracts showed moderate antiplasmodial activity (IC$_{50} \geq 10 \leq 100$μg/ml) against D6 strain, the methanol and ethyl acetate extracts of AI (L) showed very promising antiplasmodial activity of 10.5μg/ml and 12.8μg/ml respectively. In conclusion, ethyl acetate extracts of MS (L), AI (L), AG (L) and methanol extract of AI (L) have a great potential and can be pursued for the development of antimalarial drugs.

Keywords: Malaria, Antiplasmodial Activity, *P. Falciparum*, Antimalarial
A Model for Fraud Detection in Automobile Insurance Claims Settlement

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Abstract
In insurance domain, fraud detection is often a manual task based on human intuition which can be time consuming and expensive. This paper deals with comparison of the performance of neural networks and logistic regression techniques in detecting automobile insurance claims fraud. Backward stepwise technique was used to fit the statistically significant fraud indicators and AIC was used for the model selection. Logistic regression described the dichotomous dependent variable (claim status) with relation to the fraud indicators based on maximum likelihood estimation of parameters. Neural Networks converted the series of fraud indicators into one terminal variable using the quasi Newton learning algorithm. Several tools were used to compare the fitted models, namely: a unit free within sample measure of the goodness of fit was used to compare the three models, confusion matrices describing their sensitivity and specificity and the Receiver Operating Curve which yielded the Area Under the Curve (AUC) statistic. The neural network model yielded the highest value of 75% implying that it was the best fit and accounted for 75% variation in the dependent variable compared to its logistic model fit which accounted for 47% variation. It was also established that the neural network model was able to identify the true positive (non-fraudulent claims) rate at 99% and 94% and the true negative (fraudulent claims) rate at 78% and 77% for the training and validation samples respectively. The neural network model also yielded the highest AUC of 0.6866. Based on the three tools neural networks outperforms logistic regression. These results will enhance the claim assessment procedure by incorporation of statistical modeling as a tool for narrowing the number of claims to be investigated thus ensuring timely claim settlement.

Keywords: Insurance, Fraud, Neural Network, Logistic
Prevalence and Antibiotic Susceptibility Pattern of Salmonella in Asymptomatic Food Handlers in Nairobi, Kenya.

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Abstract
Food handlers constitute a significant risk in the spread of food borne diseases. They play an important role in the transmission of typhoid bacilli and other Salmonella spp. This study was conducted to determine the prevalence, antibiotic susceptibility profiles, plasmid DNA profiles and conjugation ability of Salmonella in asymptomatic food handlers in Nairobi, Kenya. A total of 1,270 asymptomatic food handlers from 29 institutions were screened for Salmonella using stool culture and standard microbiological identification methods. Susceptibility to eleven antibiotics was tested. Multi drug resistant strains were subjected to plasmid DNA isolation and characterization using gel electrophoresis and conjugation. Salmonella was isolated from 31 people giving a prevalence of 2.4%. Common Salmonella serotypes isolated were Salmonella paratyphi A (0.6%), S. paratyphi B (0.5%), S. typhimurium (0.3%), S. typhisuis (0.2%), S. enteritidis (0.2%), S. typhi (0.08%), S. abortusovis (0.08%) and S. infantis (0.15%). 42% of isolates were resistant to 2 or more antibiotics while 58% of the isolates were fully sensitive to all antibiotics tested. All multidrug resistant isolates were found to carry large (c.110 -110 kb) plasmids. 50 % of the multidrug resistant salmonella selected for conjugation transferred one or more antimicrobial resistance to recipient E. coli K12. Food handlers are a possible reservoir of Salmonella species including multidrug resistant strains and thus constitute a significant risk in the spread of Salmonella infections which could be difficult to treat. Inclusion of screening of Salmonella carrier state in food handlers should be initiated.

Keywords: Food Handlers, Salmonella, Antibiotic Resistance.
Wound Healing Activity and Safety of *Aspilia Pluriseta*-Based Ointments: Validation of Ethnomedical Use

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Abstract

Wound healing abnormalities are among the greatest causes of deformity and disability, imposing a physical, mental and economic burden on patients and healthcare professionals, and acting as substrate for infection in injury patients. There are few available cost-effective wound healing remedies especially in developing countries. Many plants are used ethnomedically for wounds, and these offer potential for novel remedies. The ethnomedical use of *Aspilia pluriseta* Schweinf (Asteraceae) on cuts, bruises and burn points to its potential for healing wounds. This study aimed at evaluating the wound healing activity and safety of the plant. The excision wound model in mice (treated once daily for 21 days, observed for area changes and histology) was used to evaluate the wound healing potential and the Buehler Non-adjuvant test for skin sensitization potential in guinea pigs. Milled plant aerial parts were incorporated into an ointment base (Simple Ointment, B.P.) to form 10% and 20% plant-based ointments (w/w) for these studies. Simple ointment (B.P.) and Silver Sulfadiazine (Silverex® Cream) were used as the negative and positive control respectively. The 20% plant-based ointment compared favorably with the standard drug in epithelialization time (15.5±1.118 days versus 16.5±0.616 days for the 20% plant powder ointment and reference drug respectively) and wound contraction (28.17±3.725 and 57.75±6.178 percent wound area reduction on the 6th and 9th days post-wounding respectively for the 20% plant powder ointment versus 14.98±7.194 and 36.37±4.871 for the reference drug, same days). However, the results were less than significant at \( P \leq 0.05 \). Histologically, the plant material accelerated remodeling with higher amounts of collagen deposited than the negative control group. The 20% plant-based ointment induced a moderate allergic reaction in guinea pigs. These results show merit in the use of this plant ethnomedically. Its allergy-inducing potential may be a limitation to its exploitation. The demonstrated wound healing activity, though, justifies in-depth studies into the plant’s wound healing potential.

Keywords: Aspilia Pluriseta, Excision Wounds, Ensitization.
Implications of Herbert Spencer’s Concept of Knowledge of Most Worth to the Achievement of Knowledge Economy through Research and Innovations

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Abstract

As Universities, scholars, researchers and related institutions continue in pursuance of knowledge through research and innovations, one key question could be: which or what knowledge is of most worth? In other words, which knowledge should be sought most or prioritized? This paper provides an account that would yield an understanding that could best inform the choice of priority areas in the pursuance of knowledge for innovation and development.

Keywords: Knowledge, Research, Worth, Education
The Impact of Vocational Training for Rural Development: A Case Study of Youth Polytechnics in Nyambene District

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Abstract
This study was built on three objectives. It sought the youth polytechnic (YP) responsiveness towards meeting the aspirations and needs of the trainees. It determined how graduates of YPs fared in the world of work and evaluated extent to which the community was involved by YP in facing rural development challenges. The study was carried out in the four YPs of Nyambene District by use of questionnaires, interview schedules and check lists as study instruments. The study adopted a case study design involving 144 respondents. The study targeted YP managers, instructors, parents/ Board of Governors and second year trainees and the adult community members served by each YP. The main study findings included inadequate: training tools, equipment and infrastructures, number of instructors, finances, utilization of information communication technology; community poor attitude towards YP vocational training, unutilized physical resources, poor income generating projects, and low enrollment. Practically, the study enlightened the need for YP programme designers on redesigning the existing curriculum to suit the dynamic work of today’s technology so as to address present and future challenges of vocational training. The parent ministry in charge of YPs would find the study useful in the formulation of future plans aimed at strengthening YP training in imparting relevant skills to trainees in readiness for self-employment in rural areas. The study is important theoretically in that it contributes to the advancement of knowledge about vocational programme development in YPs in Nyambene District in particular and in Kenya at large. The findings are key factors influencing trainees vocational training in various courses at youth polytechnics aimed at developing the local community economically. Finally, the study forms a basis on which other scholars could develop their studies in future in pursuant of unresolved issues in vocational training.

Keywords: Training, Development, Needs
Optimization of Water Hyacinth as a Feed Stock in Co Fermentation of Biogas

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Abstract:
Water hyacinth (Echnorria crassipes) is a menace due to its negative social and economic impacts in Kenyan water bodies. Despite its great potential as a renewable energy source, current major control methods have no direct benefits that can be drawn from the hyacinth. The use of the E. crassipes for energy generation has the potential to reduce poverty and curb deforestation in the rural areas. This study aims at determining the optimal conditions of biogas production from water hyacinth. The study will evaluate the chemical composition of feedstock-gas and slurry quality to establish the optimal co-fermentation ratios of the E. crassipes with cow dung. Data on pH, temperature, Total Dissolved Solids (TDS), conductivity, gas yields, gas composition and cleaning of the gas parameters will be collected. A preliminary study in batch reactor will be carried out to optimize biogas production from water hyacinth slurry. Optimum ratios of water (W), water hyacinth (WH) and cow manure (CM) for biogas production will be determined. The biogas produced will be measured according to the volume and the organic matter removal efficiency based on the Vas Chromatography. Preliminary results showed that water hyacinth substrate with 1.25g cow manure addition produced biogas 5 times higher than that of control. When compared to cow dung, biogas from water hyacinth was of more or less the same quality but low in quantity suggesting that the efficiency range is feasible. If used to produce biogas, E. crassipes will become not only a source of clean energy but also a source of employment to the communities living around the lake. In addition a more effective method of controlling the weed will have been found.

Keywords: Optimization, Biogas, Echnorria Crassipes, Cow Dung, Co Fermentation
Changing Adaptation and Coping Responses to Climate Stresses among Turkana Pastoralist of Northwestern Kenya

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Abstract
There is growing concern that increasing climate variability and change in East Africa may overwhelm existing resilience of pastoralist communities in the arid and semi-arid lands. This study unearth the changing adaptation and coping responses, and highlights a myriad measures presently employed by Turkana pastoralist of Northwestern Kenya to cope with and adapt to climate stresses. Results show that traditional adaptive strategies such as herd mobility, herds splitting across different locations to spread risk, keeping different species to ensure rational use of the natural resource base are presently being undermined by increased population pressure leading to conversion of grazing lands to other uses. This is further exacerbated by extreme climatic events such as frequent and severe droughts, limited livestock marketing opportunities, unclear property right regimes, escalating inter-communities conflicts and breakdown of traditional social and resource governance institutions. However, other emerging strategies by Turkana pastoralist include seeking for wage labor, receiving remittance from relatives, selling part of the livestock herd for subsistence, engaging in small business enterprises, supplementary feeding of livestock, selling of water, firewood and charcoal. It was concluded that these long-term and temporary adjustment by pastoralist in terms of livelihood activities in the face of climate stress in necessary. The strategies employed by the communities demonstrate the transformative and continually evolving processes and practices to take advantage of new opportunities.

Keywords: Climate change, Resilience, Vulnerability, Livestock, Strategies
Inhibition of *Leishmania* Infection Development Using Glucocorticoid Drugs *In Vitro*

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NF-κβ is a group of transcription factors responsible for many macrophage functions including apoptosis and cytokine production. *Leishmania* parasites evades host immune system partly by suppressing Janus-activated kinase 2 (JAK2)/ STAT1α, while activating NF-κB p65 RelA subunit. Glucocorticoids are known to block the NF-κβ pathway and may offer a novel treatment for Leishmaniasis. The main objective of the study was to determine the effect of glucocorticoids, Dexamethasone (dexa) and Hydrocortisone (hydro) on the rate of infection and parasite development in macrophages. Peritoneal macrophages were harvested from BALB/c mice and treated with dexa and hydro. The macrophages were then infected with *Leishmania major* promastigotes and the infection rates and multiplication indices of amastigotes in macrophages determined. Lipopolysaccharides (LPS) and RPMI 1640 culture media were used as positive and negative controls respectively. Preliminary results demonstrate a reduction in macrophage infection rates of 85.95%, 42.5% and 64.46% for 2.5ng/ml LPS (positive control), 2mg/ml hydro and 0.17mg/ml dexa respectively, compared to the negative control (RPMI 1640). Parasite multiplication indices indicated a reduction of 80.82%, 42.47% and 64.46% for 10ng/ml LPS, 2mg/ml hydro and 0.17mg/ml dexa respectively when compared to controls. The anti-leishmanial effects of glucocorticoids demonstrated by this *in vitro* study are not optimal. However, dexa exhibits better activity as compared to hydro. Moreover the targeting of the NF-κβ pathway is validated by the impressive results from LPS (positive control) which is known to block the pathway. The results show that the NF-κβ pathway is a novel target for control of Leishmaniasis. Further research is however recommended to evaluate the effect of glucocorticoid *in vivo* and in non-human primates subsequently.

**Keywords:** *Leishmania*, Glucocorticoid, *In Vitro*
Antimicrobial Activity and Phytochemical Profiles of Selected Medicinal Plants Found in Kaptumo Division in Nandi County

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Abstract
Medicinal plants are widely used by the local people to treat various human diseases. The efficacy of most of these plants has not been determined hence the present study conducted at Kaptumo Division in Nandi County seeks to determine antimicrobial activities and profile the phytochemicals found in four selected medicinal plants namely: *Kigelia africana*, *Ekebergia capensis*, *Periplocca linearifolia* and *Ehretia cymosa* that are commonly used to treat infectious diseases. Fresh plants were collected from the field and air dried under shade at 25°C and later ground into powder and extracted using acetone and water. Phytochemicals from the extracts were profiled using thin layer chromatography method. The extracts were tested against standard pathogenic microorganisms: *Escherichia coli* ATCC 25922, *Staphylococcus aureus* ATCC 25923, *Pseudomonas aeruginosa* ATCC 27853, *Candida albicans* ATCC 90028, *Cryptococcus neoformans* ATCC 32602 and clinical isolates of Methicillin resistant *Staphylococcus aureus*, *Microsporum gypseum* and *Trychophyton mentagrophytes* by disc diffusion and broth dilution methods. All the plant extracts indicated presence of phenols, terpenoids and flavonoids. Minimum inhibitory concentrations (MIC) and Minimum bactericidal concentrations (MBC) for extracts with zone diameters of 10.0 mm and above (significance activity) were determined. In disc diffusion assay water extracts of *E. capensis* was the most active and those of *Periplocca linearifolia* were the least against *S. aureus* with inhibition zone diameters of 14.7 mm and 10.3 mm respectively. Acetone extracts of *E. capensis* and *K. africana* had a MIC of 3.125 mg/ml and 6.25 mg/ml respectively. All the selected plant extracts were bactericidal except *E. cymosa*. This study demonstrated support for the claimed antimicrobial uses of the plants in the traditional medicine probably due to the phytochemicals present. Further research is recommended to isolate, purify and characterize these chemical constituents with a view of supplementing conventional drugs.

Keywords: Antimicrobial Activity, Acetone Extracts, Significant Activity and Water Extracts
Assessment on Adoption of Security Measures in Management Information Systems: A Case Study of Kenyan Universities

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Abstract
The purpose of this paper is to investigate the adoption of security measures in management information systems. Particularly this study looks at whether the security measures required in information systems are well implemented and if the Kenyan universities have secure management information systems (MIS), whether MIS have a documented information security measures and if employees are aware of the security measures and policies. Further the study finds out whether MIS employees are given adequate and appropriate information security education and training, and if they are well informed as to what is considered acceptable and unacceptable usage of the university MIS. Qualitative and quantitative methodology was used to collect data. Questionnaires and interviews were used as data collection instruments. The study was done across 10 public universities and 10 private universities in the country and hence the whole population of this study was adequately represented. MIS security measures are categorized into three, which are network security, physical security, and personal security. The study revealed that the percentage on adoption of MIS physical security measures in universities is at (43%), network security measures is at (50 %) and personal security measures is at (55%). The ICT departments of the selected universities were subjected to the study. Evidence from the study suggest that information system security measures are not widely adopted by universities hence hindering full realization of the benefits that can be harnessed from MIS. The survey further reveals that MIS security measures needs to be beefed-up if universities are to realize the full benefits of information systems. The survey is likely to assist universities and other learning institutions to gauge how secure and effective their management information systems are and whether there is need for further improvements.

Keywords: MIS, Information System Security Measures, Assessment, Adoption.
Resistance Cost of Fitness for Lumefantrine- and Piperaquine-Resistant *Plasmodium berghei* In A Mouse Model

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Abstract
Resistance against most antimalarial drugs has spread. The high failure rates associated with artemisinin-based combination therapy (ACT) is alarming, given that they are the last stronghold in malaria chemotherapy. Resistance frequently imposes a considerable loss of fitness to the parasite, in the absence of the drug; this is referred to as the ‘fitness cost’ of resistance. If mutations conferring resistance are associated with significant costs, the parasites harboring resistant genes would be expected to reduce relative to the sensitive forms in the absence of drug. There would then be a possibility of reintroducing the drug for clinical use after the prevalence of resistant parasites has declined. The aim of our study was to find out how resistance against two quinoline-based antimalarial drugs; lumefantrine (LM) and piperaquine (PQ) impacts parasite fitness. LM and PQ are both long-acting drugs currently used as part of the ACTs. The drugs were chosen since their mismatched pharmacokinetics with artemisinins may lead to strong selective pressure for resistance against them. The parasites used were *Plasmodium berghei* that had been previously selected for LM and PQ resistance and had been cryopreserved for four years. To confirm whether resistance had been lost with dormancy, the parasites were inoculated in mice and subjected to drug sensitivity tests. The stability of the resistant mutants was evaluated by measuring drug responses after several drug-free passages. Impact of resistance on fitness of these parasites was determined by comparing the growth and multiplication rates of the wild-type and mutant strains. Results indicated that PQ exposed lines were less fit than their sensitive counterparts (P<0.05), with an overall resistance cost of fitness of 80.3%, whereas LM resistance was lost overtime during passaging. In malaria-endemic countries, such as Kenya, even partial resumption of drug sensitivity may positively impact public health.

Keywords: Antimalarial Resistance, Fitness Cost, Drug-Resistant Mutants, Wild-Type Strains, *Plasmodium berghei*
Deploying Technology in Security Management and Peace Building: A Case Study of Community Early Warning System in Conflict Hotspot Districts of Rift Valley Province

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**Abstract**

The advent of internet and mobile technology has been to-date the most extraordinary human innovations and even may be the most important inheritance of the 20th century. Kenya political and social development from the dawn of the 21st century has witnessed periodic ethnic and social conflicts occasioned by competition for resources, political differences and inter-community animosities climaxed and culminating to the 2008 post-election violence. Rift valley province witnessed the most vicious and pronounced conflicts occasioning great loss of lives, properties and disruption of social and economic structures. This paper dissects various conflict hotspots in rift valley and elucidates the innovative workings of cellular phones based technological infrastructure mounted by government and non-state actors, greatly culminating to peaceful and tranquil 2012-2013 political process in Kenya. The paper alludes to salient dichotomies on how practitioners in conflict management can utilize the highly penetrated mobile telephony capabilities towards incident simulation protocols feeding into internet based “community based early warning and early response system” (cb-cewers) to detect, dissect, report, pre-empt deter and promptly manage conflicts in the grassroots. The paper audits “situation room” matrix and the efficacy and potential of cb-cewers system as mounted and deployed during the period prior to march 2013 elections in various conflict zones and districts of rift valley province by the control centre at nakuru provincial headquarters. This paper examines the workings of simplified “front sms model” and the information triangulation strategies from the community level, through the official security management structures up to the “situation room rapid analysis system”. Additionally it unveils the downward bound assembly and deployment of policing capacities to deter conflict incidences or inter-community tensions across various police stations and district based peace secretariats. Finally, the paper proposed salient cb-cewers proposals that can revolutionalise the practice and domain of secure and reliable e-crime management, conflict resolution, community policing and disaster management strategies for application by state and non-state actors in Kenya and other developing countries.

**Keywords:** Conflict Early Warning, Technological Innovation, National Cohesion
To Plant or Protect: Evaluating Forest Recovery Dynamics under Natural and Aided Regeneration in Western Kenya

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Abstract
Forest degradation remains a serious problem in Kenya, but the rehabilitation of degraded forests continues to pose a major challenge to forest managers due to limited knowledge on forest recovery dynamics. This has adversely affected the capacity of these forests to support ecosystem functions such as carbon sequestration, biodiversity conservation and the provision of wood and non-wood forest resources. Currently, opinion is divided on whether to protect degraded forests in order to facilitate natural regeneration or plant them to accelerate forest recovery. In situations where tree planting has been adopted, appropriate spacing has also been identified as a challenge. We used a replicated randomized block experiment to compare forest recovery under site protection and aided regeneration at 0.3 m, 1 m and 5 m spacing in order to identify the most appropriate forest rehabilitation technique in the Nandi Forest Ecosystem. Data was collected on tree height and diameter at breast height (DBH). The data was analyzed using two-way analysis of variance in Genstat procedures. Under aided forest recovery, tree height and DBH were significantly higher at 0.3 m spacing than 1 m and 5 m, which gave fairly comparable results. There was no significant difference in tree height and DBH between natural regeneration and aided forest recovery at 0.3 m spacing. Findings of the study indicate that dense planting of seedlings leads to faster tree growth under aided forest recovery, but the growth performance is not significantly different from results obtained through natural forest regeneration.

Keywords: Forest Degradation, Ecosystem Function, Natural Regeneration, Aided Recovery
Awareness, Attitude and Practices of Postnatal Mothers Attending Mbagathi District Hospital on Infant Feeding Options for HIV Positive Mothers

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**Abstract**

Effective infant feeding makes important contribution to the good health and development of children with effects reflecting up to adulthood. Breastfeeding is significant and preventable mode of HIV transmission to infants. Objective of this study was to determine the awareness, attitude and practices of postnatal mothers attending Mbagathi District Hospital on infant feeding options for the HIV positive mothers. This was descriptive cross-sectional study and systematic sampling was used to select participants. Quantitative data was analyzed using SPSS while qualitative data was analyzed based on themes. Study was presented to SSC at KEMRI and the ERC for approvals, 384 respondents were interviewed. 45.5% of the respondents were adequately aware of infant feeding options for HIV+ mothers, 83.9% had appropriate attitude towards the infant feeding options recommended for HIV+ mothers and 85.9% applied appropriate feeding option for age. Predictors of adequate awareness of recommended feeding for infants were number of births \(p \leq 0.001\) and level of education attained \(p \leq 0.001\) while predictors of appropriate attitude towards recommended feeding for infants born to HIV+ mothers were religion \(p \leq 0.010\) and education \(p \leq 0.013\). Out of the seven socio-demographic characteristics, only number of births \(p \leq 0.015\) related with practice with regard to infant feeding. In conclusion, awareness of postnatal mothers on infant feeding options for HIV positive mothers was generally adequate, their attitude towards the infant feeding options recommended for HIV+ mothers was appropriate and the mothers had good practice with regard to infant feeding.

**Keywords**: HIV, Infant Feeding Options, Postnatal
Songs and Dances among the Samburu of Kenya: A Historical Study

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Abstract
This study focuses on the history of songs and dances among the Samburu of Kenya in the pre-colonial, colonial and post colonial periods. It traces the origin, establishment and development of songs and dances among the Samburu. The study analyses the role played by songs and dances in the reconstruction of the cultural history of the Samburu. The study employed a combination of diffusion and functional theories. Diffusion theory is applicable in illustrating borrowed cultural elements in Samburu dances and songs. Functional theory explains the role of songs and dances in transmission and maintenance of culturally desirable sentiments in the Community. Data was collected by use of oral interviews, archival search, non-participant observation as well as thorough the examination of secondary sources from various libraries. The data was analysed using Ex Post Facto design. The study contributes to the preservation of cultural values incorporated into the Samburu historiography. Further the research findings are intended to aid researchers who may want to understand similar or different aspects of other Maa speakers’ dances and songs.

Keywords: Samburu, Songs, Dances, Culture, History
Assessment of Yield Loss Caused by *Maliarpha Separatella* Rag. On Rice at Mwea, Kirinyaga county, Kenya

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Abstract

The African white rice stem borer *Maliarpha Separatella* Rag is a major rice pest in Kenya. In order to develop an integrated control strategy, there is need to establish the level of losses attributable to the pest. This study whose objectives were to determine the level of losses caused by the pest and establish economic injury levels for use in the management of the pest, was setup at in an insect proof screen house at Kenya Agricultural Research Institute, Mwea. The experiment was arranged as a 2x6 factorial design and each treatment replicated three times. First factor was time of infestation at two levels, early and late which was 3 and 6 weeks after transplant date (WAT) respectively. The second factor was infestation rate at six levels (0, 1, 2, 4, 6 and 8 egg batches). Sampling was done seven days after each infestation and thereafter at weekly intervals until harvest. The results showed that the maximum yield reduction of 91% occurred to the plants which were infested with 8 egg batches at the early infestation. There were no significant differences (p>0.05) with the plants infested with 6 egg batches from those infested with 8 egg batches at both infestation times. On the basis of cost benefit ratio, the economic injury level perm² was 6 egg batches and 8 egg batches for the early and late infestation times respectively. The corresponding economic threshold level was 4 egg batches/m² tillers at the early infestation and 6 egg batches/m² tillers for the late infestation. This study suggests that continuous pest scouting and monitoring, through observing the number of egg batches should form an integral component of managing *M. separatella* and that the time to treat should commence earlier than 3 WAT.

Keywords: Rice, *Maliarpha Separatella*, Loss assessment
Enhancement of Pumpkin (*Cucurbita Moschata* Duchesne) Yields through Supplementary Irrigation and Leaf Harvesting Intensity Management

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**Abstract**

Pumpkin (*Cucurbita moschata* Duchesne) is an African leaf vegetable that is rapidly gaining popularity in urban, peri-urban and rural areas. It is an easy crop to grow and does well in a wide range of climates. The fruit is rich in vital vitamins and minerals. The seeds are becoming popular as a snack for their nutritional and medicinal benefits. However, water stress during drought and irregular leaf harvesting are some of the important challenges largely affecting optimal fruit and leaf yields. This study was carried out in Nairobi and Embu Counties between June 2012 and April 2013 to determine the effect of irrigation rate and leaf harvest intensity in enhancing yields. A split-plot experiment embedded in a Randomized Complete Block Design with four replications was used. A rain shelter was used to block rain water from the experimental plot. Irrigation was applied to main plots and leaf harvest intensity to split-plots. The treatments included 4 irrigation rates (1, 2, 3 and 4 liters once per week applied through drip tubes) and 4 levels of leaf harvest intensity (0, 1, 2 and 3 leaves harvested once per week per branch). The findings showed that leaf harvest intensity had a significant (P<0.05) effect on the number of branches per plant, leaf yields and fruit yields. Irrigation rate had a significant (P<0.05) effect on the time to start flowering and abortion of female flowers. Both factors significantly (P<0.05) affected the number of seeds per fruit. One liter of water applied once per week was sufficient for optimal pumpkin plant growth. Harvesting two leaves per branch once per week is recommended for farmers interested in edible leaves and one leaf per branch or none for farmers interested in fruits.

**Keywords:** Climate change management, Fruit-vegetable, Rain shelter, Water deficit
Farmers Technologies for Management of Pests of Stored Produce in Bungoma East District, Kenya

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Abstract
Pests of stored produce constitute a serious problem to attainment of food security by small scale farmers in the tropics. They have the potential of causing losses of between 25-80% and in severe cases up to 100% loss of stored produce. Post harvest losses in grains caused by storage pests make up a significant proportion of loss of produce encountered by most small scale farmers in Kenya. Due to many limitations that inhibit the small scale farmers from applying the conventional methods of pest management, farmers through many years of experience and trial and error, have devised several strategies and technologies for the purpose of reducing storage losses. There have been successful stories of indigenous/traditional methods of protecting storage products however; some other methods are yet to be scientifically proven. A survey was done to establish the various technologies employed by small scale farmers in Bungoma East District, Kenya in the management of pests of stored grains. A total of 165 farmers were interviewed to obtain information on which methods they used to manage pests of stored produce and reasons for their preference among other information gathered. The results obtained showed that most farmers (71%) used traditional methods of pest control for seed preservation due to their effectiveness on small quantities of produce, and a combination of traditional methods and modern pest control methods for large stocks of grain due to their convenience. The various traditional methods used by the farmers were smoking (34.6%) and use of plant protectants (35.4%), ash, (21.3%) animal dung (8%), used batteries (4.3%) paraffin (3%) and sorting and drying (12%) The farmers’ perception on effectiveness, convenience and preference are discussed.

Keywords: Grain storage, Storage pests, indigenous technical knowledge, pest management
Strategic Role of Location in Building Competitiveness: A Case of Automobile Industry in Kenya

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Abstract
The purpose of this study was to establish the strategic role of firm location in building competitiveness. Manufacturing industries recently have prompted renewed interest due to globalization, flexible processing technologies, marvelous customer services and a lot of innovation potential in products and processes. The development of coherent manufacturing strategy is inevitable for sustaining growth to face new manufacturing challenges and cope with dynamic environment. The pace of this transition from largely national markets and national manufacturing to global manufacturing for increasingly global markets has been astonishingly rapid and today’s economic crisis, accompanied by sharply falling sales and profits, is only likely to speed up this transition as companies seek ways to increase revenues and reduce costs. The local and regional markets have captured the interest of global vehicle manufacturers, with the entry of the Chinese auto makers raising competition against established Western firms like Nissan Motors and General Motors in Kenya. It is against this background that researchers got interested in establishing the strategic role of location in building competitiveness.

Keywords: Strategic, Competitive, Innovation and sustainable
The Challenges Facing the Monetary Policy Implementation in Kenya

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Abstract
One of the government objectives is to formulate public policies that would ensure the wellbeing of its citizen. Among the many public policies are the monetary policies whose main objective is to stabilize the economy. This is important because any decision made in implementing the policy has a great impact on every Kenyan. In the recent times the Central Bank of Kenya has encountered a lot of criticism from the media and the general public on the formulation of monetary policies. The paper aims to investigate the challenges facing the implementation of the monetary policies. In Kenya the Central Bank of Kenya has the mandate of formulating and implementing the monetary policies. The study is a qualitative research where a questionnaire was administered to 150 employees of various Banks in Kenya. The selection of the bank employees for this study is justified by the fact that the bank employees are likely to be more knowledgeable on the monetary policies than the general public. The study reveals that the implementation is faced with myriad of problems notably lack of independence, control of the new banking innovations, the conflicting objectives in monetary policies and the difficulties of forecasting future countries monetary control needs. This paper seeks to address these issues and give practical recommendation on how these challenges could be addressed effectively.

Keywords: Monetary policy, Interest Rate Spread, Financial stability and Central Bank of Kenya
Clustering, Knowledge Spillover and Product Innovativeness: A Focus on Small and Medium-Sized Enterprises in Kenya

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Abstract
The effect of clustering and knowledge spillover on product innovativeness (PI) in the context of manufacturing SMEs in Kisumu, Kenya. To answer the research questions this empirical study raised, a sample of 126 SMEs on the basis of the manufacturing hubs of Kisumu, Kenya. This study provided evidence in support of clustering and knowledge spillover impacting PI. The study has concluded that the clustering and knowledge spillover of manufacturing SMEs is closely related to product innovativeness and hence their competitiveness at the local and regional level. The study findings could inform efforts in designing different supportive actions for different cluster manufacturing SMEs based on their product knowledge gaps within the wider innovation policy initiatives in Kenya.

Keywords: Small and medium-sized enterprises, Manufacturing, Clustering, knowledge spillover, Product Innovativeness, Kenya
Effects of Integrating Biological, Synthetic and Botanical Pesticides on Thrips Population and Yield of French Beans

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Abstract
This study was carried out to assess the efficacy of integrating chemical, biological and botanical pesticides in a spray regime for thrips management in Embu east. Spray regimes evaluated for management of thrips on French beans were: (i) Chemical (Imidacloprid 100g/L + Betacyfluthrin 45g/L) plus biological (Metarhizium anisopliae ICPE 69) pesticides (ii) Chemical(Imidacloprid 100g/L + Betacyfluthrin 45g/L) plus botanical (Azadirachtin 0.15%) pesticides (iii) Conventional(Imidacloprid 100g/L + Betacyfluthrin 45g/L, Deltamethrin) pesticides (iv) Botanical (Azadirachtin 0.15%) plus biological (Metarhizium anisopliae ICPE 69) pesticides (v) Biological(Metarhizium anisopliae ICPE 69) pesticides. Data was collected on population of adult and larvae thrips, pod yield, and sales. Thrips species identified were Megalurothrips sjostedti (Trybom), Frankliniella schultzei (Trybom), and Frankliniella occidentalis (Pergande). Among the three species, Megalurothrips sjostedti (Trybom) was the most abundant whereas Frankliniella occidentalis (Pergande) had the least population. The adults were the most encountered form compared with the larvae that had a lower infestation. Chemical plus biological was the most effective spray regime causing more than 69% thrips reduction, and 50% and increase in yields, while botanical plus biological was the least effective spray regime causing less than 20% thrips reduction, and 30% increase in yields compared to the negative control. After partial economic analysis, chemical plus biological had the highest benefit-cost ratio while conventional plots had the lowest benefit cost ratio.

Keywords: French beans, Frankliniella occidentalis, Frankliniella schultzei, Megalurothrips sjojedti, Azadirachtin, Metarhizium anisopliae.
Exploring Development-Induced Displacement through the Concept of Human Security

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The study explores on the context of development-induced displaces in Lamu in terms of human security. The new port in Lamu is a classic example of a development project deemed to be "in the national interest" of Kenya. The justification given for this project is that it will bring enormous benefits to millions, whilst displacing relatively few people. The new port project in Lamu (the main component of the LAPPSET project) is intended to be the Kenya’s 2nd Transport & Economic Corridor, which will enable to reduce over-reliance on the only Corridor - the Northern Corridor. The justifications given for this mega project is in the utilitarian terms of balancing the needs of many against a few people. Even the discomfort of the few is seen to be minimal according to many project proponents. Most of the people displaced due to this project are the indigenous people of Lamu. The aim of the paper is to understand the context of development-induced displacement and the violation of their rights which will shed light on the concept of human security. The paper explores into the context wherein the proponents of the project do emphasize that the land to be lost, is of marginal value, but this proposed project can be seen as a development opportunity for the displaced since there is a resettlement component to the project. The paper argues that human security is not on what people might wish to gain but on retaining what they already have and protecting them from destitution. Development-induced deprivation alienates people from their livelihood including land, food, occupation and house. With it, their social and economic status declines and eventually they are impoverished and marginalised. Hence their human security is threatened. This paper will, therefore, study the security aspects of development-induced displacement. This includes the deprivation and insecurity caused among those whom development projects displace or deprive of land and other sustenance without proper compensation or relocation. Further justifications for development-induced people can be put forth if the people to be displaced were properly consulted beforehand, and then sufficiently compensated in ways acceptable to them. The justification here is the implicit moral responsibility on the part of states and international institutions to ensure the proper compensation of people displaced as a result of development initiatives.

**Keywords:** Development-Induced Displacement, Human Security, Human Rights, Development, Mega Projects, Compensation
Prevalence of Anti-CCP Antibodies in Patients with Inflammatory Arthritis at Kenyatta National Hospital

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Abstract
Rheumatoid arthritis (RA) is a debilitating condition. Diagnosed early, the condition can be treated with appropriate therapy so as to stop its progression. Early diagnosis of RA can be difficult as the disease may initially be indistinguishable from Undifferentiated arthritis (UA). American College of Rheumatology (ACR) criteria is not suitable for early diagnosis as its characteristics are fulfilled when bone damage has already taken place. A new serological marker, Anti-cyclic citrullinated antibodies (Anti-CCP) are highly specific for RA and have been used to confirm early diagnosis. Studies have demonstrated Anti-CCP to have an equivalent sensitivity as Rheumatoid Factor (RF) and higher specificity of 98%. We carried out a study to find the prevalence of these antibodies in patients classified as RA and UA by the ACR criteria at the Kenyatta National Hospital (KNH) in Nairobi Kenya. The objective of this study was to determine the prevalence and clinical utility of Anti-CCP antibodies in patients with inflammatory arthritis attending KNH medical clinics. This was a cross-sectional descriptive study. The setting was KNH Medical Outpatient Clinics between the month of October 2008 to February 2009. A total of 95 patients were recruited. The mean age of the patients studied in the RA and UA was 44.7 and 41.2 (p>0.05) respectively. Sixty four patients (64) satisfied ACR criteria. The overall prevalence of Anti-ccp antibodies in the population studied was 47.4%. The prevalence of Anti-ccp antibodies in patients who satisfied the ACR criteria was 62.5%. The prevalence of RF in patients who satisfied the ACR criteria was 50% compared to 9.7% for those who did not (p<0.05). The male to female ratio of subjects studied was 1:11. In conclusion Anti-ccp antibodies were more prevalent in this cohort of patients with inflammatory arthritis than RF. It was also concluded that ACR characteristics correlated well with Anti-ccp and RF. A greater percentage of patients who were RF negative were Anti-ccp positive.

Keywords: Anti-CCP Antibodies, Inflammatory Arthritis
Effect of Farm Pesticides on the Water Quality of Lake Naivasha

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Abstract
There are a lot of horticultural farming activities around Lake Naivasha, Kenya and its environs with increased levels of pesticide application due to the rapid increase in acreage under flower plantations in the catchment. Previous studies had shown detectable levels of organochlorines residue in water samples. These were indications of contamination. Moreover, the organophosphates which had been adopted as an alternative were highly toxic. The objectives of our study were to determine its water quality by determining physico-chemical parameters pesticide residue concentration of organophosphates and organochlorines using standard methods. The sampling sites were selected on the basis of their uniqueness in the nature of discharge released into the Lake thereafter a cross-sectional study was conducted between the months of February to July, 2011. There was no mathematical formula applied to calculate sample size, due to the discrete nature of variables. On each of the five sites 18 samples were collected totaling 90. The generated data was recorded on Microsoft excel spread sheet and subjected to analysis while applying SPPS using one way ANOVA at p<0.05. The study showed that the water samples tested for physico-chemical variables were relatively stable and within limits according to the World Health Organisation and Kenya Bureau of Standard’s recommended guidelines while for there were no organochlorines and organophosphates in the samples. These were good signs of the improved quality of the lake. From our studies it is recommended that the government through its enforcement agencies should continue to carry out regular inspections of the ongoing human activities in the Lake and its environs to prevent sporadic contamination and discourage any further discharge of contaminants into the Lake.

Keywords: Organophosphates, Organochlorines, Contamination, Water quality, Pesticide
Reducing Micronutrient Deficiency in Kenya Using Sweet Potato Forage as a Vegetable

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Abstract
Micronutrient malnourishment causes learning disability among children, increases morbidity and mortality. The study objectives were to evaluate six forage sweet potato cultivars on their micronutrient composition and their potential to meet calcium (Ca), magnesium (Mg), iron (Fe) and zinc (Zn) requirements of children aged 4 to 6 years. Cultivars 99/1, K049, K158, Marooko, Mugande and Wagabolige were planted in randomized complete block design with three replicates. Cuttings were planted in rows 60 cm wide and 30 cm apart and fertilizer was applied according to standard recommendations. The cultivars’ above ground vegetables were harvested at 120 days, sampled and analysed for Ca, Mg, Fe and Zn. The data was analysed using general linear model of SAS and means separated using least significant difference procedures. Cultivars 99/1, K049, K158, Marooko, Mugande and Wagabolige contained 6.10, 4.80, 7.68, 8.41, 4.40 and 5.49; 4.78, 2.90, 5.15, 3.20, 3.92 and 5.36 g/kg DM; 388.0, 230.0, 326.3, 286.7, 278.0 and 317.7 and 184.0, 180.7, 179.7, 136.3 and 177.3 mg/kg DM Ca, Mg, Fe and Zn respectively. Using WHO/FAO (2005) recommended nutrient intakes (RNI) the children will eat the respective cultivars’ vegetable weighing 98.4, 125.6, 78.4, 71.1, 136.5 and 109.4; 15.9, 26.3, 14.8, 23.8, 19.4 and 14.2; 32.5, 54.8, 38.6, 44.0, 45.3 and 39.7 and 53.7, 52.2, 53.2, 53.4, 70.4 and 54.1 g DM to meet their RNI of Ca, Mg, Fe and Zn respectively. Marooko, Wagabolige and 99/1 contained the highest Ca, Mg, Fe and Zn respectively while K049 and K158 contained equally high Zn. According to this study, once the quantity of vegetable attains RNI for Ca, the other micronutrients RNI are met too. The daily vegetable weight per child is relatively little hence these cultivars should be grown and widely fed to children aged 4 to 6 years to reduce micronutrient deficiency in Kenya.

Keywords: micronutrients deficiency, calcium, magnesium, iron, zinc
A Blend of Green Algae and Sweet Potato Starch as a Potential Source of Bioplastic Production and Its Significance to the Polymer Industry

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Abstract: Our research focus was to obtain an alternative source of biodegradable plastic from blue green algae and sweet potato starch to obtain a sustainable source of plastic synthesis. Different concentrations of starch and dried green algae were used to produce biopolymers. The amount of algae that produced the best bioplastic was the objective of the research. High percentages of dry algae produced material with high strength with a deep black colour. The concentration in percentage of sweet potato starch was varied from 25% to 87.5%, while the algae powder was varied from 21% to 75%. The blend of 87.5% sweet potato starch and 12.5% green algae had the least mass of product of 3.22 g while the blend of 25% sweet potato and 75% algae had the highest mass of 24.14 g of product. The plastic product could be significant in polythene industry, shoe and other polymer industries. Cross-linking of cellulose polymers together through chemical processes produces tough material, which can be converted to various forms. The manufacture of plastics is a form of polymerization reaction. Bio-plastic is a polymer material obtained from renewable biomass sources such as vegetable oil, corn starch, potato starch, and pea starch unlike fossil-fuel plastics derived from petroleum. When starch is dried from an aqueous solution it forms a film due to hydrogen bonding between the chains. However, the amylopectin inhibits the formation of the bio-plastic. The reaction of starch with Hydrochloric acid breaks down the amylopectin forming an appreciable plastic.

**Keywords**: Bioplastic, Starch, Polymers, organic plastic and Biodegradable
Antihyperglycemic Activity of the Aqueous Extract of *Zanthoxylum Chalybeum* Stem Bark

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Abstract

*Zanthoxylum chalybeum* Engl. (Rutaceae) stem bark is used by communities in Africa and Asia to manage diabetes mellitus in humans. This study investigated the anti-hyperglycemic effect of *Z. chalybeum* aqueous stem bark extract in streptozotocin (STZ)-induced diabetic rat models. *Z. chalybeum* was obtained from Machakos County, Kenya and a stem bark extract prepared. Rats were divided into experimental, negative control and positive control groups (n=5). Diabetes was induced in each rat in experimental group by single dose intraperitoneal injection of Streptozotocin at 45 mg/kg body weight. The plant extract was administered to the experimental rats at dosages of 10,100 and 1000mg/kg body weight orally for 14 days. The negative control group was left untreated while the positive control group was treated with glibenclamide (10mg/kg body weight, orally). The effect of the extract on blood glucose, body weight, food and water intake and oral glucose tolerance test were determined in all rats in the experimental and control groups. *Z. chalybeum* aqueous stem bark extract exhibited significant antidiabetic activity compared to the untreated diabetic controls (P!0.05). Extract treated diabetic rats had decreased fasting blood glucose at the three dose levels. There was no significant difference between the extract fed diabetic rats and the normal controls after two weeks of treatment (p!0.05). Extract treated diabetic animals recorded a comparatively decreased weight loss which was dose dependent at 15.45%, 24.38% and 26.63% for 1000mg/kg, 100mg/kg and 10mg/kg treated animals respectively, compared to the untreated diabetic rats at 36.44% . These results suggest that the aqueous stem bark extract of *Z. chalybeum* possesses significant antihyperglycemic activity. This study thus supports the traditional use of the plant for the management of diabetes mellitus. However, further studies are required to identify the active ingredient(s) and determine the mode of action.

**Keywords:** Diabetes Mellitus, *Z. chalybeum*, Rat model
Genome Sequence Analysis Reveals a Contracted Chemoreceptor Repertoire in *Glossina Morsitans Morsitans* Tsetse Fly

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Abstract

Tsetse flies transmit various trypanosome species that cause deadly African trypanosomiases, whose remedies in both animals and humans are yet unknown. Their physiological behaviors such as locating their obligate vertebrate blood-meal hosts, con-specific mates, and larviposition sites depend on their detection of ecological stimuli, using various chemosensory related proteins. Such proteins are expressed on the peripheral nervous system sensory neurons located in the antennae and maxillary palps, thus linking the external environment to the internal nervous system. These include mainly olfactory receptors (ORs), gustatory receptors (GRs), ionotropic receptors (IRs), odorant binding proteins (OBPs), sensory neuron membrane proteins (SNMPs), and soluble chemosensory proteins (CSPs). The study aimed at elucidating chemoreceptor repertoires in *Glossina morsitans morsitans* and offer their genomic molecular understanding for possible use in designing novel tools for managing vector populations. Published protein coding chemosensory genes in fruit fly and mosquitoes downloaded from their databases were used to query and annotate tsetse genome assembly Yale strain (GMOY1.1 ) via computational approaches. There were 46 ORs, 14 GRs, 18 IRs, 32 OBPs, 5 CSPs and 2 SNMPs recovered from the tsetse genome, presenting an overall lower chemosensory genes in *G. m. morsitans* genome than other diptera. Specifically, repertoires of OBPs, GRs and IRs in tsetse were significantly lower relative to *Drosophila melanogaster*. Downstream analysis revealed six-fold expansion of pheromone-like ORs and CO2 sensitive GRs with no sweet taste sensors, and highly conserved antennal IRs for common odors. The results indicate the chemoreception power of tsetse may be geared towards efficient mate and blood-meal hosts finding. The reduced repertoires may probably explain their peculiar habitat, feeding and reproduction style. This matches both their ecology-less larval development and less complex ecology with limited host range, thus eliminating the need for expanded chemical sensors. In addition, tsetse seem to rely much on olfaction than gustation, fitting their strict blood nutrition. The results are already integrated into the vectorbase tsetse genome community database thus availing resources for the nagana and sleeping sickness vector, *G. m. morsitans*. In addition, the results lay foundation for future functional and comparative studies with other related species, and search for olfactory-based management tools against blood-feeding vectors in general.

Keywords: Tsetse flies, *Glossina morsitans morsitans*, Chemoreceptors, Odorant Receptors, Gustatory Receptors, Ionotrophic receptors.
In Vitro Antimicrobial, Cytotoxic Activity & Phytochemistry Properties of Aloe Turkanensis, A Plant Used in Turkana, Kenya

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Abstract

Aloe turkanensis is a shrub. In Kenya, the plant is mainly found in Baringo, Isiolo, Laikipia, Turkana and West Pokot regions and is recognized as an important ethnomedicine. The current study was conducted in Turkana County with an objective of evaluating the efficacy and safety of the plant. The community uses the plant products to manage malaria, wounds, stomach ache, constipation, pain, skin infection, poultry diseases and retained afterbirth in cows. Data was collected through lab experiments, observation, photographing, interviews & sampling. Whole plant was harvested in Natira sublocation, in ex-Turkana west district on 10th February 2012. The plant collection was aided by Aloe-working group herbalists who identified it and voluntarily provided information on its medicinal uses. Cold maceration using 70% methanol and distilled water was used for extraction. Bioactivity testing was done using Agar well diffusion (AWD), Broth Dilution Assay (BDA) and Brine Shrimp Lethality test (BSLT). The extracts were tested against in-vitro standard cultures of B. cereus (ATCC 11778), S. aureus (ATCC25923), P. aeroginosa (ATCC 27853), E. coli (ATCC 25922) and a human infections clinical isolate of C. albicans. On BDA, the extracts inhibited the growth B. cereus (100-200mg/ml), S. aureus (50-100mg/ml), and P. aeroginosa (200mg/ml) while E. coli and C. albicans were not affected. On AWD, the extracts inhibited the growth of S. aureus (19.75±1mm) & B. cereus (18.5±05mm). Qualitative phytochemistry indicated presence of alkaloids, terpenoids, steroids, quinones, saponins and tannins. BSLT test found the extracts to be relatively non-toxic. Based on above study, this plant has metabolites that inhibit the growth of some bacterial. However, there is need for further studies to validate the in-vivo bioactivity of the plant and come up with proper methods of conservation & value chain addition of its products.

Keywords: Aloe turkanensis; Bioactivity; Cytotoxicity; Phytochemistry
Efficacy and Safety of Vernonia Hymenolepis a Plant Used in Kenya for Oral Health

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Abstract
The main aim of the study is to determine antimicrobial, analgesic properties and toxicity of Vernonia hymenolepis leaves to ascertain its use for the treatment of oral conditions. The plant is widely used as a traditional herb by communities in Kitale for treatment of various infections including oral conditions. However its efficacy and toxicity have not been established. Leaves of the plant were collected from Trans nzoia county, Kenya and identified at University of Nairobi Herbarium in botany department. Two extractions were done DCM; METHANOL in ratio 1:1 and aqueous extract. Brine Shrimp Lethality Assay was used to detect cytotoxicity and LC50 calculated. Formalin test was carried out to determine antinociceptive effect and the painful response was determined at 0 – 5 min (Early phase) and 20 – 30 min (late phase). Acetylsalicylate at dose of 100Mg/Kg was used as a positive control. The dose significantly (p<0.05) reduced the time spent in pain behavior in both phases hence indicating that the plant posses antinociceptive activity. The antimicrobial test was done to determine MIC against the test microbials. The aqueous extract was inhibitory to Staphylococcus aureous at a dose of 400mg/ml while Organic extract was inhibitory against Staphylococcus aureous at a dose of 100mg, pseudomonas auriginosa and Escherichia coli both at a dose of 400mg/ ml, Bacillus cereus at a dose of 200mg/ml and Candida albicans at 50 mg/ml. Benzyl penicillin and Amoxicillin was used as controls. The Oral Acute Toxicity Testing was done according to ATC protocol. Both the extracts are in category 5 of GHS (>2000-5000 mg/kg b.w) with LD50 of 2500. LC50 in brine shrimp was determined using Finney computer program to be 481.7188 in DCM:METHANOL extract and 491.8358 in water extract hence showing week toxicity. It's concluded that Vernonia hymenolepis possesses analgesic property, antimicrobial activity and it's not toxic.

Keywords: Vernonia hymenolepis; Analgesic; Anti-inflammatory; antinociceptive
Improving Steam System Performance with Fluidized Bed Boilers

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Abstract
Steam is an indispensable means of delivering energy. Low toxicity, high efficiency, most of the
heat content of steam is stored as latent heat hence large quantities of heat can be transferred efficiently at constant temperature. Steam system operation is divided into four categories: generation, distribution, end use and recovery. Fluidized bed boiler is the newest and cleanest way of generating steam. The traditional grate fuel firing systems have got limitations and are techno-economically unviable to meet the challenges of future. Fluidized bed combustion has emerged as a viable alternative and has significant advantages over conventional firing system and offers multiple benefits – compact boiler design, fuel flexibility, higher combustion efficiency and reduced emission of noxious pollutants such as SOx and NOx.

Keywords: Boiler design, Fuel flexibility, Higher combustion efficiency, Reduced emission of noxious pollutants such as SOx and NOx.
Effective Leadership: Determinant of Culture, Age and Gender in Eldoret Town

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Abstract
The paper aims to understand the concept of effective leadership and the effects of culture, age, and gender on leadership in Eldoret Town. A sample of nine leaders from diverse backgrounds including China was interviewed using a standard questionnaire to bring out detailed aspects of leadership which include cultural intelligence, competencies and personal effectiveness. The findings indicate that there were no significant differences in leadership behavior between males and females. However, older leaders were more averse to risk taking and technophobic, contrary to younger leaders who value independence and flexibility. Some of the traits mentioned were attributed to effective leadership styles. Based on the current results and literature review, a holistic Leadership model was constructed for development of effective leaders.

Keywords: Leadership, Age, Gender, Culture
Bacteraemia and Selected Antibiotic Resistance in Patients with Acute Febrile Illness in a Rural Hospital in Kenya

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Abstract
Bacteremia, coupled with antibiotic resistance is a common cause of morbidity and mortality in patients with acute febrile illness. This study aimed to determine bacterial and fungal etiologies, selected antibiotic resistance genes and underlying clinical predictors in patients with AFI seeking healthcare in Marigat District Hospital in Baringo County, Kenya, between December 2009 and July 2011. A total of 208 patients (111 males and 97 females) of mean and median age of 12 and 8 years respectively were studied. In addition to fever, the following clinical features were reported: chills, cough, vomiting, headache, joint aches, muscle aches, abdominal pain, eye pain, sore throat, diarrhoea and running nose. Extracted DNA from blood samples were analyzed by multiplex real-time PCR. Forty one percent of the patients had Staphylococci and were excluded from analysis. About 31% (65/208) had bloodstream infections (fungaemia 25% and bacteraemia 82%; all occurring either singly or in combination). Gram negative bacteria were the predominant, 57% (30/65) comprising group A 30%, group B 63% and 7% co-infection. Gram positive bacteria encompassed Streptococcus spp. (55%) and methicillin resistant staphylococci (21%). No Enterococcus was detected among the study population. There was no significant association of bacteraemia with age (p=0.488), gender (p=0.682) or any of the clinical signs (p=0.753). Bacteraemia was more common in patients with high grade fever (temperature ≥39°C). Contact with animals did not influence bacteraemia infectivity. Fifteen individuals had mecA gene while 4 had VanA gene. Bacteraemia is a risk factor in acute febrile illness and it is possible to use molecular methods for the detection of blood microbes and antibiotic resistance. However, given the high level of staphylococci identified, the long term use of molecular diagnosis of bacteraemia for epidemiology and for clinical management of patients vis a vis microbial culture will need further evaluation.

Keywords: Acute febrile illness, Bloodstream infection, Bacteraemia, Fungaemia, Multiplex real-time PCR
Seroprevalence of Yellow Fever Virus among Febrile Patients Visiting Selected Health Facilities in Busia County, Kenya

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Abstract
The re-emergence of Yellow Fever in Africa over the recent past has increased the vulnerability of nations to the risk of infection by this virus. The western region of Kenya is a malaria endemic zone where mosquito vectors for both malaria and arbovirus transmissions are prevalent. Yellow Fever causes fever and nonspecific symptoms and quite often these infections will be diagnosed as malaria or typhoid and these patients treated with antimalarial drugs or antibiotics empirically. and even in situations where Yellow Fever infection is suspected, only very specialized laboratories can make a diagnosis. The objective of the study was to determine the prevalence rates of Yellow fever virus antibodies, sociodemographic characteristics and risk factors for Yellow Fever virus exposure in febrile patients visiting selected health facilities in Busia county, Alupe district, Kenya. A clinical and serological investigation was performed where a detailed questionnaire was administered. An optimized indirect ELISA was used to test for presence of antibodies against Yellow Fever Virus. A total of 308 febrile patients with a mean age of 11.76 ± 11.270 were screened by ELISA. Of the samples tested by ELISA, 24 (7.8%) were reactive. Women accounted for 5.8% of this seroprevalence rate while men had a 2.0% prevalence rate. Individuals aged between the ages of five and nineteen had the highest frequency of anti YFV IgG and IgM antibodies, contributing 4.5 % of the overall YFV prevalence rate. The test screened for IgA, IgG and IgM antibodies; it was therefore not possible to distinguish between the three different Ig’s. A clear distinction of which cases were due to active transmission or previous exposure was not possible. Although serological cross reactions between flaviviruses are likely and maybe frequent, these findings suggest that YFV is circulating in Busia County. Evidence of YF exposure among the pediatric population highlights ongoing low transmission levels of the virus as these children are too old to have circulating maternal antibodies and were born long after the YF outbreak occurred. In conclusion, Yellow Fever virus is circulating in regions considered as non-outbreak zones and there is need to develop and sustain a reliable disease surveillance system with a responsive Yellow Fever control programme.

Keywords: Yellow Fever, Seroprevalence, ELISA
Leadership Challenges for Sustainable Change in Public Sector Organization

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Abstract
At the beginning of 2013, we are faced with a business environment that is increasingly dynamic. The macroeconomic environment continues to be challenging and currency markets remain volatile. With this backdrop, the public sector leaders and business leaders alike are grappling with the need to drive growth, innovation, profitability for their organizations and service delivery. Leadership challenges in the public sector involve difficulties of trying to change a massive organization with numerous stakeholders and embedded working practices. There is something missing between existing public service cultures and the public interest. How can we continue to work towards having a world-class public sector and maintain the momentum needed to support sustainable change? Highly functional public-sector organisations that effectively align their human-capital and structural arrangements stand the best chance of successful adaptation. They will also be efficient stewards of their resources, adept at achieving the right balance between centralisation and decentralisation of their functions, and guarantors of effective accountability. They will maintain their capability only if they address internal challenges, keeping a close eye on how society is changing and equipping themselves to deal with societal change. It is a reform process which is essentially a matter of invention and reinvention. This conceptual paper is an examination of the challenges facing leadership in public sector organizations. It offers a justification of the government philosophy and practice and a detailed analysis of the tasks and the importance of top leadership in positioning the government in the complex and changing environment.
The Effect of Level of Teachers’ Job Satisfaction on Academic Performance among Secondary Schools in Homa-Bay County, Kenya

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Abstract
The study analyzed the effect of level of teachers’ job satisfaction on academic performance among secondary schools in Homa-Bay County. The purpose of the study was to establish the level of teachers’ job satisfaction among secondary schools so as to find out whether the cause of low academic performance among secondary schools in Homa-Bay County was due to a level of teachers’ job satisfaction. The main objective of the study was to analyze level of teachers’ job satisfaction and academic performance of secondary schools in Homa-Bay County. The study emanates from a background of low academic performance of secondary schools as claimed by Ministry of Education Report (2011) and constant complaints of working conditions among teachers in the County. A sample of 32 secondary schools was randomly selected from the population of 300 public schools for the study. Quantitative data was collected by Minnesota Satisfaction Questionnaire (MSQ). Data was analyzed by use of inferential statistics. The analysis of variance tests was done at 0.05 alpha level of significance. Findings of this study revealed that most of the teachers in the County recorded high job satisfaction and that academic performance is pegged on teachers’ job satisfaction. A teacher whose job satisfaction is high delivers. Most schools in the County still lack learning facilities and most of the teachers still work in deplorable conditions. The ministry of education should encourage strong parental and community support through parent teacher association and Board of Management. These bodies should ensure that secondary schools are well equipped with necessary learning facilities for quality education and improved academic performance. It is hoped that the findings of this study may be useful to the Ministry of Education and personnel involved in policy making and decision making in Homa-Bay County.

Keywords: Teachers, Job Satisfaction, Academic achievement, Job Satisfaction, Academic Performance
An Evaluation of 360 Degree Feedback on Employee Development: A Case Study of Kenya College of Accountancy University in Nairobi, Kenya

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Abstract
The purpose of the study was to evaluate the influence of 360 Degree Feedback on Employee Development. The study sought to establish the influence of appraisal on Lecturers’ Development, to determine the influence of students’ appraisal on Lecturers’ development, to identify the influence of supervisor’s appraisal on Lecturers’ development and finally to examine the influence of self appraisal on Lecturers’ development at Kenya College Accountancy University (KCAU). The study employed a descriptive design. It was a case study based at KCAU in Nairobi, Kenya. The sampling technique that was employed for the respondents was a census. It involved all the thirty nine (39) permanent Lecturers. Three lecturers; one from each of the three faculties was involved in the pilot study. Thirty six (36) lecturers were involved in the main study. The study utilized one instrument-The Lecturers Multisource Feedback Questionnaire (LMSFQ). The test-retest method of assessing reliability was used to assess the reliability of the LMSFQ. A reliability coefficient 0.89 was obtained and therefore the instrument was accepted. The analysis considered the inferences that were made from the opinions of the respondents. It was narratively presented and where possible in tabular form and in frequency tables. The study found that 80.6% of the lecturers felt that peer appraisal had an impact on a lecturer’s development while all the Lecturers (100%) felt that students’ appraisal had an impact on their development. The study also found out that 88.9% of the lecturers felt that appraisal by their supervisors had an impact on their development while 97% of the Lecturers felt that self assessment had an impact on their development. The study concluded that Peer, Student, Supervisor and self-appraisals greatly impact on a Lecturer’s career development. The study recommends that further studies be carried out establish the Impact of 360 degree on Employee Performance.

Keywords: 360 degree appraisal, Employee performance, performance appraisal
Swot for Renewable Energy in Africa: Challenges and Prospects

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Abstract
Africa is endowed with huge energy resources, be fossil or renewable energy. Fossil fuels alone can largely satisfy all the energy needs of the continent, but sustainable solution to Africa’s energy lies in the increased use of renewable energy. Africa’s renewable energy resources are as diverse as they are evenly distributed and enormous in quantity. Although hydroelectricity is the biggest source of electricity in a number of countries in Africa, its potential remains largely underutilized. Surrounded by two major oceans, wind and current resources are immense and solar resource is by far the single most abundant energy resource Africa with intensity of solar radiation five times the global average and almost evenly distributed on the continent. Geothermal resources mainly the Eastern Africa Rift Valley remain largely untapped. Biomass and cogeneration must not be left behind. Despite almost unlimited renewable energy resources, no more than 20 per cent, and in some countries as little as 5 per cent of the population has direct access to electricity. However not everything is lost and progress is being made in almost all segments of renewable energy. This work is largely based on publications from authoritative energy research institutions in renewable energy and on economic and feasibility analyses of world energy and development financiers. It looks at the strengths of renewable energy in Africa characterized by the enormous reserves, the opportunities in the renewable energy sector and achievements, the weaknesses, challenges and prospects in the wake of some African economies being the fastest growing economies of the world at the moment.
Determination of Levels of Phosphates and Sulphates in Domestic Water from Three Selected Springs in Nandi County, Kenya

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Abstract:
This research was to estimate the levels of phosphates and sulphates in three selected springs. The analysis of phosphates requires good digestion which converts phosphorus to orthophosphate in the process. Therefore, ascorbic acid digestion method was employed in the phosphate analysis. The sulphates spectrophotometric analysis was based on the formation of colloids by sulphates and Barium chloride. The greatest challenge was instability of conditioning reagent with time. Several timing trials were done to come up with the optimum time for reaction between the addition of conditioning reagent and sample analysis. Sampling was done at selected springs in Baraton, Sironoi and Kaptildil Locations in Nandi County. The selected water springs are commonly used by residents for domestic purposes. Phosphate concentration was between the range of 2.79 mg/L to 622mg/L, while sulphates were in the range of 109.8 mg/L to 250.98 mg/L. 92% of the sampled water had phosphate level beyond the WHO recommended maximum of 5 mg/L. This would pose health effects such as osteoporosis and kidney damage. The research is of great significance in monitoring the quality of potable water since the presence of sulphate in drinking-water may cause noticeable taste and may contribute to the corrosion of distribution systems. The findings of the research is important in advising famers to employ sustainable farming methods to avoid influx of nutrients into the water bodies and impact on the quality of domestic water systems.

Keywords: Phosphates, Sulphates, Turbidimetry, Domestic Water, Spring
Determination of the Amounts of Acesulfame-K, Ascorbic Acid, B-Carotene and Benzoic Acid in Selected Packaged Juices in the Kenyan Market

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Abstract
The current study evaluated the amounts of acesulfame-k, ascorbic acid, β-carotene and benzoic acid in PET bottled juices bearing the label ‘fruit juices’. This was done to validate the claim that these juices are derived from fruits. 10 randomly picked juices from retail outlets in Nairobi were analyzed for acesulfame-k, ascorbic acid and β-carotene, and 17 were for benzoic acid using validated reverse phase HPLC. The samples were extracted using appropriate solvents and were analyzed alongside external standards for quantitative purposes. It was found that 40% (n=4) of the juices did not declare acesulfame-k as an ingredient although present in detectable levels. Ascorbic acid was detected in significant amounts in all the juices, while β-carotene was only present in 30% (n=3) of the samples and in trace levels. Benzoic acid was detected as the main preservative used in all juices and in acceptable levels. Although the levels of benzoic acid were acceptable, in the juices with artificial sweetener, acesulfame-k no claim was provided in the list of ingredients. Similarly, though marked as fruit juices, the levels of natural fruits components such as β-carotene and ascorbic acid were low. This poses a potential challenge to consumers who would like to establish the authenticity of the products before they acquire them for their consumption. The study therefore recommends that fruit juices manufacturers should provide all the label claims as a value addition tool to their products and to help consumers make informed choices.

Keywords: Acesulfame-k, Ascorbic acid, β-Carotene, Benzoic acid, Juices.
Hypoglycemic Effect of the Aqueous and Ethyl Acetate Extracts of the Leaves and Stem Bark of *Senna Spectabilis* in Balb/C Mice

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**Abstract**

*Senna spectabilis* has for a long time been used as a folk medicine to treat diabetes mellitus in South Eastern part of Kenya. Therefore, the present study was aimed at investigating *in-vivo* hypoglycemic activity of the plant aqueous and ethyl acetate extracts. Six groups of mice each consisting of five mice were employed in the study. Diabetes was induced in five of these groups using alloxan monohydrate at a dose of 186.9 mg/kg body weight. Normal control mice were administered orally with 0.1 ml physiological saline; diabetic mice with 0.075 mg of reference drug, glibenclamide; 1.25 mg, 2.5 mg, and 5 mg of leaf and stem bark aqueous and ethyl acetate extracts in 0.1 ml physiological saline for 50, 100 and 200 mg/kg body weight respectively, and the other group of diabetic mice was given 0.1 ml physiological saline. Blood glucose level was determined after 0, 2, 4, 6 and 8 hours. Ethyl acetate leaf and stem bark extracts at 100 and 200 mg/kg body weight induced hypoglycemic activity in a dose independent manner which was comparable to that of glibenclamide at 3 mg/kg body weight from the 2nd to the 8th hour. *S. spectabilis* exhibits a significant hypoglycemic activity in both aqueous and ethyl acetate extracts. The activity is either dose dependent or independent for the leaves and stem barks extracts. The study findings provide a rationale for the application of *S. spectabilis* to manage diabetes mellitus.

**Keywords:** *Senna spectabilis*, Hypoglycemic activity, Diabetic BALB/c mice, Ethyl acetate extract and Aqueous extracts.
Features Affecting Hurst Exponent Estimates

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Abstract
Hurst exponent denoted (H) is a dimensionless estimator for the predictability of a time series. Initially defined by Harold Edwin Hurst (1951) to develop a law for regularities of the Nile water level, it now finds applications in stock prices. The Hurst Exponent index can be interpreted as a measure of predictability. This study aims at determining why this index swings from persistence to anti-persistence. Simulated data x in R software was used to investigate Hurst exponent and its properties. The H index for x was estimated using two already researched methods Higuchi and Aggregated Variance. Decomposition was done, spikes were introduced, sample size was changed and H values estimated. A model was then fit on x and forecasting was done. The concepts found on simulated data were applied on secondary data obtained from Gretl software and selected such that they had different statistical properties and sizes. The minimum sample required for Hurst index estimation was obtained. It was found that data sets with strong trend component had higher H values but when spikes were introduced, the H values dropped. The forecasts for the data sets whose H index values were close to one were also found to be better compared to those whose H index values were closer to zero. Real data of tea prices for the past 10 years obtained from Kenya Tea Development Authority was then used. The H index was estimated and found to be 0.987419. The forecasts were found to have very low standard errors compared to the real values. This study shows that there is need to subject data to predictability tests before building models for forecasting; otherwise taking data and directly modeling it for forecasting can be very frustrating when one lands into data that cannot be predicted.

Keywords: Hurst exponent, predictability, time series, spikes, trend.
Emerging Issues in Health Research: Biorisk Management (BRM) and Dual Use Research

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Abstract
Rapid growth of life sciences and biotechnology in Kenya has propelled research activities to new frontiers like genetic engineering, Nano science, cloning and recombinant DNA, presenting not just opportunities but also unique challenges. To this end, there have been concerted efforts to ensure that though the rights of scientific inquiry are promoted and protected, ultimately, those rights do not infringe on the safety of the people and environment. Kenya government recognizes that responsible and ethical use of modern biotechnology contributes to developments in the fields of health, animal science, agriculture, and environment. Several initiatives have been undertaken to build capacity of scientists so that they have the right tools to design and undertake research safely. This paper focused on the emerging issues in biosafety, biosecurity and dual use research. The paper presents solutions on how researchers can develop capacity to effectively assess, prevent, and develop informed mitigation strategies before they engage in projects that have potential hazards. The paper also addresses the unique challenges of dual use research and outlines existing regulations, norms, and prohibitions, that are meant to guarantee conduct of effective, safe, and responsible research. Three major components of biorisk management i.e. assessment, mitigation and performance (AMP model) will be discussed. Lastly, novel home grown strategies for building and maintaining a robust BRM system at the universities & institutions will be presented. It is envisaged that this presentation will help expand awareness in BRM issues and dual use research. This knowledge is expected to be translated to practical tools that will result to safe research at universities and other institutions.

Keywords: Biorisk, biosafety, Biosecurity, Dual use research, AMP Model.
Performing Femininity and Masculinity in Primary School Children’s Drama: An Analysis of the Kenya National Drama Festival 2004-2010

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Abstract
The Kenya National Drama Festival is a socializing agent that teaches children lessons about appropriate and inappropriate gender roles and stereotypes. It persuades children to accept the values represented by the characters and the themes besides providing them with role models for what they can and should be like when they grow up. The research objectives investigated how femininity and masculinity is represented in terms of gender roles and stereotypes of the characters, the processes through which the actors/actresses and viewers internalize and interpret and therefore normalize them, and the measures that can be adopted to encourage gender responsive drama during national festivals. The target population for the study was all the plays presented by primary schools between 2004 and 2010 at the KNDF. Stratified sampling was used to select one play out of the three best of every year which culminated into the seven plays. Purposive sampling was used to select ten actors and actresses, viewers, two adjudicators and scriptwriters’ interviewees to participate in the study. The study used both primary and secondary data collection techniques. The instruments for primary data collection were: observation and personal interviews. The ABC of Gender Analysis Framework measured gender representation projected in the plays while The Performative theory emphasizes the actors/actresses and viewers role in creating meaning of the contents of the plays. Findings indicated that men, women, boys and girls in the plays are perpetually stereotyped in character and role. Women and girls are seen in the domestic and reproductive sphere while men and boys characters are seen in the productive sphere. Though those interviewed revealed a great sense of gender awareness and sensitivity in regard to gender differentiation, social lessons depicted still affect their worldview on gender roles and stereotypes presented in the plays. This study recommends the need for drama teachers, scriptwriters and adjudicators to undertake gender awareness training to ensure gender responsiveness in all items presented at the Kenya national drama festival for a gender responsive society.

Keywords: Performing, Femininity, Masculinity, Gender roles, Gender stereotypes
Catechin, Quercetin and Total Phenolic Content in Five Leafy Amaranth Species Grown in Kenya

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Abstract
Amaranth is the collective name for the domesticated species of the genus *Amaranthus* (family *Amaranthaceae*). It is one of the oldest food crops in the world with evidence of its cultivation dating back to over 6000 years. Amaranth has a high nutritional value, fast growing plant, easily cultivated in gardens and fields; and drought tolerant crop. There are many species of amaranth under cultivation but the growers do not know which of these has the highest nutritional impact. Five commonly consumed amaranth varieties were studied; *A.albus, A. hybridus, A.cruentus, A.dubius* and *A. hypochondriacus*. These vegetables were planted in an experimental farm and were harvested at 5-6 weeks after planting. The fresh leaves were analysed in order to fingerprint the phytochemical composition of the selected varieties. Total phenolic, catechins and flavonoids content in the leaf extracts was determined spectrophotometrically and calculated as gallic acid, catechin and quercetin equivalents, respectively. *A. cruentus* had the highest total phenolics, quercitin and catechin content of 3.59 Gallic acid equivalent/100mg equivalent, 14.28 Quercitin equivalent/100mg and 7.15 Catechin equivalent/100mg respectively. *A. hypochondriacus* had the lowest phenolic and catechin content of 1.68 Gallic acid equivalent/100mg and 3.63 Catechin equivalent/100mg, while *A. dubius* had the lowest quercitin of 4.69 quercitin acid equivalent/100mg. The presence of phytochemicals in amaranth shows that besides providing nutrients amaranth has medicinal properties hence its consumption should be encouraged.

Keywords: Catechin, Quercetin, Total Phenolics, Phytochemical
Effect of Fresh Garlic Extract on the Histoarchitectural Studies of the Bone Marrow Stem Cells in Adult Male New-Zealand White Rabbits

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**Abstract**

Garlic is wild progenor that originated in the high planes of West-Central Asia. It has been widely used as food and medicine. Its effects have been demonstrated in both animals and humans. The aim of this study was to examine the effect of freshly prepared Aqueous Garlic Extract (FAGE) on the Histomorphology of rabbit bone marrow stem cells. Adult Male New Zealand white rabbits were used for the study. Five experimental groups were intraperitonially injected with different absolute concentrations of freshly prepared garlic extracts. Pluripotent Stem Cells were Histologically analyzed for their rate of growth and development, shape, sizes and characteristic staining to denote normal or abnormal precursor cell functioning. These were done from bone marrow aspirates from selected rabbit bones. There wasn’t any statistical significant difference between the control group (2ml distilled water, placebo) and the 4 experimental groups (gp 1 = 0.5, gp 2 = 1.0, gp 3 = 2.0 and gp 4 = 4.0 ml) of absolute fresh garlic extract concentration respectively. However, there seemed to be an increase in the hematopoietic activity of rabbits in experimental groups 3 and 4 (83.4%, p<0.05) as compared to groups 1 and 2 (30.3%, p< 0.01) and consequently the control group, as microscopically observed from the smears. Conversely, dependent on the dosage, garlic seemed to have an influence in each experimental group, thereby eliciting sigmoid (S-shaped) dose-response curves and an exponential growth rate and development of pluripotent Stem Cells. The study showed that freshly prepared garlic extract and its active chemical compounds are a good source of blood boosting herb which can be used to stimulate the bone marrow cells into efficient hemopoiesis.

**Keywords:** Garlic, Hemopoiesis, Pluripotent, Histomorphology, Intraperitonal
A Triterpenoid From \textit{Hypericum Keniense} Schweinf. (Giant St. John Wort) Growing In Kenya

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Abstract
\textit{Hypericum keniense} schweinf (synonyms: \textit{Hypericum revolution} Vahl, \textit{Hypericum lanceolatum} Lam) and locally referred to as “Mûthathumwa” by the Kikuyu community, is a perennial herb of family Hypericaceae, which comprise 484 species that are naturally occurring or which have been introduced in the world, except Antarctica. \textit{H. keniense} is indigenous to Kenya and has been long used in folk medicine. Little has been done on its phytochemistry and only isolation of coumarins has been recorded. The present study involved isolation and characterization of some of the chemical constituents from the whole stem of the plant. The plant material was collected from Gakoe forest after being identified by local traditional medicine practitioners and later authenticated by a taxonomist. The collected material was phytoscreened and thereafter a methanolic extract was prepared by soxhlet followed by gradient elution in column chromatography using normal silica gel. The results of phytochemical tests indicated that the whole stem had saponins, tannins, phenols, anthraquinones, steroids, carotenoids, flavonoids volatile oils and coumarins. Column chromatographic isolation achieved a crystalline compound which had spectroscopic data (UV/VIS, IR, NMR and MS) strongly suggesting that it would be betulinic acid, a compound of interest in research of plants with anticancer activity in Kenya.

Keywords: \textit{Hypericum keniense}, Phytochemistry, Betulinic acid, Chromatography
Re-Thinking Early Childhood Development Education: An Impetus to Economic Growth

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Abstract
Many scholars have penned on the importance of the Early Childhood Development Education as a foundation of both knowledge and learning. The Early Childhood Development Education (ECDE) is a crucial stage of development that cannot just be wished away. This paper seeks to raise an awakening call to current and future generations to re-think the value and importance attached to ECDE if the society has to realize full socio-economic, political and environmental development. The paper will highlight the concept of ECDE where it will bring out the holistic characteristics of children between ages 0-8 years. The paper will then discuss the national ECDE objectives in Kenya where the desired competencies in children transiting to lower primary will be brought out. The paper will then delve into the importance of the society investing in early years where the relevance of ECDE to national unity and career preparedness is expected to start. The Convention on the Rights of the Child clearly highlights the importance of early child development, saying that a child has a right to develop to “the maximum extent possible.” (Article 6) and that “States Parties recognize the right of every child to a standard of living adequate for the child's physical, mental, spiritual, moral and social development.” (Article 27). The paper will then focus on the impact of ECDE to economic growth of society and draw a conclusion.

Keywords: Early Childhood Development, Impetus, Rights, Development Goals
A Study of the Prevalence and Correlates of Early Onset Neonatal Hypocalcaemia in Term Neonates at Kenyatta National Hospital

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Abstract
Hypocalcaemia is a major concern in the neonatal period, often associated with metabolic disturbances whose consequences are high morbidity and mortality. Neonatal hypocalcaemia correlates to maternal calcium levels as the neonate depends on the mother to supply all the calcium during foetal life and lactation period. Calcium intake in women during pregnancy and lactation can be low. This would reflect as low calcium level in neonates. It is, therefore, important to assess serum calcium levels in the term neonate and correlate it to maternal levels at birth. This was a hospital based cross sectional survey. 121 pregnant women and later their newborn babies were recruited. Fisher’s formula was used to calculate minimum sample size. Consecutive sampling was applied. The study was set at Kenyatta National Hospital (KNH) labour ward. All pregnant women admitted and later their new born babies were sampled. Once a pregnant woman was recruited, a questionnaire was administered, blood pressure taken, trousseaus and chovtek’s signs elicited. A blood sample was then drawn and analysed for levels of calcium, alkaline phosphatase, phosphates and albumin. 24 hours after delivery the baby was assessed for any signs of seizures, weight, length and head circumference taken and blood sample drawn and analysed as that of the mother. The study was cleared by a joined ethical committee of Kenyatta national hospital and university of Nairobi. 121 pregnant women with a mean age of 27.5 years and a median parity of 1.0 were recruited.121 neonates with a mean gestational age of 39.3 weeks were also recruited. The prevalence of maternal hypocalcaemia was 29(24 %) whereas neonatal hypocalcaemia was at 26 (21.5%).Hypocalcaemia in the neonate was significantly associated with maternal hypocalcaemia (p 0.013). It was concluded that neonatal hypocalcaemia is at 21.5% and it is significantly associated with maternal hypocalcaemia. Routine maternal calcium supplementation during pregnancy should be implemented to prevent maternal and neonatal hypocalcaemia. Routine Serum calcium analysis should also be undertaken in pregnancy and during the neonatal period for those mothers who are not on supplementation.
The Intellectual Property Management Approach (Policy Framework)

“Whether Underground, On The Surface, Above The Sky and All Over The Universe There Is Always A New Idea”
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Abstract
I have introduced the paper by building grounds for justification that universities need to approach research, innovation and production through sound intellectual management policy. I have considered intellectual property management Service as one of the offices that must be empowered in terms of resources, staff and equipment if the university is to achieve proper IPM. Employees, students, visitors and other stakeholders must be empowered in a more proactive way than in a reactive manner. Commercialization options must be done tactful manner to bring the best reward to creators and the university. Starting new companies is the highest achievement of IPM Service and must be pursued with all energies to bring our country out of poverty. IPM Service Oasis fund is a necessity since underfunded IP department will not function well, this will also allow for serious business considerations and various fund management. Revenue must also be distributed in attractive manner to the IP creators and the university to encourage innovation. Distribution of tangible research property should be flexible, legally sound and allow for the accommodation of other stakeholder wishes. Dispute resolution must be clear, simple and take the shortest time possible. Related university policy National acts and international policies need to be put into consideration to avoid conflicts and contradictions. IP management is going to be the lifeline of universities world over. Just before conclusion I give quick facts about research, innovation and IP. In conclusion I predict challenges that might face our universities in future and how IPM can offer solution to such problems and advocate for universities to embrace IP in a modern way.

Keywords: Intellectual, Property, Management, Policy, Innovation.
Diatom Flora in Lake Victoria: Diversity, Spatial Patterns and Environmental Relationships

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Abstract
Planktonic diatom assemblages and environmental variables were studied in 14 sites in Lake Victoria (Kenya part). The objective was to determine the diatom community composition and diversity and describe their distribution patterns in relation to environmental variables. Environmental variables were determined using appropriate electronic meters and analytical standard methods. Diatoms were cleaned with sulphuric and nitric acids and mounted in Styrax® for microscopic enumeration at magnification 1000 x under oil immersion. Correlation analysis was employed to determine relations between diatom diversity measures and environmental variables. Two-way Indicator Species Analysis (TWINSPAN) was used to determine the diatom community structure. Canonical Correspondence Analysis (CCA) was used to estimate relationships between diatom distribution and environmental variables. 101 diatom taxa belonging to 29 genera were identified and 13 environmental variables measured. Species diversity was higher in the Nyanza Gulf and shallow areas and was low in the open main lake. Species richness was highly correlated with lake depth, conductivity and phosphate-phosphorus; species diversity and species dominance were highly correlated with lake depth, conductivity and silicate; evenness was highly correlated with conductivity and silicate. TWINSPAN separated the diatom community into two main groups comprising assemblages of the Nyanza Gulf and the ones from the open main lake, reflecting environmental gradients. The open main lake was associated with higher abundance of Nitzschia acicularis that was also the indicator species for this group. Aulacoseira agassizii, Cyclotella meneghiniana, Nitzschia fonticola and Cyclostephanos dubius were indicator species for the Nyanza Gulf. CCA identified conductivity, alkalinity, dissolved oxygen and lake depth as the main environmental variables that significantly explained variations in the diatom assemblages. The results provide evidence that diatoms can be useful indicators of water quality and environment in Lake Victoria.

Keywords: Diatoms, diversity, water quality, bioindicators, Lake Victoria
Evaluation of *in Vitro* Antibacterial and Antifungal Activities of *Entada Abyssinica* Stem Bark Extracts against Microbial Infections.

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**Abstract**

In Africa, not much information on the use of medicinal plants has been documented. This study undertook to screen the stem bark extract of *Entada abyssinica*, commonly used for herbal treatment in Kakamega, Kenya, for antimicrobial properties. Organic and aqueous extracts of the stem bark of *E. abyssinica* were tested *in vitro* against *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Candida albicans*, *Candida parapsilosis*, *Microsporum gypseum* and *Trichophyton mentagrophyte*. Susceptibility of these organisms to the extracts was tested using disc diffusion method while Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal/Fungicidal Concentration (MBC/MFC) were determined using agar dilution and broth macrodilution methods respectively. 37.5% of the tested extracts of *E. abyssinica* were active against both the bacteria and fungi tested (disc diameter ≥ 10 mm). Water extracts showed broader spectrum of activity with 87.5 % inhibition against the tested organisms (disc diameter ≥10 mm). Petroleum ether extracts had no activity against the bacteria or fungi. The water extract of *E. abyssinica* had bactericidal activity, with MBC (≤ 50 X 10³ µg/ml) against 3 (75%) of the 4 tested bacteria. The activity of *E. abyssinica* against some pathogenic microorganisms was a pointer to its usefulness in the development of new antimicrobials.

**Keywords:** Microbial infection; Broth macro dilution; Bactericidal; *Entada abyssinica*
Neutral Acrylate/Methacrylate-Based Monolithic Stationary Phases for the RP-CEC of Neutral and Charged Species in the Absence of Annoying Electrostatic Interactions

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Abstract
The development of polymeric stationary phases for use in reversed-phase capillary electrochromatography (RP-CEC) has traditionally involved the inclusion of monomers bearing fixed charges to generate the desired electroosmotic flow (EOF) necessary for mass transport. This has impeded the application of these charged stationary phases to the RP-CEC separation of oppositely charged solutes owing to undesirable electrostatic interactions between the fixed charges and the charged solutes leading to band broadening and in some instances irreversible adsorption. Our research successfully introduced neutral organic acrylate/methacrylate-based stationary phases with adequate EOF for mass transport. The EOF generation is believed to arise from adsorption of electrolyte ions onto the monolith’s surface imparting the surface with the necessary zeta potential to generate the EOF. Here, the preparation of a neutral octadecyl acrylate monolith (ODAM) and its application to the separation of a wide range of solutes will be discussed. The monolith was prepared by the in situ copolymerization of octadecyl acrylate and trimethylolpropane trimethacrylate (TRIM) in a ternary porogenic solvent consisting of cyclohexanol, ethylene glycol and water. The second part of the talk will discuss the enhancement of retention, selectivity, efficiency and EOF of the ODAM by changing the crosslinker from TRIM to pentaerythritol triacrylate, and its applications to the RP-CEC of various solutes including polyionic peptide mixtures and proteins as well as neutral small molecules. Thirdly, the development of a naphthyl methacrylate monolith exhibiting hydrophobic and π-interactions will be presented. Its applications to the separation of various aromatic solutes including environmental pollutants and isomers will be highlighted.

Keywords: Capillary electrochromatography, monolith, octadecyl acrylate, π–interactions, naphthyl methacrylate
Markov Transition Matrices for Cohorts of Students in Bachelor of Science (Actuarial Science) Programme: A Case Study of JKUAT

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Abstract
Higher Education Institutions in Kenya have encountered rapid expansion of programs and departments in the recent years, and this has profound impact on the entire society. This continues to demand a greater proportion of the country's financial resources and the cost is borne solely by the Government. As result of these events, much of the attention centres on the lag between the time students are admitted and the time they are graduating. The purpose of this research was to investigate the flow of students in the Bachelor of science (Actuarial Science) programme in JKUAT via Markov analysis. A sample of Bachelor of science (Actuarial Science) 2005 and 2006 cohort was used. A transition model that is used here describes the stocks and flows of students through an education system in terms of transition ratios. The results show that under fairly general Markov chain model of the transitional determination, student flows do not display the random walk characteristics which may be interpreted as purely following a Markov process.

Keywords: Fundamental matrix, Markov analysis, Recurrent state, Transition probabilities, Transient state.
Determinants of Delivery of Health Services By Community Health Workers: A Case of Embu District

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Abstract
The introduction of the community strategy involving Community Health Workers (CHWs) was to pacify the growing demand for quality healthcare by the general population. However there have been concerns on whether the involvement of the CHWs leads to better delivery of health care services. There is confusion about their services, sustainability and resources. Also, the community’s role in the implementation of the strategy lacks clarity. This study sought to identifying demographic, programmatic and community factors that influence the delivery of health services by CHWs in Embu district. A cross sectional study design was used, where both quantitative and qualitative data was collected. Structured questionnaire, key informant interviews (KII) and focused group discussions (FGD) were used. The study involved 137 trained CHWs. The quantitative data was processed and analyzed using the SPSS (version 17). Odds ratio with 95% confidence intervals was used to show associations and p-value <0.05 was considered a statistically significant level of precision. Qualitative data was analyzed manually by themes and subthemes. The findings show that CHWs offer vital health services at the community level in Embu district. Referral services, barazas and health education goals were well achieved in the community units; however the score on visits to households per month is low. Supplies, period of refresher course, days for giving the services, feedback information and knowledge on disease signs, symptoms and its management had significant influence in the delivery of services by CHWs. Aged CHWs were more active than middle aged ones. Male CHWs were more active than their female counterparts. On average, CHWs in the District work for eight days in a month. All none supervised CHWs scored poorly in the delivery of health services. Community Health Committees were ranked the best supervisors. Appreciation by community, cultural norms, traditional practices, customs and beliefs affect the delivery of services. It is recommended that a clear contextualized guideline be developed on the qualification, scope, mandate and motivation of CHWs in order to improve delivery of level one health services. The strategy adopted should be sustainable at community level.

Keywords: Delivery, health service, community health workers
Collaborative Learning Activities Influence on Students’ Achievement in Mathematics in Technical Institutions in Kenya

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Abstract
Mathematics plays develops logical, creative and critical reasoning of students, solve problems, optimize industrial processes, function with linear and non-linear thought processes and communicate solutions briefly and precisely. Despite the critical role played by mathematics, low achievement in the discipline had been witnessed. Low achievement in mathematics had been a source of concern to parents, instructors, educators, consumers of technical and vocational outputs and the government among other stakeholders because the input was not commensurate with the output. Low achievement in mathematics was associated with instructional challenges. Collaborative learning activities could improve students’ achievement in mathematics. Yet, collaborative learning activities which could provide appropriate experiences in mathematics, project-based teaching and industrial-based activities had not been fully exploited. The purpose of the study was to establish what activities in mathematics could stimulate students’ interest in mathematics in technical institution in Kenya. The findings and recommendations were expected to inform policy decision in establishing quality and relevance in training in mathematics in technical colleges in Africa and world over. The study was carried out by a descriptive survey design. Questionnaires were administered to Lecturer’s and students collect data on teaching styles. Interviews were carried out on heads of departments to cross-check the responses in the questionnaires. Collaborative learning activities as a teaching strategy to improve students’ achievement in mathematics in technical institutions in Africa and world over were recommended.

Keywords: Collaborative learning activities, Achievement in mathematics
Modeling and Volatility Analysis of Stock Returns in Nairobi Stock Exchange

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Abstract
Heteroscedasticity arises when the error term of a regression equation does not have a constant variance. Financial markets are known to be very uncertain a phenomenon called volatility which is a key variable used in many financial applications such as investment, portfolio construction, option pricing and hedging as well as market risk management. This study models the heteroscedasticity of volatility of stock returns in Nairobi Stock Market of Safaricom and KCB using daily return series from 9th June 2008, to 31st December, 2010, using ARIMA-GARCH models. The procedure for building the model involved model identification, order determination, estimation of parameters and diagnostic check. Shapiro–Wilk test rejected the null hypothesis of normality for both series at 5% level of significance while Philip Perron (PP) and Augmented Dickey Fuller (ADF) reveal that price series were not stationary while returns series were stationary. All the return series exhibit, leptokurtosis, volatility clustering and negative skewness. The estimation results reveal that ARIMA (1, 0, 0)-GARCH (1, 1) and ARIMA (0, 0, 2)-GARCH (1, 1) best fits Safaricom and KCB respectively. Investors who wish to avoid large, erratic swings in portfolio returns may wish to structure their investments to produce a leptokurtic distribution. Further, researches should focus on the calculation of value-at-risk (VaR) in the markets.

Keywords: Heteroscedasticity, Volatility, ARIMA-GARCH-mode
Antihyperglycemic Activity of the Aqueous Extract of *Zanthoxylum Chalybeum* Stem Bark

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Abstract

*Zanthoxylum chalybeum* Engl. (Rutaceae) stem bark is used by communities in Africa and Asia to manage diabetes mellitus in humans. This study investigated the anti-hyperglycemic effect of *Z. chalybeum* aqueous stem bark extract in streptozotocin (STZ)-induced diabetic rat models. *Z. chalybeum* was obtained from Machakos County, Kenya and a stem bark extract prepared. Rats were divided into experimental, negative control and positive control groups (n=5). Diabetes was induced in each rat in experimental group by single dose intraperitoneal injection of streptozotocin at 45 mg/kg body weight. The plant extract was administered to the experimental rats at dosages of 10, 100 and 1000 mg/kg body weight orally for 14 days. The negative control group was left untreated while the positive control group was treated with glibenclamide (10 mg/kg body weight, orally). The effect of the extract on blood glucose, body weight, food and water intake and oral glucose tolerance test were determined in all rats in the experimental and control groups. *Z. chalybeum* aqueous stem bark extract exhibited significant antidiabetic activity compared to the untreated diabetic controls (P<0.05). Extract treated diabetic rats had decreased fasting blood glucose at the three dose levels. There was no significant difference between the extract fed diabetic rats and the normal controls after two weeks of treatment (p<0.05). Extract treated diabetic animals recorded a comparatively decreased weight loss which was dose dependent at 15.45%, 24.38% and 26.63% for 1000 mg/kg, 100 mg/kg and 10 mg/kg treated animals respectively, compared to the untreated diabetic rats at 36.44% . These results suggest that the aqueous stem bark extract of *Z. chalybeum* possesses significant antihyperglycemic activity. This study thus supports the traditional use of the plant for the management of diabetes mellitus. However, further studies are required to identify the active ingredient(s) and determine the mode of action.

Keywords: Diabetes Mellitus, *Z. chalybeum*, Rat model
Impact of Training Boda Boda Operators and Safety Status in Kakamega County, Kenya

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Abstract
Motorcycle transportation commonly known as *boda boda*, is very useful in rural areas of Kenya due to poor infrastructure. Statistics from the Kenya police indicate that this mode of transport accounts for most road accidents in Kakamega County. This leads to injuries, maiming, or death. The research was conducted to evaluate the impact of training levels undertaken by boda boda operators on road safety, accidents, and their awareness levels on safety measures. Four hundred and eighty questionnaires were randomly administered to boda boda operators, health facilities and law enforcement officers. The variables included age, education level, marital status, training level and awareness, ownership, time of operations and number of passengers ferried. It was observed that 64% of boda boda operators had no valid licenses. About 51% of the operators were trained through apprenticeship, 33% through driving school and 16% self-training. An average of 61% did not have any road safety training. There was significant difference between the number of years in operation and accident involvement ($X^2=3.299$, df=3, $p<0.05$). Those who had worked between 1-5 years had higher accidents than those with over 10 years. The licensed and trained operators had significantly fewer accidents than untrained operators ($X^2=1.172; \text{ df}=1 \ p<0.05$) accounting for 47% and 53%, respectively. In conclusion, most of the boda boda accidents are due to lack of training and awareness lesson road safety. Thus, there is urgent need for the operators to go to driving school, and also get awareness training on road safety. The County should provide continuous training and road safety awareness programmes. This will provide knowledge, and change perceptions on road safety practices in Kakamega County. The information could be used in policy development and improvement in Kenya.

Keywords: Boda boda operators, accidents, road safety, training
Enhancing Excellent Customer Care Services in the Media Industry

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Abstract
Customer service is a core business process, which entails all the activities involved in making it easy for customers to reach the right parties within the company and receive quick and satisfactory services, answers and resolutions of the problem. Indeed, good customer service is the bread and butter of any business. This study was carried out in order to determine the factors that enhance Excellence customer Care service affecting the media industry in Kenya. The objective of the study was to find out customer retention policies and customer satisfaction factors that affect excellent customer care operation. This could add value to the media industry, the learners and future scholars. This research study was conducted out within limit of certain limitations and delimitations. However, the researcher was relying on literature review on the independent variables. This study applied a purposive research design and sampled the two major media houses which were the daily Nation and the Standard. The researcher used stratified random sampling technique to select the sample of 30 respondents from a target population of 100. The data was conducted by administering questionnaires. The researcher used structured and non-structured questionnaires for the analysis of the data which was analyzed using tables, bar graphs and charts. The study recommended that Quality service has a link to market growth and profitability resulting from loyal customer base. In order to deliver quality customer service, there is need to understand service quality from both the customer and service providers perspective. There is also need to understand the means of measuring, recording and monitoring the service quality. An organization should be able to always adopt the changing customer needs and indeed identify areas of improvement so that it can offer quality excellent customer service. The mission statement and the organizational vision should be clear, focused and strategic.

Keywords: Customer Service, Media Houses, Quality Service, customer loyalty
Relationship between Headteacher’s Leadership Experience, Teacher Supervision, School Location, and Pupils Performance in KCPE Examination in Ol’ Kalou Division, Kenya

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Abstract
Formal Education is a critical determinant of a country’s development process. Consequently, Kenya’s government places high premium on education and training. At the primary cycle of education, major focus has been on enhancing access and transition of pupils to secondary schools since the country attained independence in 1963. However, level of pupil’s performance in exit examination, specifically Kenya Certificate of Primary Education (KCPE) examination has over the years been rather low. Although examination performance is dependent on many factors, this study selected three factors, namely headteacher’s leadership experience, teacher supervision and school location with a view to determining the extent to which they could be related to pupils performance in KCPE examination. Data were self-collected from 59 primary schools in Ol Kalou Division, Nyandarua country, Kenya. Nominal scale data were analysed through frequency counts and percentages while hypotheses were tested using chi-square ($\chi^2$) at .05 alpha level. Pupils performance in KCPE examination was insignificantly related to headteachers’ leadership experience (p>.05) and teacher supervision (p>.05). However, a statistically significant relationship (p<.05) was established between KCPE examination performance and school location. The study offers useful insights on ways in which the Ministry of Education, Teachers Service Commission (TSC) and school managers can enhance pupils’ performance in KCPE examination.

Keywords: Leadership Experience, Teacher Supervision, School Location, Pupils Performance, KCPE Examination.
Impact of the East African Community Integration on Small and Medium Enterprises: A Case of Kenya

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Abstract
The viability of small and medium enterprises (SME’s) is vital to economic development and growth in the East African Community Region. An important factor in all this is the growth of these enterprises and how they can effectively respond to the environmental (exogenous) factors brought about by the regions’ integration into a regional block. This is a theoretical paper whose objective is to examine the nature of regional integration and the experiences by SME’s in the East African Community states and considers research questions in their relation to the external factors influencing the firm’s strategies as well as changes in their structure. The objectives SME’s pursue and the extent to which their objectives are achieved is therefore considered. These exogenous variables include access to finance, the legal/regulatory environment and technology, business infrastructure and labour mobility.

Keywords: East African Community: Regional Integration: Impact: Small and Medium Enterprises, Exogenous
Associative Effects of Tanniniferous Browse Mixtures: A Simple Tool to Improve Livestock Feed Resources

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Abstract
An in vitro three-step digestion study using pepsin and pancreatin was used to assess the effects of browse mixing on post ruminal dry matter (DM) digestibility and associative effects of tanniniferous foliage. Six browse mixtures were prepared by mixing Berchemia discolor with Acacia brevispica, Acacia elati, Acacia mellifera, Balanites aegyptiaca, Grewia bicolor or Zizyphus mucronata in a 1:1 ratio to make M1, M2, M3, M4, M5 and M6, respectively. The seven single browses and the six browse mixtures were incubated with buffered - rumen fluid. Browse mixing significantly increased (P < 0.05) the in vitro total tract (TTDMD), rumen DM digestibility (RDMD) and the in vitro lower tract DM digestibility (LTDMD). Associative effects on TTDMD, RDMD and LTDMD, were also influenced by mixing of browses (P < 0.05). Complementarity of nutrients from diverse plants is important in evaluating browse mixtures for use as supplements for livestock feeding in arid and semi-arid areas

Keywords: Associative effects, Browse mixtures, Three-step in vitro digestion
The Role of Kenya University Libraries in Knowledge Creation, Research and Development

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Abstract
University libraries are nerve centre of academic systems. They serve as key areas where students, staff and researchers spent most of their time in search of knowledge. In most cases university libraries lay foundation in research whereby users acquire process, store and retrieve and disseminate information. In developing countries like Kenya, mechanism anticipated to the involvement of university libraries in the research process in this era of global knowledge economy is not only clear but also exist is embryo due to lack of cooperation and professionalism, poor technological infrastructure, and the dwindling financial budget to support research. Despite these facts, Kenya Vision 2030 recognizes information as a key resource of economic drive and mandates both private and public sectors observed as major consumers and creators of knowledge to strive towards economic growth and development. Collaboration is an important aspect of knowledge management that has never been fully integrated by professionals working within academic circles. This paper shall address the place of university libraries of Kenya in research creation and development of knowledge economy. The paper will also briefly discuss opportunities and challenges facing university libraries, and conclude by recommending appropriate methodologies which may be used to strengthen research activities in both private and public universities of Kenya.

Keywords: University Libraries, Information Literacy, Knowledge
Biogas Combustion in Conventional Biogas Stoves, Modified LPG Burning Biogas Stoves and Locally Fabricated Stoves

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Abstract
Biogas combustion can be a challenge to the environment and efficiency due to fuel and operational flexibility. Efficient combustion can mitigate indoor air pollution by reducing products of incomplete combustion. Efficient combustion is a result of combined factors. Some of the factors include; gas velocity, gas-air mixing ratio and the quantity of methane contained in the biogas. Gas velocity and mixing ratio are factors determined by gas supply pressure, jet size and air opening. A study of how a combination of these factors affects the overall stove efficiency was carried out. Survey was conducted to identify common stoves and their performance around Thika and Nakuru area. Fifty operational stoves were examined and grouped into three categories; conventional biogas stoves, modified LPG stoves and locally fabricated stoves. One stove from each category was considered in the evaluation of efficiency. Three different biogas plants were used to vary the gas composition. Efficiency of the identified stoves was evaluated and plotted against pressure to establish the optimum pressure range in which the stove efficiency stabilized. Gas consumption rates for one stove, fitted with different jet sizes, were compared at different pressure points. Carbon monoxide content in the flue was also compared against the obtained efficiency. In the conventional biogas stove considered, optimum efficiency was attained at a pressure of 1300 Pa with a mixing ratio slightly below 6.0. Modified LPG stove fitted with a jet diameter of 2.3 mm attained optimum efficiency at pressure of 1800 Pa and a mixing ratio of 6.0. Locally fabricated stove had a diffuse flame with optimum efficiency at pressure of 1600 pa. It was within these parameters that the lowest indoor air pollution was registered.

Keywords: Biogas, Combustion, Pressure, Velocity and Efficiency
An investigation into the Factors That Influence Customer Repurchase Intention in Supermarket Stores

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Abstract
The purpose of the study was to investigate the factors that influence customers repurchase intentions in supermarket stores in Eldoret CBD, five specific research objectives were addressed i.e. to: find out the influence of brand image awareness on customers repurchase intentions, determine the relationships between perceived quality and customers repurchase intentions, establish the influence of customer satisfactions on customers repurchase intentions, determine the influence of customer loyalty on customers repurchase intentions and to determine the influence of geographic proximity on customers repurchase intentions. The research tools for the study include questionnaire and interviews. The study employed descriptive and explanatory research design. The study targeted 295 respondents made up of customer in six selected retail stores. The data was analyzed using descriptive statistics and inferential statistics such as correlation and regression analysis. The finding of the study showed that majority of the consumers who patronize supermarkets and malls were young executives, married people with an income between 5,001 to 20,000 Kshs. The findings revealed that (70%) of the respondents were female. The research also indicated that majority of the respondents were aged between 20 to 34 years. Majority of the respondents, which is (3.8%), had college level of education. It was concluded that brand image awareness and customers repurchase intentions has significant relationship ($P=433.5<0.001$); perceived quality and customers repurchase intentions has significant relationship ($P=0.000<0.001$); further, customer satisfactions and customers repurchase has significant relationship ($P=211.759<0.001$). Customer loyalty and customers repurchase intentions has strong positive correlation coefficient $P=0.841<0.01$, Thus, hypotheses $H_01$, $H_02$, $H_03$, $H_04$ were verified to have significant relationship. However, the relationships between ($H_05$) geographic proximity and customers repurchase intentions were tested not to be significant. This research provides useful information for corporate management to prioritize their resources in terms of human resources, investment, time, and budget allocation.

Keywords: Repurchase intentions, Supermarket stores, Brand image, Perceived quality, Customer satisfactions, Customer loyalty, Geographic proximity
Analyses of the Key Challenges Affecting Potato Farming in Oljoro-Orok Division.

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Abstract
The paper analyses the key challenges affecting potato farming in Oljoro-orok Division, Nyandarua County. The objective of this study was to evaluate the key challenges and opportunities facing potato production in Oljoro-orok division. Primary data was obtained from randomly selected farmers through questionnaires. Secondary data on potato yields was collected from Nyandarua west District Agriculture Office for a period of eleven years. Purposive sampling was used to select 300 farmers in the division. Proportionate sampling was used to select the sample of farmers in each of the four locations. The data collected was analyzed using descriptive statistics namely frequencies, percentages and means with the aid of Statistical Package for Social Science (SPSS) version 17.0. The results were presented using line and bar graphs, tables and circles. Rainfall variations, lack of clean seeds and crop diseases have been found to be the major challenges facing potato production in the division. Forty-five per cent of the respondents saw rainfall variation as the main cause of decreased potato yields 33% lack of clean seeds and 6% crop diseases. The study recommends adaptation measures to be applied to cope with rainfall variations. Such measures include irrigation using water available in Jacob, Terracin and Kivindo dams during the dry spell. Other measures include digging of earth dams to avoid water logging during heavy rains. A lot of emphasis on the use of certified seeds should be done by the Agriculture field officers to caution farmers from planting the same potatoes they harvested in the previous harvest.

Keywords: Key challenges, Rainfall variations, Crop diseases, Potato yields
Marine Green Algae Lubricating Oil (Mgalo) and Biofertilizer

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Abstract
Culturing of algae as an alternative feedstock for biofuel production has received a lot of attention in recent years. Due to their fast growth rate and ability to accumulate high quantity of lipid and carbohydrate in cells, algae can be exploited for oil/Lubricants, biodiesel and bioethanol production. In addition, superior feedstock offers several environmental benefits, such as effective land utilization, carbon dioxide sequestration, self-purification if coupled with wastewater treatment plants. The technology does not trigger food versus fuel feud. Based on technological advances, the potential of algae towards energy security and its feasibility for commercialization are being explored. An attempt to extract oil from marine green algae through solvent extraction and production of organic biofertilizer (N:P:K substitute) from the resulting biomass was undertaken. The oil extracted from the algae was used to prepare oil/lubricant. The new dimension has the potential of revolutionizing the biofuel industry by providing an alternative source for fuel/oil sustainability. Lubricant/oil production was directed towards using aquatic algae for sustainance of the environment while using land that is not suitable for agriculture into aquaculture.

Keywords: Biofertilizer, Lubricating Oil, Marine Green Algae

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Abstract
The paper analyses the trend of rainfall and its effects on potato yields in Oljoro-orok Division, Nyandarua County. The objective of the study was to analyse seasonal and annual rainfall characteristics and correlate them with potato yields in Oljoro-orok division. Secondary data on rainfall and potato yields was collected from Nyahururu Meteorological Station and District Agriculture Office respectively for the period of eleven years. The data collected was analyzed using descriptive statistics namely frequencies, percentages and means with the aid of Statistical Package for Social Science (SPSS) version 17.0. The results were presented using line and bar graphs, tables and circles. The findings were that annual rainfall and potato yield shows an increasing trend between 1999 and 2009. Rainfall has shown a decreasing trend during the long rain season and an increasing trend during short rain season. Rainfall variability is significant in both seasonal and annual trends ranging from +464.97 in 2007 to -239.63 in 2009 on the annual trend, +624 in 2007 to -360 in 2008 during the long rain season and +152 in 2006 to -171.6 in 2007 during the short rain season. From the findings, the researcher recommends that sustainable land management practices such as mulching, digging of trenches and earth dams and use of irrigation during the dry spell as an adaptation measure should be applied to cope with rainfall variation.

Keywords: Rainfall variability, Rainfall characteristics, Potato yields

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Abstract
Risk management focuses on adopting a systematic and consistent approach to manage all of the risks confronting organization. Risks distinctiveness applicable to SMEs in Kenya include: uncertain risk, a chance of loss, normally accidental, sudden and unforeseen. This uniqueness makes entrepreneurs to seriously think about risk, its impact on their businesses and how risk can be managed. It is therefore important to investigate the influence of risk management practices on performance of small micro enterprises. Five specific research objectives guided the study i.e. to identify the features of risk management practices by SMEs, to examine the various types of risk associated with SMEs, to determine the effect of risk on SMEs performance, to identify obstacles of risk management of SMEs in Eldoret and to propose the risk management policies to be adopted for effective guidance for actions on improving the performance of SMEs in Eldoret. The descriptive research was employed in the study. The target population comprises of SME operators mainly drawn manufacturing, services and processing within Eldoret CBD. The sample for the study was selected using stratified random and simple random sampling methods. The research instruments were questionnaire, observation and interview. The data was analyzed using descriptive statistics (frequency tables), while correlation and regression analysis were used to test the hypotheses. The finding of the showed that very few SME owners, managers, entrepreneurs or key designated employees make use of risk management tools and techniques within their businesses, to achieve growth and sustainability. However, the majority agreed to the high importance of risk management in the success of a business enterprise. The findings of the study furthered revealed that leverage on financial structure, issue of collateral security, incapacity to go for technological advancement; tough competition and inadequate margin are among the risk associated with SMEs. The findings of the study furthered suggest that the risk management practice has a lot of effect on SMES performance. This study is significant since it is hoped the findings and recommendations of the study will assist the policy makers in the Ministry of Trade and Industry in making appropriate decisions.

Keywords: Risk management, Performance, Small Micro Enterprises
Role of Deputy Principals as Perceived by Principals, Deputy Principals and Teachers of Public Secondary Schools in Nyamache District, Kenya.

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Abstract
Secondary school deputy principals (DPs) have experienced problems in defining their roles. This has left them with confusion and conflict. This study therefore endeavoured to determine the role of DPs as perceived by principals, DPs and teachers in Nyamache district. The objectives of this study were to determine the role of deputy principals; to find out the challenges faced by deputy principals; to establish intervention measures to enhance role performance and; to find out the importance of DP’s post in school administration. The target population was 32 principals, 32 DPs and 264 teachers. Descriptive survey research design was used in the study. Stratified and then random sampling was used to select 60 respondents who were used in the study. Data was summarized and presented in form of tables and graphs for analysis. The findings of this study include the following; not all DPs were appointed by Teachers Service Commission (TSC); the DPs should perform all the six school administrative tasks; appraisal and discipline of support staff, guidance and counseling, pastoral care, liaison, disseminator and monitor are DP roles. Lack of freedom to make decisions, rebellious teachers, lack of administrative allowance, lack of authority to incur expenditure, interference from sponsors, lack of motivation and appreciation from the principal, role ambiguity and demand overload were found to be some of the challenges that DPs face. Training before and after appointment, clear role definition, authority to incur expenditure, administrative allowance, appointment of teachers in higher grades as DPs and moral support were found to be the intervention measures that can mitigate the challenges that affect DPs. It also emerged that the position of a DP is essential in school administration. This study has added to the existing knowledge about school administration and deputizing. These findings may also be beneficial to DPs in enhancing their role performance, help other stakeholders in understanding role expectations of DPs and TSC and Ministry of Education (MoE) on policy formulation.

Keywords: Deputy principal Roles, Teacher appraisal, Teacher performance
Multiplex Real-Time PCR to Identify Sepsis Microbes and Selected Antibiotic Resistance Genes in Patients with Acute Febrile Illness

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Abstract
In many rural hospitals, blood culture and drug resistance screening is often not practical. Microbiological culturing is limited in its diagnostic capacity and timeliness. Multiplex Real-time PCR has the potential to rapidly identify causative microbes in sepsis and fill this diagnostic gap. DNA extracted using QIAamp DNA Blood mini Kit from blood samples obtained from 208 patients (111 males and 97 females) with acute febrile illness were analyzed by Multiplex Real-time PCR (Magicplex™ Sepsis Real-time Test) to identify Gram positive bacteria (Staphylococcus spp., Streptococcus spp. and Enterococcus spp.), Gram negative bacteria group A (Pseudomonas aeruginosa, Acinetobacter baumannii, Stenotrophomonas maltophilia; Serratia marcescens, Bacteroides fragilis and Salmonella typhi), Gram negative bacteria group B (Klebsiella pneumoniae, Klebsiella oxytoca, Proteus mirabilis, E.scherichia coli, Enterobacter cloacae and Enterobacter aerogenes), fungi (Candida spp. and Aspergillus fumigatus) and antibiotic resistance genes (mecA, vanA and vanB). Of the 208 patients, 41% had Staphylococcal infections and were considered contaminants thus excluded from analysis. About 31% had other microbes comprising; fungi (25%) and bacteria (82%), all occurring either singly or in combination. Of bacterial infections, Gram negative bacteria were the predominant microbes (57%) comprising of group A (30%), group B (63%) and 7% having co-infection with both groups. Gram positive bacteria encompassed Streptococcus spp. (55%), methicillin resistant staphylococci (21%) with 24% having both. No Enterococcus was detected among the study population. Fifteen individuals had mecA gene while 4 had VanA gene. Sepsis is common among patients admitted with AFI. Multiplex Real-time PCR has the potential to serve as an adjunct to blood culture; adding diagnostic yield, accuracy and shortening the time to pathogen identification. The accurate and rapid identification of BSIs is necessary for early treatment.

Keywords: Multiplex Real-time PCR, Sepsis, Acute febrile illness, Methicillin-resistant Staphylococci.
Bridging the Insurance Gap through Bancassurance

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Abstract

The financial services sector being one of the key pillars in the country's development blueprint, The Kenya Vision 2030, has culminated in a myriad of financial problems that urgently require robust, strategic and innovative solutions through a formidable collaboration between the public and private sector. This research paper's mode of presentation shall be oral and it will specifically highlight how the concept of bancassurance could be amicably adopted to bridge the insurance gap and accelerate insurance penetration which currently stands at 3.03% of the Kenyan GDP. This study which has been conducted through analysis of previous publication letters, news and journal articles, banking and insurance literature, reveals the global history of bancassurance, its benefits and challenges and how it can be incorporated into the Kenyan financial system. This paper therefore, offers players in the both the insurance and banking sector with a well laid out case on how bancassurance could be one of the key approaches towards bridging the insurance gap in Kenya.

Keywords: Bancassurance, Insurance gap, Bridging
Truth and Justice in Kenya: A Critical Perspective

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Abstract
This Paper discusses historical injustices in Kenya and the path to addressing these injustices particularly after the 2007-2008 post election violence, the establishment of the Truth and Justice Reconciliation Commission, its past mandate and whether or not it has met its targets in terms of coming up with findings that will assist in writing wrongs and getting closure for the victims of past and present regimes as well as bringing communities together. It will look at the pitfalls and challenges that bedeviled the commission and how we can build from this, as well as drawing up the essentials of achieving truth, justice and reconciliation by studying the works of highly qualified publicists on transitional justice and the efforts of truth and reconciliation commissions in South Africa, Liberia, Rwanda among others. The paper will conclude by articulating the writers findings on and suggesting ways we can apply the knowledge of human rights law to solve past injustices and achieve truth and reconciliation.
Treatment Compliance among Patients with Hypertension at Kenyatta National Hospital

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Abstract
Cardiovascular diseases (CVD) such as hypertension (HTN) are a leading cause of morbidity and mortality globally. They are gaining momentum in developing countries due to westernization, nutritional transition and lifestyle changes. Successful management of HTN and other CVD are dependent on early diagnosis and initiation of treatment therapy including lifestyle modifications and more importantly compliance to treatment. We sought to elucidate the treatment compliance among patients with hypertension attending Kenyatta National Hospital (KNH). A sample of (N=229) HTN cases who presented at KNH in and out-patient departments were recruited. A structured questionnaire obtained socio-demographic, risk factors for HTN and treatment compliance. Objective measurements notably anthropometrics were measured to elicit physiological status of the participants. Ethical approval was obtained from the KNH/UoN Ethics Committee. Data was abstracted and analyzed using SPSS. A total of 229 hypertensive patients composed of 102 (44.5%) males were recruited with the average age of (52.7 yrs) and (5.8) years of illness, while most (32.9%) patients were 60 years and above. Majority (95.6%) of patients were aware of their hypertensive status while 81 (35.4%) were suffering from other co morbidities mainly diabetes 64 (79%). Majority 219 (95%) of the patients were on pharmacological antihypertensive therapy and 195 (85%) took drugs as prescribed. Compliance with pharmacological therapy, clinic appointment, regular monitoring of blood pressure decreased (p<0.05) proportionally to age. Participants had abnormal anthropometrics, overall, the mean BMI was 29.1, with 93 (40.6%) of the participants being overweight, while 87 (38%) obese respectively. A number of patients still engaged in risk behavior namely, smoking (10.5%), taking alcohol (13.5%), adding salt (55%) and lack of exercise (35.5%). The results underscore the need to develop appropriate strategies to target specific behavioral interventions among clients with hypertension to leverage with pharmacological compliance. Emphasis on the importance of lifestyle modification for control and prevention of risk factors may delay development of complications, improve quality of life and assure longevity. There is need for clinicians to emphasize the importance of non pharmacological intervention compliance in the management of HTN.

Keywords: Treatment compliance, Hypertension, Kenyatta National Hospital
Performance Evaluation of Horizontal Subsurface Flow–Constructed Wetlands for the Treatment of Domestic Wastewater in the Tropics

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Abstract:
The lack of information on constructed-wetland performance in the tropics is among the factors that have hindered the adoption of low-cost wastewater-treatment technologies as alternatives to conventional wastewater treatment. A pilot scale study was undertaken in Juja (Kenya) to assess the performance of horizontal subsurface flow–constructed wetlands (HSSF-CWs) under tropical conditions. Primary domestic wastewater effluent was continuously fed into three replicate wetland cells, each with an area of 22.5 m$^2$ (7.5 × 3 m) and with gravel as substrate. The study revealed successful performance of the wetlands in terms of compliance with local discharge standards with respect to chemical-oxygen demand (COD), BOD$_5$, total suspended solids (TSS), and SO$_4^{2-}$ at an average mass removal efficiency between 58.9 and 74.9%. Moderate removal of NH$_4^+$ and total phosphorus (TP) was recorded. The estimated first-order aerial-rate constant and the BOD$_5$ background concentration showed the HSSF-CW to be area-requirement competitive. The good performance in organic matter and suspended solids removal reveals that HSSF-CW can help to alleviate the current environmental pollution problems experienced in developing countries caused by the discharge of partially treated or untreated domestic wastewater.

Keywords: Waste treatment; Developing countries; Water pollution; Wetlands; Subsurface flow; Tropical regions.
Ameliorating Melarsoprol Toxicity Using Antioxidants Kenyan Purple Tea Anthocyanins and Co-Enzyme-Q\textsubscript{10}: A Mouse Model

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Abstract
Melarsoprol, an organic arsenical is the only drug used to treat CNS stage HAT caused by \textit{Trypanosoma brucei rhodesiense} infection but unfortunately induces a severe post treatment reactive encephalopathy (PTRE) in up to 10% of treated patients, half of whom die from this complication. A mouse model was adapted to assess use of Kenyan purple tea anthocyanins (ACN's) and/or coenzyme-Q\textsubscript{10} (Co-Q\textsubscript{10}) in blocking or nullifying melarsoprol toxicity. Co-Q\textsubscript{10} and tea ACN's were administered orally at a dosage of 200mg/kg body weight after every second day using a gavage needle. After lapse of the ten day period, animals were administered with melarsoprol intraperitoneally at a dosage of 3.6mg/kg body weight for four days and sacrificed 24 hours post the last dosage to obtain brain samples. Results from the present study demonstrate that melarsoprol was apparently toxic at normal intravenous doses of 3.6mg/kg body weight, prominently reducing packed cell volume, aconitase-1 and glutathione levels in the brain of mice. However, oral administration of tea ACN's or Co-Q\textsubscript{10} prevented to a significant degree melarsoprol-induced decrease in packed cell volume and restored aconitase-1 and glutathione levels in the brain of mice, implying boost in brain antioxidant capacity. Notably, ACN's metabolites were detected in brain tissue of ACN fed mice using high performance liquid chromatography. However, co-administration of both antioxidants caused a reduction of these beneficial effects implying a negative interaction. The present study demonstrates a role of reactive oxygen species sensitive aconitase-1 and glutathione in the induction of melarsoprol reactive encephalopathy. Evidence provided in this study implicates melarsoprol with interference of brain antioxidant systems and proposes that therapeutic intervention with Kenyan purple tea ACN's or Co-Q\textsubscript{10} may be useful in improving treatment outcome in late stage human African trypanosomiasis consequently reducing post treatment reactive encephalopathy occurrence.

\textbf{Keywords:} Melarsoprol, Encephalopathy, GSH, Aconitase, Anthocyanins, Coenzyme-Q\textsubscript{10}. 

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Abstract
There was a growing interest among researchers in education on exploring strategic human resource strategies for faculty retention in universities around the world. A survey of the human resource strategies was carried in private universities in Kenya. It was especially conducted as a case of Daystar and Pan Africa Christian universities for the purpose of exploring various human resource strategies geared towards retention of full time faculty in these respective universities. The target population was full time faculty, heads of departments and deans of three departments common to both universities, namely, biblical studies, counseling and business; and the human resource managers. Data was collected using questionnaire, interview guide and document analysis and analyzed using Statistical Package for the Social Sciences (SPSS) and descriptive narratives. Standard research ethics were observed. The findings revealed that strategic human resource managers in both universities had some strategies in place for retention of faculty. The participants, especially deans, heads of departments and lecturers without administrative tasks, proposed ways of improving the existing strategies to enhance faculty retention, challenges they considered to be faced by strategies human resource managers (SHRM) in their efforts to retain faculty and ways to minimize the same. In summary, monetary challenges were more than non-monetary, according to the opinions of participants. The SHRM in both universities take note of expressed dissatisfaction, cited ways of improving retention by facing challenges through their professional expertise and suggestions of research participants. Based on research findings, the researcher concluded that; there were differences of opinions among lecturers, heads of departments, academic deans and human resource managers on the best strategies to be used to retain faculty. Majority participants agreed that heavy workload was a challenge to their capacity to do research and publish. In one university, a dean expressed that heavy administrative duties had challenged research efforts for a long time. It was therefore necessary for the strategic human resource managers to consider hiring additional teaching staff to share extra workload to enable the universities to grow through research, writing and publication. The management needed to provide a climate which would make exchange of views between lecturers and management on the best strategies each university needed to configure in order to retain their valuable faculty.

Keywords: Retention, Strategic human resource strategies, private universities
Determination of Amoebic Dysentery among Paediatric Population Attending Embu Provincial General Hospital

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Abstract
Amoebic dysentery is a disease caused by Entamoeba histolytica through the invasion of the large intestine walls and multiplication in the sub-mucosa, leading to ulceration. The infection is widely distributed world-wide and is commonly acquired by ingestion of contaminated food and water. Kenya, being a developing country has a significant amoebiasis disease burden. We undertook a cross-sectional study to determine the prevalence of amoebic dysentery among pediatric population attending Embu Provincial General Hospital, Kenya. Diagnosis was done by direct wet preparation for the identification of trophozoites and formol ether concentration method for identification of cysts in stool. Informed consent was gotten from parents/guardians prior to participation of children in the study. We found prevalence of 19.6% with higher prevalence in males (71.4%) compared to females (28.6%). A higher prevalence was also found among the age group of 3-4 years. The higher prevalence in male children could be due to their higher affinity to play in the soil (increased oral-faecal exposure) and a lower level of personal hygiene. The higher prevalence among age-group 3-4 yrs could be because they have a tendency to pick things and put in the mouth increasing rate of infection. We state that the infection rate is still relatively significant and proper hygiene measures need to be implemented to curb high incidences. The results of our study could assist the government, non-governmental organizations and community based organizations in the application of strategies in the diagnostic prevention of amoebic dysentery.

Keywords: Amoebic dysentery, Stool analysis, Children, Hygiene
Distribution of Bacterial Skin Contaminants in Blood Cultures of Children Below 6 Years from Various Units at Kenyatta National Hospital

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Abstract
Blood culturing is a diagnostic tool in health centers to detect microbial infections of blood. Contamination is a significant problem during blood culture preparations which is not only costly to patients and the healthcare system, but also impact on results interpretation by clinicians. We undertook a study to determine the contamination of cultures of blood from children under 6 years admitted in various wards at Kenyatta National Hospital. The wards studied were 3A, 3B, 3C, 3D and PFC. Different microorganisms were tested for including Coagulase negative \textit{Staphylococcus}, Diphtheroids and \textit{Micrococcus}. The results indicated that contamination rate of 7.4\% and the most common contaminant was coagulase-negative \textit{Staphylococcus} constituting 76.9\% of contaminants while micrococcus was the least at 15\%. The skin of male children was relatively more contaminated compared to female (with 100\% of the diptheroids 100\% of the micrococcus and 44 \% of the coagulase negative \textit{Staphylococcus}). The percentage attributed to coagulase negative \textit{Staphylococcus} in the respective wards were as follows: 3A (73\%), 3B (82\%), 3C(75.8\%), 3D(80\%) and PFC(69\%). Other microorganisms accounted for the remaining percentages. The observed rate of skin contamination was relatively high compared to previous similar studies in other hospitals. One possible source of this contamination could be improper skin sterilization. Training on aseptic blood collection targeting Phlebotomists and clinicians is therefore necessary. Some of the measures likely to reduce contamination rate include hand washing between patients, use of tincture of iodine and or isopropyl alcohol as antiseptics and strict adherence to standard operating procedures.

\textbf{Keywords}: Blood culture, microbial contaminants, hospital wards
**Antimicrobial Susceptibility Patterns of Coliforms in Beef Sampled From Butcheries in Kiandutu Slum, Thika, Kenya**

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**Abstract**

Coliforms are a major global cause of health problems due to infections. A limited number of species, including *Escherichia coli*, *Klebsiella pneumoniae*, *Enterobacter aerogenes*, *Enterobacter cloacae* and *Serratia marcescens* are responsible for most coliform infections especially in children and immuno-compromised individuals. Their occurrence in beef is an indication of the contamination during slaughtering, transportation or at the retail outlets. We assessed the antimicrobial susceptibility profiles of coliforms isolated from butcheries in Kiandutu, a poor residential neighborhood in Thika town. Typical of most Kenyan butcheries, the butcher-man also multitasks as the cashier. Meat samples were concentrated in peptone water to increase the number of colony forming units. They were then cultured in selective and differential media and finally their antimicrobial susceptibility tested using the Kirby Bauer method. Data was double entered and validated with EpiInfo 2002 (US Centers for Disease Control and Prevention, Atlanta, Georgia, United States). Chi-square (χ²) tests was conducted with STATISTICA 6.0 (StatSoft, Data Analysis Software System, Tulsa, Oklahoma, United States), was used to determine the antimicrobial susceptibility pattern of coliforms in beef with a confidence interval (CI) of 95% (0.05). Lactose fermenter coliforms had the highest distribution (89.95%) while the non-lactose fermenters were in 3.19% of all the beef sampled from butcheries in Kiandutu slum. A higher percentage of coliforms were resistant to all antibiotics used in the study with all the coliforms isolated from beef samples showing 100% resistance to Ampicillin. This study demonstrated that beef contamination with these infectious agents was significant warranting intervention. We recommend that meat should be inspected and be properly cooked before consumption to prevent transfer of food borne diseases.

**Keywords**: Coliforms, Meat products, antimicrobial susceptibility
Distribution of *Mycobacterium Tuberculosis, Cryptococcus Neoformans* and *Cryptosporidium Parvum* in HIV/AIDS Patients Attending Defense Forces Memorial Hospital

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Abstract
Mycobacterium tuberculosis, Cryptococcus neoformans and Cryptosporidium parvum are common opportunistic infections in HIV patients. Among the three, tuberculosis/HIV co-infection is the most frequent mostly among the poor. Cryptococcus and Cryptosporidium in HIV patients is slightly low. The aim of the study was to determine the distribution of these pathogens in a hospital laboratory catering for military. Systematic random sampling was used to collect data analyzed by EpiInfo2002 (US Centers for Disease Control and Prevention, Atlanta, Georgia, United States). Chi-square test was conducted with STATISTICA 6.0 (StatSoft, Data Analysis Software System, Tulsa, Oklahoma, United States), to determine the distribution of Mycobacterium tuberculosis, Cryptococcus neoformans and Cryptosporidium parvum with a confidence interval (CI) of 95% (P<0.05). The study found out that Mycobacterium tuberculosis was the most common opportunistic infection in HIV/AIDS patients with a distribution of 11.7% followed by Cryptosporidium parvum (9.8%) and finally Cryptococcus neoformans (8.8%). The most affected age group was 35-44 years old for Mycobacterium tuberculosis and Cryptosporidium parvum while the most affected age bracket for Cryptococcus neoformans was 25-34 yrs. Males were the most affected than females with all the pathogens.

**Keywords:** HIV/AIDS, Mycobacterium tuberculosis, Cryptococcus neoformans, Cryptosporidium parvum, Co-infection, Prevalence
Determination of Tuberculosis among Patients Attending Huruma National Council of Churches of Kenya (NCCK) Clinic

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Abstract
Tuberculosis is a global epidemic disease (WHO, 1994) with high morbidity and mortality rates. Kenya has a large and rising TB disease burden and is ranked among the twenty-two countries that collectively contribute about 80% of the world's TB cases. The TB case notification rate (CNR) rose from 51 to 326 per 100,000 populations between 1987 and 2009 (WHO, 2011). Occurrence of TB among patients seeking health care in private clinics in Nairobi has not been studied. This study determined the occurrence of tuberculosis among patients seeking health care services at Huruma National Council of Churches of Kenya (NCCK) clinic in Nairobi. All clients above the age of ten who sought health services at the clinic and were referred to the laboratory for TB investigation and consented were included into the study. Specimen collection, analysis and reporting were done according to guidelines from the Division of Leprosy, Tuberculosis and Lung Disease, Kenya. Staining with Ziehl-Neelsen, Carbol Fuchsin Solution staining microscopy was used. The results of microscopy were graded using WHO/IUATLD grading. Chi-square ($\chi^2$) test was used to determine the relationship between tuberculosis and the patient’s age and gender with confidence interval (CI) of 95%. The test found no association between age/TB and gender/TB among patients (p-value <0.05) (Pearson $p=0.335$ and continuity correction of 0.665). The results of this study will help in designing interventional studies for prevention and control of tuberculosis within the community. Implementation of the recommendation of this study will reduce incidence rate of TB and further provide scientific reference for prevention and control of TB based on age and gender.

Keywords: Mycobacterium tuberculosis, tuberculosis, diagnosis, prevalence
Comparative Study of Cerebrospinal Fluid Cell Count Using Manual Method (Neumbauer Chamber) and Automated Sysmex-Xt 4000i at the Aga Khan University Hospital Nairobi

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Abstract
Cerebrospinal fluid (CSF) cell counts have traditionally been performed using manual microscopy technique. This is not only time-consuming but also labour intensive and requires experienced laboratory staff around the clock if CSF analysis is offered on a 24-hr basis. Furthermore, this analytical procedure has a high intra- and inter-operator variability and does not supply any additional information on the predominant cell type. Recently, different automated blood cell counters have been evaluated for CSF cell count. In this cross-sectional study, we compared manual and automated counts of white blood cells from CSF samples from 200 in-patients from the wards at Agha Teaching and Referral Hospital. The methods compared were CSF cell counting with the improved Neubauer chamber (hemocytometer) and the automation employing a comparative work and turn-around time (TAT) determination. Cell counts were performed manually using haemocytometer and then analyzed on the Sysmex xt 4000i. Descriptive statistics and spearman correlation was used for method comparison. The percentage of normal cells counted by automation was 36.5% while the percentage of abnormal cells was 63.5%. The difference was attributed to the background of the automated equipment according to Kleine to Nebe ct, et al. (2010). Although these equipment has a shorter TAT (Turn Around Time) it is oversensitive, because it can even pick bacteria that has been contaminated in the fluid and will be counted as cells. Therefore if the fluid is not clear and colourless it is bound to give abnormal results that would lead to mis-reading to clinicians. Normal cells counted by manual method was 66% while the abnormal cells was 34%. Sysmex 4000i XT Systems need to be improved with respect to counting and differentiation of CSF Cell count otherwise it would give a higher count of more than 5 cells per mm3 which would be regarded as abnormal by the clinician leading to wrong treatment. Until the automated equipment are improved the clinicians / technologists/scientists need to be trained more on how to use the manual method for counting CSF cell count to minimize the error.

Keywords: Cerebrospinal fluid, Neubauer chamber, Sysmex xt 4000i, comparative study
Antioxidant Properties of Selected Kenyan Medicinal Plants Used in the Management of Cancer.

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Abstract
Reactive oxygen species [ROS] cause oxidative damage to the tissues and protection from such damages are provided by endogenous and exogenous antioxidants. The cancer chemopreventive activities of naturally occurring phytocompounds are of great interest. Plant based antioxidants are preferred due to the multiple mechanisms of actions and of the phytochemicals present in them. We have examined antioxidant activities of ten herbal extracts derived from medicinal plants used as folklore medicines in management of cancer. The methanol extracts of the selected plants were evaluated for their free radical scavenging properties using 1,1-diphenyl-2-picryl-hydrazyl (DPPH) free radical. Ascorbic acid was used as a standard. Briefly, high antioxidant activity was observed in the methanol extracts of Albizia coriaria (3.738 µg/ml), Carisa tetramara (3.911 µg/ml), Prunas Africana (4.356 µg/ml) Maytenus senegalensis (5.215 µg/ml) and Terminalia spinosa (5.744 µg/ml). These results suggested that the anticancer activity in these plants may be due to presence of antioxidant principles. This validates their use in folklore management of cancer. We also propose that the phytochemicals present in these plants maybe potential anticancer candidates.

Keywords: Antioxidant, Medicinal plants; Phytochemicals; Radical scavenging, DPPH, Cancer.
Determinants of Farmers’ Participation in Contract Farming in Kenya: Case of Potato Production in Bomet District

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Abstract
It is known that contract farming enhanced crop productivity and income and acted as an incentive for farmers to supply a niche market. Due to lack of sound organized market of potatoes, there was inefficiency in potato production and marketing in the district. To overcome these problems farmers formed organized production and marketing system under contractual arrangement with the buyers. Though most farmers participated in the contract farming some did not thus necessitated the study to find out why they did not participate. Sixty five potato farmers both contracted and non-contracted were randomly selected in Bomet districts to determine factors which influence their participation in contract farming. Descriptive and analytical statistics on farmers’ socioeconomic parameters were used to explain the relevant farmers’ farming characteristics and participation. A binary logit regression was run on socioeconomic and demographic factors to explain farmers’ participation in potato contract farming. The results shown that age variable was negative and significantly (p=0.005) related to contract and implied that the older the farmers, the lesser the probability of participation in contract. Farm sizes in terms of acreage owned and training were related to the likelihood of being a participant in contract farming as shown by positive and significant coefficient (p=0.05) and (p=0.006) respectively. Farmers were initially trained and inducted to contract arrangement as a member of farmers’ group. The odds ratios which correspond to decreases, or increases in odds of participation in contract showed that farmers exposed to training and had adequate farm sizes increased their chance in contract farming participation.

Keywords: Contract farming, determinants of participation, old ratio, Binary logit
Improving the Quality and Increasing Utilization of Integrated Antenatal Care Services & Skilled Deliveries in Matuga-Kwale, Kenya

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Abstract
With the adoption of the Millennium Development Goals (MDG) by Kenyan Government, maternal health indicators were focused on with the aim of reducing maternal mortality rate (MMR) by three quarters by 2015. In 2008 the Global MMR per 100,000 live births was 250, Africa 620, East Africa 500, Kenya 400 to 500 and Matuga district in Kwale County had 590-700 (KDHS 2009). The district 2011 population was 161,053 projected from 2009 census, growth rate being 2.9% p.a. Population of women of child bearing age was 39,619, estimated deliveries 5,959, MMR of 590, 4th Antenatal Care (ANC) visit < 30%, Low maternal Haemoglobin (Hb), deliveries by skilled birth attendants <30% and poor referral systems. Due to the above, the district did a 2 years (2011/2012) project with the goal to improve maternal health. The main objective was: improving the Quality and Increasing Utilization of Integrated ANC Services & Skilled Deliveries. Specific objectives were to improve: quality of ANC services, utilization of skilled institutional childbirth services, strengthen continuity of care and improve community linkages. The study area was Matuga district, study population being health workers in 21 health facilities and sample size 1 to 2 persons per facility. Using the district and facilities data, a situation analysis to develop indicators to measure improvement was done. After trainings coaches and health workers, 21 Quality Improvement Teams (QITs) of 7-12 members were formed. Each QIT did a facility process mapping to identify delays, unnecessary steps and other bottlenecks in the processes of care. Problem identification to come up with the root causes was done, interventions and change ideas developed, implementation and monitoring done to identify improvement. With stakeholders support, periodical learning sessions were done, to share experiences, change ideas and challenges. By August 2012 tremendous results of deliveries by skilled birth attendants increased from 33% to 46 %, 4 ANC visits from 37% to 57%, ANC in first trimester from 7% to 21%, taking blood pressure from 32% to 100%, checking Hb and receiving Haematinics increased to >80 % and > 90% respectively, and referrals from community to health facility from 13 to 75, three new laboratories build and 10 delivery rooms renovated. Even better results achieved as per the harvest meeting and 2012/2013 Annual Work Plan. The project impacted on other Districts like Kilifi in Coast start implementing our outcomes. Matuga now has better health indicators, working areas, motivated health care workers, community participation and health to all clients. The Ministry of Health is now implementing a similar project countrywide through the Kenya Quality Model for Health (KQMH) using the same approach after the evidence of the Matuga project. If rolled out, to other Countries and to the world at large, the project would improve maternal health making MDG 5 a reality.

Keywords: Integrated Antenatal Care, Utilization, Quality, Antenatal
The Inadequacy of the Policy, Legal and Institutional Framework for Oil and Gas Exploration in Kenya: A Land and Resource Tenure Perspective

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Abstract
The main objective of this study is to prove the hypothesis that in Kenya’s quest for oil and gas exploration and production, land and resource tenure issues have been sacrificed at the expense of the commercialization of the said activities. The study thus forms part of the ongoing discourse on the tension between conservation of land and natural resources such as oil and gas and their (commercial) sustainability in the long run. The study was conducted through analysis and synthesis of primary data collected from interviews with industry stakeholders and field visits. The primary data was supported by secondary data gathered from desktop research and library visits. The study findings suggest that land and resource tenure issues must be properly mainstreamed and aligned into the upstream sector of oil and gas exploration and production activities. The urgency of this task, the study argues, is to be found in recent and current oil and natural gas discoveries in Kenya. The study culminates into recommendations for improving the policy, legal and institutional framework for oil and gas exploration in Kenya in order to give fundamental prominence to land and resource tenure.

Keywords: land tenure, resource tenure, oil exploration, oil production, resource sustainability
Yield Performance of Potato Seed Tubers after Long Storage in a Diffuse Light Store (DLS)

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Abstract
An on-farm trial was carried out at KARI (Tigoni) and in Nyandarua County in central Kenyan highlands to determine the yield potential of some common potato cultivars following storage in a diffuse light store (DLS) for eight months. The trial was carried out for two consecutive seasons i.e. March-July 2012 (first season) and October 2012 to February 2013 (second season). Eight potato cultivars commonly grown in Kenya and of different maturity periods were used. In Nyandarua, the experiment was carried out in three farmers’ fields while the KARI Tigoni station was meant for comparison. In each site, the experiment was a split-plot with potato cultivars as main-plot factor and storage as sub-plot factor. There were three replications in each site. Planting of tubers after storage in DLS gave significantly (P≤0.05) more yields than planting freshly harvested tubers. This difference was observed both on the farmers’ fields and at KARI Tigoni research station.

Keywords: Diffuse light store; potato cultivars; on-farm storage
Prevalence and Potential for Aflatoxin Contamination in Groundnuts and Peanut Butter from Farmers and Traders in Nairobi and Nyanza Provinces of Kenya


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Abstract
Most of the peanut butter marketed in Nairobi is processed in cottage industry and its aflatoxin contamination status has not been documented. This study was therefore conducted to determine the status of aflatoxin contamination in groundnuts and peanut butter in Nairobi and Nyanza. Eighty two fresh samples comprising raw and roasted groundnuts and peanut butter were obtained from market outlets and cottage processors in Nairobi and Nyanza regions. The marketers and processors were asked for information on the source of groundnuts. The incidence of Aspergillus section Flavi was determined using standard laboratory methods. Defective nuts in raw groundnuts were determined by manual sorting. Aflatoxin analysis was done using competitive ELISA technique. Groundnuts in Nairobi were imported from Malawi while those Nyanza were grown in the region. The fungal species isolated from the samples were: Aspergillus flavus (L and S strains), A. parasiticus, A. niger, A. tamari, A. alliaceus, A. caeletus and Penicillium spp. The percentage of defective nuts among all unsorted groundnuts ranged from 0.0% to 26.3%. The mean percent defective nuts was higher for Nairobi samples than Nyanza. Aflatoxin levels in all samples ranged from 0 to 2377.1 μg/kg. The mean aflatoxin level was higher for raw samples from Nairobi than Nyanza. The source of groundnuts and defective nuts were positively associated with aflatoxin levels. The source of groundnuts and presence of defective nuts were identified as the main factors influencing increased aflatoxin contamination in the cottage industry. Mechanisms for inspection and certification of imported groundnuts should be put in place accompanied by effective monitoring for compliance to set aflatoxins standards. All the market players should sort their groundnuts before selling or processing in order to reduce aflatoxin contamination of peanut butter.

Keywords: Aflatoxin, cottage industry, groundnut, peanut butter
Effect of Leadership Paradigms on Customer Service Delivery in the Local Public Sector in Kenya

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Abstract
This study examined the effect of transactional and transformational leadership paradigms on customer service delivery in local authorities in the Western region of Kenya. This was based on the recognition of the role played by local authorities namely county, municipal and town councils in offering essential services to citizens at the grassroots level of governance. Using a correlational research design, data was collected from 322 employees of these entities using questionnaires. It was analysed descriptively using frequencies and percentages and inferentially using Pearson’s Product Moment Correlation test. The study found that both transformational and transactional leadership approaches had a positive and significant influence on customer service delivery. However, the transformational leadership approach had a greater effect on customer service delivery than the transactional leadership approach. The study recommends that the successors of the local authorities, that is county governments, should utilize these approaches in managing their operations in order for them to accrue benefits to themselves and the citizens in their jurisdiction.

Keywords: Transactional leadership, Transformational leadership, Customer service delivery
Collection, Characterization and Evaluation of Kenyan Naturalized Dual-Purpose Pumpkin 
(Cucurbita Moschata Duch)

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Abstract
Pumpkin is an emerging important indigenous vegetable in Kenya. However, its potential remains unexploited. This study collected pumpkin germplasm in Nyeri and Kakamega, characterised and evaluated. Bioversity International descriptors were used. Morphological characterisation and evaluation was done on-farm in completely randomized design, replicated three times. Evaluation started 20 days after emergence up to fruit harvesting. Data were subjected to analysis of variance using the SAS program. Means were separated at P=0.05. Accessions (155) were collected with 70 and 85 from Kakamega and Nyeri, respectively. Eight failed to germinate and one died prematurely. Significant variation (P<0.05) resulted among 146 accessions. Fruits ranged from 0.5-19.25 kg/accession; fruit length to width ratio was 0.7-2.1 cm. Morphological variation was great in fruits. Variation of peduncle length and total fruit weight was 5.55 and 145.65, respectively. Sex type was monoecious male and female with most flowers being male. Most male flowers were early compared to female flowers. Only 9 accessions had female flowers appearing early. Fruit shape for 38 accessions was globular; most accessions (42) weight 1.2 kg on average. One accession matured within 91-110 days; fruits for 125 accessions matured after 110 days. Delay in fruit maturity was attributed to the long dry spell. Accessions (99) regenerated after fruit harvest, while 27 accessions had no second fruit cycle. Predominant mature fruit skin colour ranged from green to orange; secondary fruit skin colour from speckled to striped; fruit surface from smooth to warty; and internal flesh colour from white to yellow. Main colour of flesh and flesh colour of outer layer ranged from yellow to pink-red. All accessions had fruit vein tracks and peduncle abscised when overripe. Deep fruit ribbing was only in 40 accessions; 69 accessions had small blossom scars. Kakamega and Nyeri accessions produced 310 and 183.75 kg/plant. The minimum and maximum fruit weight in Kakamega was 0.50 and 19.25 kg, respectively; Nyeri was 0.25 and 8 kg, respectively. The mean fruit weight for Kakamega was 4.8 and Nyeri 2.96 kg. It took more days for Nyeri accessions to mature. Kakamega accessions had more thick-fleshed fruits, more variation in flesh thickness, fruit length to width ratio, total fruit weight, days to first mature fruit and leaf ratio, while Nyeri accessions showed variation in days to first flowering, maturation period, and stem thickness. Green-leafed accessions were susceptible to pests unlike variegated accessions and had early fruits, but most aborted prematurely. Fruit number for green-leafed averaged 1 per accession. There is great variation in pumpkins in Kenya. Cultivars are interbreeding a lot. Conservation of naturalised germplasm needs to be expedited to save it from further distortion and extinction.

Keywords: Genetic erosion, Germplasm conservation, Mother trials, Pumpkin phenotype
Green Supply Chain as a Solution to Environmental Degradation

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Abstract
Today the increasing emphasis of supply chain management in creating the proper ingredients of a successful business strategy and the concept of a Green Supply Chain is gaining interest among operations practitioners as a sustainable and profitable undertaking. Further a Green Supply Chain can be thought of as a supply chain that has integrated environmental thinking into core operations from material sourcing through product design, manufacturing, distribution, delivery, and end-of-life recycling, a complete operations cycle in an organization. This study looks at a literature review of green supply chain and relates the concept to supply chain management and operations management to find a solution to environmental degradation. Further an understanding of theories and models relating to green supply chain application is illustrated. Finally this paper recommends the implementation of Green Supply Chain initiatives beyond a compliance issue but into a means of generating value in many organizations and have now focus not only on cost but also assuring compliance, minimizing risk, maintaining health, and protecting the environment. Further implementations along a company’s supply chain can raise productivity, enhance customer and supplier relations, support innovation, and at the end enable growth and generate efficiencies and reduce entire cost. Therefore as organizations restructure to reduce their company’s environmental footprint, effective supply chains have increasingly become a key area of focus as the final solution to cost through adoption of green supply chain.

Keywords: Supply Chains, Environmental Management, Green Supply Chain Management, Logistics, Production
Getting It Right: Integrating Research, Innovation and Entrepreneurship for Socio-Economic Transformation

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Abstract
Knowledge is a prime mover and an engine that stimulates socio-economic growth of a nation. A nation must deliver in high quality, relevant higher education and strengthen the Science, Technology and Innovation (ST&I) sector in order to attain socio-economic transformation. This requires the right national innovation ecosystem that ensures effective quality interactions between the academia, the industry/enterprise sector and Government, and strengthens linkages and strategic partnerships in ST&I. Such interactions and partnerships enhance the sharing of vital experiences, facilitate the generation of high quality and relevant graduates from current and up-to-date curricula, and enhance innovation and entrepreneurship. An effective national innovation ecosystem combined with status consideration of both the local and global ST&I context, facilitates transformation from a resource-based national economy into a knowledge-based economy. A knowledge-based economy is about survival and sustainability, such that a nation should continuously create new innovative products (goods and services), processes, organizational and marketing methods; develop and acquire new technologies resulting from innovations, and add value to existing products. Therefore, achievement of national socio-economic transformation is dependent on various essential factors and calls for an innovative and entrepreneurial culture as discussed in this paper.

Keywords: Knowledge-based Economy; Science, Technology & Innovation; Socio-economic Transformation
Urbanization and Transportation in Kenya

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Abstract
Kenya’s urban development and expansion has consistently been growing at a steadfast rate while provision of transport infrastructure at planning stages has always been wanting, as a result, the sprawling urbanization in cities like Nairobi is not easily discernible because of incoherent transport infrastructure development. This paper investigates the relationship between urbanization and transportation, with an aim to establish how a knowledge economy can shape urbanization and transportation in developing countries with particular emphasis on Kenya. Key objectives that guided the study include: To assess the existing challenges and opportunities of the transportation system in Kenya, to understand the urbanization process that has been shaped by transport corridors and to propose feasible recommendations within the transport sector that can guide sustainable urbanization in Kenya. Study is structured as follows: Introduction and background to study, research methodology and literature review, research findings and situational analysis and concluded with strategic recommendations. The study singles out case studies in Copenhagen and Amsterdam as cities of best practice to establish benchmarking concepts for the development of sustainable urbanization and transportation framework in both urban and upcoming rural centers. Also through empirical studies, it was established that efficient transportation has a direct impact on the sustainable growth of cities and towns. It hypothesizes that through extensive research and innovation, the understanding of the concept of urbanization and transportation can aid in the establishment of a foundation for a knowledgeable nation to help inform policy and decision-making in developing countries and also foster greater and improved regional linkages. True to this hypothesis, the study revealed that future urbanization policy should be formulated with full consideration of transportation both in the public and private sector. This will enhance lucrative infrastructural investment opportunities as well as create competitive urban economies for centuries to come.
Resource Leakage, Availability and Segregation of Duties in Accounting Departments of Secondary Schools: A Case of Nakuru County

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Abstract
One of the basic requirements in dealing with financial resources is that those who deal with the resources should have their actions checked and counter checked to avoid any miss-allocation of resources. To achieve this, there must be proper record keeping and segregation of duties. This research being a part of a wider research in financial accounting in secondary schools was aimed at: identifying the level of segregation of duties in secondary school accounting, identifying the specific duties and who accomplishes them, identifying the current status of the segregation of duties and establish the possibility of leakage of financial resources. The major aim of this research is to recommend a practical way of segregating duties in the accounting departments of secondary schools. To accomplish the above task, the research identified all the secondary schools in Nakuru County both private and public as the population of the study and sampled 33 schools. A questionnaire was administered by the researcher to the sampled school’s accounting department. The results were analyzed to establish the level of segregation exercised by the sampled schools. The major findings include, most of the functions are performed by either the principal or the school bursar, level of leakage of resources was high and schools had no definite methods of prioritizing procurements. The explanation by many was that there were no enough personnel over which to distribute the functions. This state of affairs is attributable to the reluctant manner in which principals involve other persons in financial matters of the school. In the research it was observed that principals and their bursars had mutual friendship. Some sampled schools refused to answer the questionnaires arguing that the information sort after was confidential and could not be divulged to the researcher. These findings point to a need to review the segregation of duties in accounting department and in order to overcome the bottleneck of lack of personnel, it is suggested that principal’s secretary, deputy principals, heads of departments be involved in the management of financial resources and to employ a purchasing officer in order to remove the over-dependence on the principal and the bursar.

Keywords: segregation, Leakage and resources
Interference Alignment Vs Blind Interference Alignment: Diversity and Multiplexing Gain in a 4G Cellular Network

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Abstract
Incorporation of multi-input multi-output orthogonal frequency division multiplexing (MIMO-OFDM) and universal frequency reuse in fourth generation cellular network standards has brought with it increased interference. One of the promising methods for interference mitigation is Interference Alignment (IA). IA is being considered for inclusion as one of the driving technologies for the fourth generation wireless networks. It promises increased capacity in the presence of interference yet requires much by way of channel state information at the transmitter (CSIT). Blind interference alignment (BIA) promises improved capacity under some conditions with no requirement for CSIT. This work compares, through simulation, the diversity (in terms of bit error rate (BER)) and capacity (in terms of bits/sec/Hz) performance of IA and BIA in similar environments of a fourth generation cellular network. Multiple users at the cell edge are considered and scheduling incorporated. Simulations are done using MATLAB®. In conclusion, this work presents the trade-offs between linear-IA precoding and staggered antenna based BIA in a fourth generation cellular network in a potential deployment for link level simulation.

Keywords: Interference Alignment, Blind Interference Alignment, Channel State Information at the Transmitter
Port Governance and Rule of Law in Kenya and Nigeria

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Abstract
Ports constitute important links in international trade, not only for domestic economies of coastal states but also for the economies of the littoral states economic partners, especially landlocked neighboring countries. It goes without saying that a good port governance system is quite critical for the economies of Kenya and Nigeria. In this respect, as in issues of good governance generally, rule of law is a sine qua non. Although much research has been carried out about various port governance models, this paper argues, from the point of view of relevant laws, that while a particular model may be the best in particular circumstances, rule of law is the most important driver of a functional, efficient and good port governance model.

Keywords: Seaport, Port governance, Rule of law, Kenya, Nigeria.
Influence of Intellectual and Cultural Environments on Students’ Conceptualization of ‘Heat’ in Physics Education: a Case of Nyandarua District, Kenya

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Abstract ‘Heat’ forms an important part of the science curriculum at all levels in the education system. Poor performance on questions involving heat in examinations suggests that students have difficulties in conceptualizing heat and could have ideas that are incompatible with the accepted physical theories. This study investigated the kinds of ideas that students use to explain heat and its associated physical phenomena and sought to establish whether students conceptions about heat are influenced by their level of intellectual development and cultural beliefs. Data was collected from 269 Form one and 225 Form three students in 15 randomly selected schools in Nyandarua district. Cross-sectional survey research design was used. The research instruments comprised two questionnaires, one to solicit students’ ideas on the physical phenomena associated with heat and the other to assess influence of cultural beliefs on students’ conceptions of heat. Their reliability coefficients were above the 0.7 recommended for social sciences research. Students’ conceptions were categorized in terms of the prevailing theories of heat namely caloric, pre-kinetic and kinetic. Chi-square tests of analysis indicated that the distribution of conceptions was dependent upon the students’ level of intellectual development. Further the study found that a particular metaphor concerning heat exists in the conceptions of secondary students of kikuyu ethnic community in Nyandarua district. The study recommends that students’ alternative conceptions be addressed. Further, kinetic theory of matter be introduced at primary school level and the aspects of indigenous culture that complement the accepted science theories be included in the curricula of schools.

Keywords: Heat conceptions, Heat misconceptions, Intellectual environment, cultural environment, kinetic theory of matter.
**DDT Usage in Kenya: A Public Health Magic but an Environmental Pollution Nuisance**

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**Abstract**
The use of dichlorodiphenyltrichloroethane (DDT) and its metabolites for public health activities in Kenya, to control tropical diseases especially malaria has gained momentum in the last 10 years. This corresponds to a decrease in malaria infestations and an increase in its levels in the environment ecosystems as evidenced by this report. This paper presents a report of a project which aimed at determining the presence of DDT and its metabolites in water, sediments and grass samples in Kimondi, River Nzoia and River Nyando wetland ecosystems and analyzing the social-economic impact of the presence and levels of DDT in wetland ecosystems in the local communities. The analysis of such samples by Gas Chromatography/Mass Spectrometer indicated the presence of DDT and its metabolites in water, sediments and grass materials with levels ranging from 31 to 200 ppm in water, 68 to 482 ppm in sediments and 62 to 186 ppm in grass materials in the three sampled wetland ecosystems. This is an indication that the usage of DDT and its metabolites for public health activities is not restricted (as per WHO regulations) to indoor spraying but also is being used for outdoor activities as issue which is an environmental catastrophe in the making. The public health impact of its usage, without any doubt, has yielded much anticipated results of lowering malaria infestation, improving family and social lives of communities, reducing poverty index and improving country’s economy although its bioaccumulation to the environment may cause other serious human and environmental negative conditions as DDT is cited to be toxic and persistence to the environment. Thus there is a need to strike a balance between its use in public health and its environmental impact and hence initiating a good and sustainable environmental management plan of its use is long overdue.

**Keywords:** DDT, Wetlands, Malaria, Public Health, Environment.
Web-Based Land Information Management System: Case Study of Nairobi City Council

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Abstract
Reliable land information is crucial for planning and development of any country. There are various challenges that hinder proper management of land information especially in developing countries. In Kenya rapid pace of development, coupled with high growth rates brings with it heavy burdens on land management. This problem is also aggravated by high population growth increasing the demand of limited land resources. Hence it is imperative that Kenya needs an effective Land Information System to plan the utilization of its land resources for development. Currently land information in Kenya is managed by various organizations which include the Ministry of Lands, survey of Kenya (SOK), city councils and county councils. This means there is no centralized land management system. This leads to lack of standardized method of capturing, recording, and maintaining land-related data. This results to duplication of data across these organizations and also departments within individual organizations. This structure also hinders easy access to consistent, accurate, up-to-date land information in a cost-effective manner. The current labor-intensive manual processes used to collect, store and maintain this information contain a greater risk for human error. The study main goal was to develop a web-based land information management system with an aim of providing a proper land information collection, storage and dissemination platform for the Nairobi City Council. The proposed system is composed of three subcomponents: a single database, web-based mapping component and a website. The database provided is centralized, mapping component provides tools for data updating and visualization while the website hosts the mapping component and also provides additional information related to land management. To develop the system stable Geographical Information Systems (GIS) softwares and other Open Source softwares were used that included Quantum GIS and Mapserver for windows (MS4W). The system contained information on parcel ownership, land use, taxation, location boundary, land value, encumbrance and many more. The system offered a solution to management of land information, by providing one shared integrated system hence reducing duplication and lowering maintenance cost. The system also offers a streamlined flow of land information with the Nairobi city council ensuring there is well structured process of collecting, storing and disseminating of this information. Adoption of the system will ensures we leverage advancement in GIS technology in management of our various resources.

Keywords: GIS, Land information, Nairobi city council, Open Source, Web-based
Determination of Anti-Fertility Activity, Phytochemical Profile and Physiological Effect of Selected Medicinal Plant Extracts in Mice

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Abstract

Medicinal plants are reported in folklore to play a role as contraceptives. These claims and/or the mechanisms of action have not been demonstrated scientifically. Very few studies have been carried out to confirm the safety and efficacy of medicinal plants used as anti-fertility agents. To establish anti-fertility activity of total extracts from Terminalia brownii, Ximenia americana, Bridelia micrantha, Lippia kituensis, Rhoicissus revoilii, and Ocimum masaiense, and then test the bioactive extracts for safety, their effect on the weight of ovaries and uterus, and their effect on the estrous cycle. Extraction was done using water and organic solvents. The extracts were then administered to mice at a dose of 800 mg/kg. Acute toxicity was tested by administering a dose of 0 to 5000mg/kg orally. From the study, the extract of the leaves of Bridelia micrantha and Ximenia americana showed reversible anti-fertility effect. The stem bark of Terminalia brownii had an irreversible anti-fertility effect at a dose of 800mg/kg when administered orally. The study on the effect of the active extracts on the estrus cycle exhibited an arrest of the normal estrus cycle at either the diestrus or the proestrous phase. The presence of compounds such as steroids, terpenoids, alkaloids, saponins and flavonoids found in the bioactive extracts may have contributed to the anti-fertility activity. The bioactive extracts had no significant effects on the weight of both the ovaries and the uterus and no severe signs of toxicity at the highest concentration tested (5000 mg/kg) were observed except Ximenia americana leaves. The study provided medicinal plant extracts that have potential to be developed into an alternative drug for birth control.
Trends in Consultation and Public Participation within Environmental Impact Assessment in Kenya

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Abstract
The objective of this study was to document trends in public participation within EIA in Kenya, using a Consultation and Public Participation Index (CPPI) developed for the analysis of EIA Study Reports submitted to the Environment Authority between 2002 and 2010. Results indicated that public participation remained relatively low, with the highest score of 1.65 in 2010, out of a possible score of 5. Scores for individual dimensions within the index fluctuated during the study period, with participation methods and type of participants scoring the highest, following increased emphasis by the Environment Authority on the conducting and reporting of public participation. This was followed by venue, notification and language used, in that order, which were often times not reported, and when reported, choices per dimension were limited. This is the first time this Index has been used yet serves as a good starting point to evaluate public participation within EIA.

Keywords: Consultation and Public Participation Index (CPPI); Environmental Impact Assessment (EIA); Kenya; public participation

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Abstract
The Constitution of Kenya promulgated in 2010 set high standards for those seeking state office. Chapter 6 of the Constitution (on Leadership and Integrity), setting the guiding principles of leadership and integrity, demanded that state officers be selected on the basis of personal integrity, competence and suitability; be selected in free and fair elections; and through a method that is objective, impartial, honest, and accountable; and one that is free of nepotism, favoritism or corrupt means. The Constitution further created a number of Commissions to ensure that the above was achieved including: the Ethics and Anticorruption Commission (EACC), the Commission on Administrative Justice (CAJ), the Independent Electoral and Boundaries Commission (IEBC), the National Cohesion and Integration Commission (NCIC), as well as a reformed and restructured judiciary. These Commissions, supported by other Acts of parliament and the judiciary were to ensure that men and women of integrity and with the right leadership qualities were elected in the March 2013 general elections. However, no credible vetting of nominees was undertaken; the process was haphazard and uncoordinated; while the vetting institutions were at loggerhead with each other. This paper examines the factors that explain this inability or unwillingness of vetting institutions to vet those who contested the March 2013 elections. Through interviews with Commissioners and senior government officials and members of the civil society, the paper identifies six such factors: multiple understanding of leadership and integrity; legislations that are either missing or do not meet the Constitutional threshold; inefficiencies within the Office of the Registrar of Political Parties (ORPP); poor and inadequate political party structures; and, government actions that compromised Chapter 6. The paper also offers recommendations on how vetting of public officers can be done to ensure adherence to Chapter 6.

Keywords: Leadership: Integrity: Chapter 6: the Constitution of Kenya: General Elections
Kenya-China Co-Operation in the Textile and Clothing Industry through Silk Production and the Resultant Socio-Economic Empowerment of Kenyans

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Abstract
The global textile and clothing (T&C) industry is diverse and heterogeneous. The industry is involved in the cultivation of fibres, production of yarns, fabrics and varied products such as apparel, bed-linen, geo-textiles and industrial filters among others. In Kenya, the T&C industry has operated in a liberalized economy since the 1980s and constitutes an important component of the manufacturing sector. The industry has continually faced several problems such as obsolete technology and the influx of cheap second-hand clothing. The result is the closure of key firms such as KICOMI and EPZs leading to high unemployment, poverty and crime rates. Kenya’s rural population is poor due to aridity, flooding and persistent cattle rustling and banditry. The population needs sustainable sources of income. The objective of this study is to interrogate the potential of silk production in providing socio-economic empowerment to Kenyans. This study is guided by Michael E Porter’s Competitive Advantage Theory (1990). The research design is literature reviews. Sericulture requires simple technology and extensive labour. Globally, China’s T&C exports topped at US$206 billion in 2010, occasioned by the firms enjoying economies of scale; advanced technology at low capital investment; resource development to ensure high quality and; water and energy conservation technology among others. China is renowned for extensive knowledge in sericulture and silk production. Kenya has an abundant supply of educated, skilled and inexpensive labour for the T&C industry. The Kenya government offers incentives for direct foreign investment include permission to repatriate unlimited earnings, no controls on foreign exchange transactions and speedy processing of work and business permits. The Kenya-China co-operation would transform the on-going small-scale sericulture to large-scale that would offer a steady supply of silk yarns to the industry and products to diverse consumers. The effort shall lead to Kenyan’s socio-economic empowerment and attainment of Kenya’s Vision 2030.

Keywords: Globalization; Sericulture; Silk; Socio-economic empowerment; Vision 2030
Effect of Incorporating Lablab Residues on Bean Root Rot and Chafer Grub

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Abstract

Lablab is a valuable green manure crop used to maintain soil fertility, especially for smallholder farmers who may not afford inorganic fertilizers. However, the effect of the residues on the severity of soil-borne pathogens is not well understood. This study was carried out to investigate the effect of different lablab residue management methods on bean root rot and chafer. Lablab crop was established during the 2011 short rains followed by planting of beans with lablab residues incorporated on same plot during the subsequent long rain season in 2012. Lablab residue management methods were incorporation over the whole plot, residues placed between rows of beans, residues removed plus application of DAP fertilizer and residues removed without fertilizer application. Bean varieties used were KK8, KK15, KK072 (tolerant to root rot) and GLP2 (susceptible to root rot). Data collected included plant change in soil nutrient status, incidence of root rot and chafer grub, severity root rot infection in bean stem bases, biomass at harvest and yield. Incorporation of lablab residues increased total percentage nitrogen and organic carbon. Highest root rot incidences were observed in plots where the lablab residues were cut and removed in low fertility site. Although there were significant differences in Fusarium infection levels among the residue management options, the pattern was not consistent among the bean varieties and experimental sites. All the bean varieties showed high levels of infection in the stem bases but the root tolerant varieties KK15 and KK8 were observed to develop numerous adventitious roots just above the point of infection. Significantly higher incidences of chafer grubs were observed in plots where lablab residues were scattered and incorporated over the whole plot. Highest yields of variety KK15 were observed in plots where lablab residue was incorporated over the whole plot in Kapsengere site. Plots where lablab was removed and DAP fertilizer applied yielded the highest biomass, followed by plots where the biomass was incorporated uniformly over the whole plot. The results indicate that incorporation of lablab residues improved bean crop growth, yields and crop biomass without significant increase in root rot damage. Uniform incorporation of the residues resulted in better crop performance and the beneficial effect was more pronounced in low fertility site. The performance enhancing benefits of the residues is also available to the intercrop maize. This practice would be most appropriate to small holder legume farmers who have inadequate capital to purchase inorganic fertilizers.

Keywords: Lablab purpureus, green manures, root rot, Phaseolus vulgaris, chafer grub

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Abstract
Generally it is acknowledged that ecological organic agriculture (EOA) contributes to socio-economic and ecologically sustainable development. The market for organic products is growing and offers producers and exporters in developing countries opportunities to improve their incomes and living conditions. Training and research institutions play a key role in motivating the uptake of agricultural strategies and technologies to enhance attainment of these outcomes. The curricula of training institutions are key in setting the training and research agenda. But how are the training and research institutions contributing to the growth of EOA in Kenya? To answer this question this study focused on seven major training and research institutions in the country and examined their curricula: Bukura Agricultural College, University of Eastern Africa Baraton, Kenyatta University, Jomo Kenyatta University of Agriculture & Technology, University of Nairobi and Egerton University. The results showed that almost all the institutions have incorporated components of EOA in their curricula. However, none of them had a full study programme on EOA. Across all the institutions there are common course units that embrace EOA and these included: Soil and Water Management; Crop Protection; Soil Fertility and Plant Nutrition; Biodiversity Conservation; Agricultural Biotechnology; Sustainable and Conservation Agriculture; Agro-forestry Principles of Crop Production; Animal Nutrition and Livestock Feeding; Pests and Diseases Control; Pastures and Fodder Crops; Dryland Agriculture and Organic Farming. However, concise principles of EOA were not clearly spelt out in the course descriptions. Equally the values guiding the inclusion of EOA were not clear. Based on these findings the study recommends sensitization and awareness creation campaigns to give EOA prominence in training curricula; establishing EOA emphasis in curricula training; determining extent of capacity development at different training levels; and documenting status of demand of EOA.

Keywords: Curricula, Ecological Organic Agriculture, Sustainable Agricultural Development
Mapping Antecedents and Obstacles of E-Banking Adoption: An Indo-Kenyan Bankers’ Perspective

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Abstract
The banking sector across the globe is embracing e-banking technologies and using as a part of business strategy for expansion, revenue increase, extension of customer network and creating perfect competition among financial service institutions. The current paper is an effort to investigate bankers’ perceived need, methods they use to motivate customers and perceived challenges of e-banking adoption. The data for this study was obtained from a survey which was conducted in India and Kenya in the fourth quarter of 2006 and in the first three quarters of 2007. When comparing the two countries, it was inferred that, Indian and Kenyan bankers’ considered e-banking adoption as a very important step to be taken currently. Further analysis indicated that the high adoption cost, lack of proper infrastructure in banks, privacy issues and fear of rapid rise in e-crimes were the most significant at 5% level indicating that this factors were mostly affecting the growth and adoption of e-banking.

Keywords: E-Banking, Technology, E-Channels, Internet Banking, Electronic Banking
An Investigation of Dimensional Strategy in Religious Research on Christian Commitment in Selected High Schools, University and Churches in Kenya

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Abstract
With the contemporary increase in religious diversity and postmodern spiritualities around the world, there was a growing interest among researchers in religion to investigate dimensional strategies as viable approach to investigate various aspects of Christian commitment to God and fellow man. The study was conducted as a case of selected schools, churches and Mount Kenya University using descriptive survey design. The specific schools were Ndaragwa Girls Secondary, Kigumo Mixed Secondary, Kirwuara Boys Highschool in Muranga and Mount Kenya University, Thika Campus. Churches surveyed were Covenant Revival Altar, Greenhouse Church and Deliverance Church Kimbo. The target population was secondary school, university students and churches. Specifically the participants were Christian students with no leadership position, student leaders, Christian religious education teachers, Church leaders and pastors. Data was collected using questionnaire and interview guide, both of which were semi-structured. Data analysis was done using Statistical Package for the Social Sciences (SPSS) and descriptive narratives. Standard research ethics were observed. The findings revealed that there was a wide range of correlation values between groups of participants and within members of the same group concerning various aspects of Christian commitments and missing variables in Glock's dimensional model as a viable strategy for conducting religious research. In summary, Biblical beliefs held by participants (orthocardia) scored higher on the likert scale than their corresponding Christian practices (orthopraxy) according to the opinions of participants. The leaders across the board expressed stronger beliefs in all the institutions surveyed as compared with their members. Church and student leaders indentified challenges in fulfilling their devotional and ministerial commitments, suggested ways of overcoming them and made recommendations for continuous improvement.

Keywords: Dimensional Strategy, Religious Research, Christian Commitment
Factors Leading to High Turnover of Househelps (A Case Study of Shaabab Estate in Nakuru Town)

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Abstract
The modern woman is usually overburdened with a myriad of activities; from raising children, managing her career / business, attending college (evening classes) whilst attending to the needs of her marriage. The easiest way out of this routine is by getting some sort of domestic help. Domestic helps could come in form of housemaids, laundry person, cook, driver, gardener, housekeeper or nanny; however, many homes prefer the services of housemaids who live with the family, do most of the household chores and care for the children, sometimes juggling various duties including washing, cleaning, cooking and baby-sitting. At least 3/5 homes have house helps meaning it has one of the largest number on employees. In contrast it is also one of the jobs where job turnover is also very high. House help turnover may have a negative impact on the children under care, employer performance and also disrupt daily running of the house. Negative effects include recruitment cost, induction cost; time spent looking for the replacement, increased work load to the employer among others. This study was carried in Shaabab Estate, Nakuru and investigated the factors that lead to high turnover of house helps. Objectives of the study were to find out whether terms and conditions of work of house helps lead to high turnover of house helps. The study also established whether discrimination by the employers led to high turnover of house helps. The relationship between job security and high turnover of house helps was examined as well as the effect of working conditions. One of the major limitations that the study faced was that some respondents feared that participating in the study would result to their dismissal and as such they were not willing to give any information.

Keywords: Turnover, househelp
Edible insects as a Novel Ingredient for Nutrient Dense Food Products

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Abstract
Edible insects such as winged termites, ants, grasshoppers and locusts are some of the insects that are an integral part of the diet in Western region of Kenya depending on seasonal availability. They are able to survive in virtually all habitats ranging from dry lands to wetlands. They are harvested in the wild and traditionally consumed as a snack: raw, fried or sun-dried. Our studies since 2007, have found that termites, grasshoppers and locusts are nutritionally superior to some animal source foods e.g. beef. Winged termites had a fat content of 44.8 – 47.3 g/100g, protein 33.5 - 39.7 g/100g, available carbohydrate 0.7 - 8.7 g /100g, iron 53.3 - 115.9 mg/100g and zinc 7.1 -12.8 mg/100g. The level of unsaturated fatty acids was 50.54 – 67.83 %, while n-6:n-3 ratio ranges between 5.80:1.00 to 57.70:1.00 signifying potential nutritional and public health significance. Long-horned grasshoppers had a protein content of 37.1 - 35.3 g/100g, fat content of 48.2 - 46.2 g/100g, iron 16.6 - 13.0 mg/100g and zinc 17.3 mg/100g - 12.4 mg/100g. Termites have so far been used as ingredients in development of cakes, buns, starter soups, complementary foods among others. A complementary food that’s contains termites is currently undergoing a randomized controlled efficacy trial in Western Kenya after a successful consumer acceptance trial among children and their parents/guardians. Since our focus has so far been on wild harvesting, there is need to explore commercial production as a sort of livestock (mini-livestock) especially in dry lands and expanded utilization.

Keywords: : Entomophagy, New Products Development, Human Nutrition, Nutrient Density
Development in Institutions of Higher Learning: A technological Impact

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Abstract
This paper explores how the world is a midst technological advancement since the industrial revolution. It has moved from chemical to electronic processes, industrial to a learning age, manual to automated labour and analogue to digital. Whereas technological revolution is proceeding with a high speed, University professors can now efficiently organize and develop their own materials for each course they teach. Virtually all publications should be written, typeset and electronically distributed. The technological breakthrough in Education which started in the early 1980s struggled in development but continues to compete with digital video interactive developments of blue chip companies like Intel. This has created a user friendly technological and educational development. This paper establishes that there are striking similarities between technological advances made in both the 20\textsuperscript{th} and 21\textsuperscript{st} centuries. These advances have offered Universities many new possibilities though with new challenges. These rapid technological advances in higher education are pushing for learning institutions into searching for synergy for systems and library disciplines. The study concludes that Universities will be giving much attention towards creating knowledgeable students by preparing them to fit in the labour market.

Keywords: Technology, Knowledge, Institutions, Students, Electronic
An integrated model to analyze stakeholders' adoption of innovative products and technologies in the food sector: The case of iodine biofortification

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Abstract
Stakeholders, consumers and producers, in the food supply chain still face technical, economic, social, cultural and traditional obstacles to successfully adopt innovative products and technologies. This is often due to a lack of knowledge on stakeholders reactions towards these innovations. As such, many market failures lack a stakeholder driven approach. The current paper builds upon existing behavioral theories of protection motivation theory (PMT) and technology acceptance model (TAM) to develop an integrated model for analyzing stakeholder perceptions in the healthy food supply chain. The resulting combined PMTam model has two pillars for analyzing consumption and production oriented components of the chain. Therefore, it provides a broader understanding of the uptake of novel applications and technologies in the food supply chain, such as GM food, biofortified food, novel food, and healthy food.

Keywords: Healthy Food Chain, Protection Motivation Theory (PMT), Technology Acceptance Model (TAM), Biofortification
Causes, Effects, Prevalence Rates and Coping Mechanisms of Abuse among Primary School Children in Nakuru County

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Abstract
Child abuse is witnessed globally. Child abuse refers to sexual, psychological, emotional and physical abuse of children. Child neglect is also referred to as child abuse. Despite the fact that research on child abuse has been carried out by a number of researchers and recommendations given, many children are abused almost on a daily basis. It is for this reason that the researchers carried out a study undertakes to protect the child from all forms of abuse and further obliges the concerned authorities to the children. The study was carried out in Nakuru county and involved a sample of 200 respondents data. The objectives of the study were to find out the forms, causes prevalence rate, effects and the coping mechanism of child abuse. The study found out that child abuse cases are rampant in Nakuru county and the causes were; poverty, wars and conflicts, harsh environments, marital strife, stepparents. The effects of abuse are; death, depression, suicidal tendencies, anxiety, post dysfunction, chronic head, abdominal, pelvis or muscular pain with no identifiable reason. The coping mechanisms are, counseling, child care centres, government intervention, children’s home, adaption, child welfare services which have the authority to remove abused children from home and make placement in foster care systems. The study recommends that children should be protected from the various forms of abuse, stiff penalties should be imposed on child abusers, counseling to be done on abused children by trained counselors, placement of children in conducive environments.

Keywords: Abuse, Data, Globally, Neglect
Data Collection and Communication in the Extensive Livestock Areas of Kenya

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Abstract
Two way communications, a key component in the effective delivery of veterinary services to livestock to livestock keepers, is challenged in extensive pastoralist livestock production systems. The vast areas to cover, the necessarily mobile nature of the livestock keeping system, constantly moving in search of grazing and water, and the limited outreach of veterinary services providers militate against conventional data collection methods. Mobile communication devices, of which pastoralists were notably early adopters, can provide a ready solution to overcoming the shortfalls of static data collection in extensive livestock production systems. If fully exploited, mobile communication devices can provide data that is accurate, current and relevant to an action oriented veterinary services. Concurrently, messages and information briefs, in response to the received data, can be simultaneously fed back to the critical points along the livestock value chain, most importantly to the livestock producers themselves. The surveillance tools used for data collection have evolved from paper and pen through typewriters and calculators to the current mix of desk top computers and mobile devices. Through out this transition, the accuracy and timelines of the data collected has remained a core requirement for ensuring the quality of the reports generated. This paper is based on the experiences of a pilot trial in the integrated use of mobile services in data collection, transmission, storage and analysis tailored to the extensive livestock production systems of Kenya. The objective of the pilot trial was to evaluate the use of mobile technologies in addressing the communication challenges in extensive livestock production systems. It describes the steps taken in setting up the tools and platform for data collection by field operator’s database creation and the generation of reports for the stakeholders. If fully exploited, mobile communications devices can provide data that is accurate, current and relevant to an action oriented veterinary service.

Keywords: Mobile Devices, Data, Livestock Production.
Granger Causality and Error Correction Models in Economics: A Simulation Study

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Abstract

Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model are usually used to analyze time series data with volatility clustering which is a feature of economic data over time. In this paper, the suitability of Granger Casuality Model (GCM) and Error Correction Model (ECM) in analyzing such time series is analyzed and accordingly, two series of data is stimulated using the GARCH(1,1) model which are used for the analysis. The choice of the simulation model is based on its ability to capture volatility and heteroskedasticity. GCM and ECM models’ parameter are investigated for adequacy. Results from Augmented Dickey Fullerr (ADF), Phillips Perron (PP) and Kwiatkowski Phillips Schmidt Shin (KPSS) tests indicate stationarity in the data as expected. GCM is built to demonstrate all the long term relationships. A linear ECM is also fitted and there is evidence that a short-term relationship exists between these two series. A high threshold value exists at the second lag, an indication of simple smoothing in the data. The residual deviance was greater than the degrees of freedom asserting that the model perfectly fit the data, supported by high $R^2$ value of 0.871. Residuals from the fitted linear model are also stationary. The study concludes that ECMs and GCMs are appropriate in analyzing time series. It is recommended that a similar study be undertaken but with a combination of Autoregressive Moving Average (ARMA) process and GARCH models. Further study should also be conducted on tail clustering analysis.

Keywords: Granger Casuality, Error Correction Model, Economics
Information Management for Improved Government Decisions in Tanzania

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Abstract
The article presents the results from the study conducted in the Kinondoni Municipal Council (KMC) in the city of Dar es Salaam in Tanzania. There are three interlinked objectives that were attached to the study: first, to identify the structure of information management that is in place within the municipality; second, the investigation identified the use of the captured or tamed information such as reports by the municipality; finally it identifies the roles of internal stakeholders (users) in the delivery of public service. To attain these three goals/ objectives, the research design was created and data were captured through desk reviews and field work in the municipality. A sample of 60 respondents was selected, some of them purposively and while others were randomly selected. The findings show that information structure, form and format play the key role in the use and behaviors or activities of users of information in making decisions for improved delivery of public services in Tanzania. The way information management is structured attracts the quality retrieval and use of such information by the users during planning, decision making and general management within the respective section of the public service.

Keywords: Information management and decisions in Tanzania
Devolution Prospects: Promoting Affirmative Or Negating Economic Development in Kenya

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Abstract
Devolution governance is not a new phenomenon in Kenya, since its characteristics can be traced back to the 1960’s Majimbo system of governance as highlighted in the 1965’s Sessional Paper No. 10. This leadership is motivated by democratic political concerns and regional group pressures on issues to do with unequal resource distribution. Its viability and sustainability remains ambiguous particularly, its ultimate effect on Kenyan economy. Considering that Kenyan devolution is rooted at the Local Authorities (LA) and constitutionally mandated by LA Act Cap 265, this research surveys and explores funds affiliated with fiscal devolution and their ultimate effect on economic development. These include LATF, RMF, CDF, CEBF, FPE and REPLF. Using questionnaires on the two frameworks that pillar devolution: DFRD and SRDP, this research is possible. Key focus is on aspects of efficiency, redistribution, stabilization and assignments, which are stable and explicit. The study establishes that policy and legal frameworks towards fiscal devolution involve Kenyan citizens in decision-making. However, this approach is flimsy since it does not precedence formal and substantial citizen engagement in all decision-making levels. Underlying challenges in implementing and operationalising fiscal devolution too are evident. With this form of leadership however, livelihoods, transport infrastructure, health, education and sanitation have significantly improved. The Kenyan devolution system needs optimization to mitigate its underlying challenges that discourage economic development. This is feasible by applying best leadership practices such as consistent policy evaluation and scrutiny, independent sub-national units and fiscal devolution frameworks, which are comprehensive.

Keywords: Devolution, Fiscal decentralization, Expenditure
Classification of Pfemp1 Dbla Sequence Tags from Clinical Isolates from Two Malaria Endemic Sites Based On Cysteine Residues

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Abstract
Malaria, caused by Plasmodium falciparum, remains the major cause of childhood morbidity and mortality in sub-Saharan Africa. PfEMP1 protein, coded for by a family of about variant var genes is a parasite protein found on infected erythrocyte membrane. PfEMP1 protein mediates cytoadherence of infected erythrocytes on endothelial cells leading to severe symptoms of malaria. The DBLα domain in var genes is relatively conserved. Although PCR amplification of the whole gene is difficult due to high variability, primers targeting this domain have been designed and used to study pfemp1 genes. DNA extracted from field isolates collected from Mbita (Western Kenya) and Tiwi (Coastal region) was used for DNA extraction and amplification of DBLα domain of pfemp1. Cleaned PCR products were sequenced by 454 sequencing (Roche) at ILRI, Nairobi. Sequence tags were then aligned in Mega 5.2 and classified based on the number of cysteine residues present in the sequence. Six sequence groups were found in sequences from both endemic sites. Group 4 sequences were the most prevalent. Sequence tags from Tiwi had a higher proportion of cys2 (group 1 and 2) than sequences from Mbita although individual group 2 sequence tags were slightly higher in Mbita tags. Similarly the proportion of groups 5 and 6 sequence tags was higher in Tiwi sequence tags than those from Mbita. Group 1 sequence tags have been correlated to expression of group A var genes whose expression has been associated to severe symptoms of malaria and immune naivety of the patient. Their higher proportion in Tiwi sequences from genomic DNA correlates with findings of studies from the coastal region where cerebral malaria and impaired respiratory symptom is common.

Keywords: Malaria, PfEMP1, Cysteine, var genes, 454 sequencing, DBLα
Contribution of Amaranth Grain to Nutrition and Health Status of Adults Living With HIV in Mweiga, Nyeri – Kenya

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Abstract
People living with HIV (PLHIV) are at greater risk of under nutrition and micronutrient deficiencies. Meeting the increased nutrition needs remains a challenge and calls for nutrition interventions like use of nutrient dense amaranth grain. This study assessed the contribution of amaranth grain consumption to nutrition status, morbidity patterns and CD4 count of PLHIV in Mweiga Home-Based Care Group in Nyeri Kenya. The sample comprised of 66 pre-ART PLHIV who were provided with 100 grams of amaranth grain flour daily for porridge preparation for six months. Results noted the mean kilocalorie intake at baseline was below the RDA (3139 ± 365 SD for males and 2479 ± 312 SD for females). With amaranth grain, the mean energy consumption increased to 3549 ± 386 SD and 2892 ± 330 SD for males and females respectively at month one. The proportion of the respondents who met the RDAs for zinc, iron and calcium was over 77% by the sixth month. The mean weight gain was 3.35 ± 0.5 kg. The common illnesses noted were cold, cough, pneumonia, malaria and diarrhea. The proportion of those with illness at baseline reduced significantly at month six (P= 0.031). The mean CD4 count increase was 105 ± 6.3 mm³ from baseline to month six, which was significant (P=0.041). Kilocalories consumed correlated significantly with BMI (r=0.473; P=<0.001). Moreover, there was a significant relationship between CD4 count and BMI (r=0.433; P= < 0.001). Intake of micronutrient had a significant relationship (P<0.05) with presence of illness and CD4 count. Consumption of 100 grams of amaranth enabled the respondents to meet the RDA for energy, protein and selected micronutrients thus leading to the observed increase in weight and reduction in morbidity. This study recommends adoption of amaranth grain by PLHIV for improved health and nutrition status.

Key words: amaranth grain, morbidity pattern, CD4 count, nutrition status, weight gain
Assessment of Factors Influencing Uptake of Skilled Delivery in a Rural District in Kenya

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Abstract
This study was conducted to establish the factors that influence uptake of skilled delivery services, to determine the reasons for home deliveries and to assess neonatal care practices among the mothers in Nyamira District. In a cross-sectional survey, 342 mothers who delivered within one year preceding the study and attending maternal and child health clinics were interviewed using a semi structured questionnaire on their most recent delivery, place of delivery, who conducted the delivery of the current child, neonatal care and feeding practices. Key informants were also interviewed on cultural aspects of childbirth, neonatal care and feeding practices. About 82% of respondents had skilled deliveries. Factors such as maternal education (p=0.004), partner involvement (p=0.000), age of pregnancy during the first ANC visit (p=0.000), time of delivery (p=0.001), onset of labor before the expected date of delivery, were perceived as key determinants of uptake of skilled delivery. Women who lived in spouse/partner-headed households were more likely to have skilled delivery than women in parent/self-headed households OR=2.98, [95% CI 1.60–5.56]. The mothers who had skilled deliveries were more likely to prefer breast milk as first baby food OR=6.23 [95% CI:3.35-11.67]. Babies born in health facilities were more likely to be warmly wrapped within five minutes after delivery compared to those born elsewhere, OR=2.35, [95% CI:1.19-4.53]. To address maternal and neonatal mortality the interventions must include health education of the family members and relatives on the risks of unskilled deliveries and engage the community to address the socio-cultural practices that pose risk to the maternal and neonatal health.

Keywords: skilled delivery, neonatal care, delivery
Challenges Experienced By Primary Schools in Moulding Pupils’ Character

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Abstract
The importance of having responsible citizens in any nation cannot be overemphasized. Character formation is most influenced at a tender age. This is due to youth interactions with peers, non family members and the environment. At such age youth are known to even emulate how elders talk, walk and act. A primary school is the first formal institution that deals with youth. It can therefore affect their character formation positively or negatively. Primary schools replace the home environment in terms of contact time with the youth in a day. Pupils often leave home early and return late. Therefore the main point of focus to influence character formation is at the Primary School. However, challenges are faced by schools due to the diverse backgrounds of many pupils. This study was carried out to establish the influence on character formation of pupils in a day Primary School through peer pressure, parents, teachers, environment at school. The study site was the school. The sample size was 72 out of 240 class eight pupils representing 30% of the study population. The study used descriptive survey system design based on questionnaire. The study focused on the following attributes: class performance, peer influence, social grouping, leadership qualities, behaviour, responsibility and the environment. The results were that though leadership qualities or traits in pupils are nurtured early in life they cannot directly affect academic excellence. However, the environments in which pupils study and do their work significantly affect their character formation, academic excellence and school completion. Findings of this study will assist policy makers in the formulation of policies to deal with the challenges faced by primary schools in molding youth into responsible leaders.

Keywords: Pupils Character, Primary Schools, Youths, Future Leaders
Management of Post-Traumatic Stress Disorder by Use of Children Fiction

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Abstract
Globally, there is an aridity of scholarly interest on studies on exposure of children to extreme violence and management techniques of the same. Post traumatic stress disorder (PTSD) is a condition that affects children and adults who have been exposed to extreme conditions of violence like genocide, war, ethnic clashes, loss of parents due to HIV-Aids pandemic and post election violence. This research paper will present results and findings of a study on alternative methods of management of PTSD in post genocide Rwanda. The main study employed Qualitative research technique: specifically in-depth textual analysis to isolate palliative narrative dynamics that can be used as alternative management of trauma. Comparison of clinical methods of managing trauma i.e. hypnosis and exposure therapy to hermeneutics and reader response theory was done. Experts’ opinions were sought to determine efficacy of the suggested methods and validity of the findings. The most important finding of this research is the discovery of an alternative affordable way of managing trauma in children. Secondly a novel way of authoring children books was also established i.e. Hedo-biblio-pediatrics. This term is used in this research to refer to a technique of using books to socialize traumatized children back to normalcy after grim exposure to violence. In conclusion, it hoped that the findings of this research will help governments, publishers and psychiatrist to plan and make decisions that will improve the health of children affected by Trauma in third world countries which are often torn apart by wars, ethnic conflicts and strife and diseases.

Keywords: Bibliotherapy, Catharsis, Hermeneutics, Trauma
Efficacy of Journalism Training Programmes in Middle Level Colleges in Eldoret Town, Uasin Gishu County, Kenya

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Abstract
With recent improvement of media freedom in Kenya, there has been an increase in the number of media houses in the country. In response to the subsequent increased demand for media practitioners, many institutions have come up seeking to train journalists to meet the increasing demand for media personnel. However, the manner in which journalism training programmes in these mushrooming middle level colleges are designed is inevitably wanting. There is no documented evidence of coordinated standards of training among the journalism training colleges due to lack of a regulatory agency regarding the establishment of these institutions. In order to determine the efficacy of journalism training programmes in middle level colleges in Eldoret town, this study sought to find answers to the following key questions: how does the training in the specified colleges in Eldoret town prepare students for careers in media industry? How is the journalism syllabus for training diploma and certificate students in the middle level colleges developed? To what extent is the content and process of training at middle level colleges consistent with journalistic job requirements? Curriculum theory of John Dewey guided the study. The study adopted a cross sectional survey design based on a mixed methods approach. The target population comprised 18 journalism training colleges in Eldoret town. Purposive sampling was used to arrive at the research participants who included heads of departments and students. In total the study had 72 respondents. Data was collected using questionnaires, document analysis, and interview schedules. The qualitative data collected was analysed thematically based on specified categories while quantitative data was processed and analysed descriptively. The findings of the study showed that most of the journalism training colleges in Eldoret town rely on foreign examining bodies that barely have minimum entry requirements and specified period of training. It also found out that tutors in these colleges do not participate in developing the curriculum but just execute as per the examining body. This makes it difficult for the graduates from these colleges to cope with the contemporary media industry requirements. The study strongly recommends for the establishment of a strong link between journalism training institutions and other stakeholders like the Kenya institute of curriculum development (KICD), Ministry of education science and technology and the media practitioners to effectively serve the society.

Keywords: Efficacy, Curriculum, Training and education
Entomophagy among the Babukusu Community of Bungoma County, Kenya

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Abstract
Traditional African Feeding culture and dietics has been derided by the present day African societies for non-nutritious foods like French fries commonly known as chips among the Kenyan urban societies. Entomophagy is one of feeding habits that have been mostly derided in Kenya. Entomophagy is the consumption of insects as food. There are also some species of plants and animals that derive nutrients from insects. Human insect-eating has been a common diet among different cultures in parts of the world, such as North, Central and South America, Africa, Asia, Australia and New Zealand. Over a thousand types of insects are known to be eaten in the world. The Babukusu people of Bungoma County have a specific Entomophagy towards the white ants, which they call as chiswa in their vernacular. This paper sought to explore insect eating as a food strategy and nutritional culture of the people living in Bungoma County in Kenya. The study used ethnographic approach that operationalised participation and non-obtrusive observation as the main data collecting methodologies. The study established findings that Entomophagy is rich in nutritional value and useful in overcoming food challenges during the times of food shortage. The study finally demystified Entomophagy by suggesting a mental paradigm shift towards this community food security and food resources management by encouraging modern ways and approaches to Entomophagical production and supplies.

Keywords: Entomophagy, Chiswa, nutrition, dietics
Potato Production in Kenya; Producer and Production Characteristics

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Abstract
Potato is important as both a staple food and a cash crop for many Kenyan rural families; and ranks as the second most important food crop after maize. It is produced by about 800,000 small scale farmers spread throughout the high altitude Counties of Kenya. Lack of recent, detailed production and producer characteristics was the main reason for the study. We sought to document the characteristics of producers; as well as how they produce potatoes. We wanted to understand the production practices and challenges so as to develop appropriate mitigation strategies. Multistage sampling was done to select 390 farmers in 4 of the 10 most important potato producing Counties. A questionnaire was used to collect information from farmers and means were separated using ANOVA. Results showed that farmers differed significantly in age which was within the 41-48 years bracket; and they had significantly different years of experience in potato production. They used significantly different land sizes for potato production as well as significantly different quantities of farm inputs (seed, fertilizer, manures) while also facing significantly different prices for potato seeds and the prices at which they sell potatoes. We found information gaps on various issues that research can urgently address. These include the best rotation crop for the farmer practice of one season of rotation; soil fertility effects of the farmer practice of applying fertilizers at both planting and when the crop is in the field; the optimal fertilization program for each soil type in the different agro-ecological zones; how to use the farmers current seed buying behavior to introduce quality seed into the seed distribution system; and how to improve the dismal yields that ranged from 4 to 6.4 tons per acre.

Keywords: Potato production, Potato agronomy, Socio-economic
Open Defecation as a Threat to Environmental Democracy
Multiple Case Study of Turkana County, Kenya

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Abstract
Millennium development goals, The Kenya vision 2030 and the constitution of Kenya jointly and severally indentify human access to clean and save environment as a democratic right. All human beings must enjoy constitutional rights of access to clean, save and life supporting enviroment. Therefore any democratic civilisation minus opportunity of its people to access clean environment is indeed paradoxical and self defeating. Human Open defecation is a threat to clean environment. Open defecation impeaches on human life both in terms of comfort and health. In spite of these facts the stakeholders in urban areas and sub-urban areas of Turkana County are still massively practicing open defecation without care or caution. Indeed it is a socialized human disposal system in this area. The dwellers of Turkana County build huts in their homes to form Manyatta homestead but they don’t include a toilet or a latrine pit in their domestic physical plan. This study therefore was expedited to meet the following objectives; to find out the cultural bases for open defecation in Turkana County of Kenya, to establish health consequences like stunting and typhoid which were hypothetically associated to open defecation in Turkana County of Kenya and to establish environmental administrative challenges to control of open defecation in Turkana County of Kenya. The Study used ethnographic research approach and multiple case studies of Manyattas in Turkana County. Data was collected through non-obtrusive observation and interview schedules. Collected data was analyzed by using mixed approaches of qualitative and quantitative data analyzes. The analytical tools of content analysis and descriptive statistics were used respectively. The study findings established that there are cultural, economic, pastoralist and security factors that cause open defecation behavior among the communities of Turkana County in Kenya. the study also found out that there is strong positive correlation between communal open defecation and stunting in human physical growth. The study thus concluded that there is need for community mobilization against this vice.

Keywords: Open defecation, Manyatta, Stunting, democracy
African Indegenous Education and Its Relevance to Modern

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Abstract
Education is the process of transmitting from the older generation to the next the accumulated wisdom and knowledge of the society and preparing the young people for their future membership of the society and their active participation in its maintenance and development. This study sought to examine important issues in African indigenous Education namely its goals, content, teaching methods and its philosophical foundation. Under this education, each person in the community is practically trained and prepared for his/her role in society. It draws its content from the physical, social and spiritual environment of the people. The philosophical foundations of African indigenous education are preparationalism, functionalism, communialism, perennialism and holismicism. The study was based on secondary data. Based on the findings; the study shows that some elements of African indigenous education are relevant to modern education.

Keywords: Indigenous education, goals, content. Philosophical foundations, relevance
In Search of a National Philosophy of Education for Kenya

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Abstract
A national philosophy of education refers to a statement or sets of statements that outline certain fundamental ideals, values and principles that inform, guide and direct the theory and practice of education in a given country. This statement or sets of statements appear in mere social or ordinary language but essentially possess basic philosophical underpinnings. For instance, Tanzania’s philosophy of education was coined by the late first president of the country Mwalimu Julius Nyerere as Education for Self-reliance, while Mozambique’s Education for Emancipation was drafted by Samora Machel, the country’s first president. Such a philosophy is based on the national philosophy of the nation in question. A national philosophy, on the other hand, refers to a country’s general world-view as articulated and envisaging the people’s collective values and aspirations. These values and aspirations may be written or not. In the case of Kenya, for instance, these are found in the National Anthem, the Constitution, and various other official documents such as Sessional Paper Number 10 of 1965, the numerous reports on education and Vision 2030 among others. This paper sought to answer the basic question: Is it possible to have an education system that is not based on any philosophy whatsoever? To do this, it first attempted to explain the concept of a national philosophy of education before showing the need and the place of such a ‘philosophy of education’ in an education system. It argued that a worthwhile education system must of necessity be based on a sound philosophy. It also endeavoured to show that philosophical foundations of education are more basic and fundamental than other foundations such as historical, sociological and psychological ones. Indeed, it belaboured to prove that these other foundations are themselves dependent and based on certain philosophical underpinnings. Secondly, the study sought to establish whether Kenya has a well-articulated or workable philosophy of education. In this regard, it attempted to explain, clarify, elucidate and enrich the philosophical underpinnings within the Kenyan education system. Consequently, it proposed a philosophy of education for Kenya that is considered to be viable and relevant to the needs, aspirations and conditions of the Kenya nation-state. Thirdly, in proposing a new philosophy of education for Kenya, the paper identified appropriate Criteria and corresponding Conditions of such a philosophy within the Kenyan historical and socio-cultural milieu. It then proceeded to discuss and highlight the content or ingredients of the said philosophy of education and its role in the education system.
Marginalization of Affective Domain in Teaching Practice

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Abstract
In an educational context, the classroom effect is more important than the school effect in explaining the variation on learner’s achievement. At the classroom level the quality of teaching is and therefore the teacher is one of the most critical determinants of quality learning. The teacher accounts for 30\% of the variance in the learner’s achievement. In the process of teaching the affective dimension is the most significant contributory factor to the learner’s educational success. Affects exert a decisive influence on learning and on how learners perceive and value what is being taught, as well as their behaviour and on their self-perception as learners. The learner’s enthusiasm towards education in general and learning in particular and its consequent outcome in the short and long run is directly correlated to the teacher’s affective behaviour in the teaching process. While teacher’s cognitive skills and learners cognitive development is important the extent to which this development and skill are valued, applied and sustained is attributable to affective domain in the teaching and learning. Based on constructivism paradigm, this paper values the affective dimension of teaching and learning process and describes the author experiential lessons on the quality of classroom instructions among the student teachers during the teaching practice supervision with a major observation on the marginalization of the affective domain despite its importance.

Keywords: Marginalization, Affective domain
Theoretical and Analytic Quality of Theses from the School of Education in Mount Kenya University

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Abstract
One of the most fundamental roles of a university beyond training/capacity building is the creation, storage, dissemination and application of knowledge. This latter role is manifested in the quality of research not only among the lecturers and professors but also among the students particularly at post graduate level where originality is a conventional criterion. Theses and dissertations also represent the entirety of the cumulated educational experience. The quality of a thesis or dissertation is assessed on two general criteria namely theoretical quality (eg format, consistency) and analytic quality which includes use of quality data and appropriate analytic methods. This paper represents the results of a rapid assessment of 50 Masters theses sampled from school of education in Mt Kenya University. While acknowledging the various strengths on theoretical format in the dissertation the paper gives recommendation on the different theoretical and analytic weaknesses that need to be addressed.

Key words: Theoretical, Analytic, Quality, Theses
School-Based Factors Influencing Process Redesign Implementation in Public Day Schools in Mogotio District

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**Abstract**

This paper provides a holistic view of the factors influencing Process Redesign (PR) implementation in a project. While the PR is conceptually appealing, in practices there are many unsuccessful cases. This study investigated the major school-based factors influencing implementation of PR in public day secondary schools in Mogotio District. For an organization to succeed, it is essential that balanced attention be paid to all contextual factors such as management support as well as factors that pertain directly to the conduct of the project i.e. change management and organizations culture. Schools as learning environments are no longer viewed as formal organization, but an ideal place of nurturing learners’ talent and producing highly competitive individuals. This implies that school-based reforms should be well-implemented to ensure that it conform to the most current strategies and remove outdated methodologies. Public day secondary schools in Mogotio district were the target population of the study. The study focused attention to the four selected public day secondary schools in Mogotio district. A subset of the study population (sample) was taken from the study population. Sampling was then done by taking a 10% of the study population representing various departments in the selected schools. Data collection was undertaken by use of questionnaire which was administered to the respondents from each department. Raw data acquired from the already filled questionnaires was analyzed and interpreted using SPSS and presented using tables, charts and graphs. From the findings, it was evident that misconception of school culture, reluctance and inexperience of the management, internal and external influence of the school and lack of cooperation from the stakeholders influenced the implementation of new reforms in public day secondary schools.

**Keywords:** Process redesign, Public-day secondary schools
Apoptotic Machinery as a Drug Target in Protozoan Parasites: A Case of Malaria Parasite

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Abstract
For a long time, apoptosis has been thought to be a preserve of metazoans, but mounting evidence within the last two decades demonstrating that programmed cell death (PCD) is also a feature of unicellular organisms is increasingly causing a paradigm shift on traditional tenets of PCD. *Plasmodium berghei* NK65 was subjected to 5-fluoroorotate (FOA, an inhibitor of thymidylate synthase, TS) pressure in mice. After 15 generations of drug pressure, the 2% DT (the delay time for proliferation of parasites to 2% parasitaemia, relative to untreated wild-type controls) reduced from 8 days to 4, equaling the controls, confirming that FOA-resistance could readily be generated. During growth in absence of drug, the FOA-resistant parasite line, but not the wild-type showed an apoptosis-like death, as confirmed by light and transmission electron microscopy and corroborated by oligonucleosomal DNA fragmentation. This observation is interesting since to the best of our knowledge, it is the first report where resistance to a chemical stimulus and not the stimulus itself is shown to induce apoptosis in a unicellular parasite. FOA resistance led to depleted dTTP pools, causing thymineless parasite death via apoptosis. This supports the tenet that unicellular eukaryotes, like metazoans, also undergo apoptosis. We conclude that since apoptosis is a process that can be pharmacologically modulated, the parasite's apoptotic machinery may be exploited as a novel drug target in malaria and other protozoan diseases of medical importance.

Keywords: Antimalarial Drug Resistance, Apoptosis, Novel Drug Targets, Thymineless Cell Death
GARCH Modelling in Foreign East African Exchange Rates

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Abstract
East African Community (EAC) was established by Kenya, Tanzania and Uganda. Later, Rwanda and Burundi became members of the EAC. The EAC is currently actively engaging its member states in coming up with a common currency. The project was aimed at finding out which is the most optimal model using the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) that best fit the exchange rates of the member states. The GARCH models were introduced by Engle (1982) and Bollerslev (1986) significantly designed to capture the volatility clustering and returns. The foreign exchange rates of the EAC from January 2001 to December 2012 were obtained from Central Bank of Kenya and analysed using R statistical software. The GARCH (1,1) was found to be the optimal model that best fit the exchange rate.

Keywords: GARCH, EAC, Heteroskedasticity
Assessment of Financial Distress among Listed Firms in Nairobi Stock Exchange Using Multi-Discriminant Analysis Approach

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Abstract
The study of bankruptcy is becoming more relevant and important as even large companies are failing that cause economic and social problems to the society. Using financial distress model to predict failure in advance is for most businesses absolutely essential in their decision making process. Hence this study involves an assessment of financial distress among listed firms in NSE using Multi-discriminant analysis (MDA) approach. The financial distress status of these companies is estimated using Altman’s Z’-score formula for predicting bankruptcy. The Z’-score model is one form of multiple discriminant analysis that is based on information from financial statements. The study was aimed at surveying the financial distress status of the firms listed in NSE, to map out the financial performance trend over five-year time horizon using MDA and to draw conclusion and recommendation on application of MDA in Kenyan context. The first sample was 44 firms selected from a population of 58 listed firms in NSE after filtering out 14 firms from financial and investments sector since the Z-score models are not applicable for financial companies because they carry off-balance sheet items. Considering time horizon and availability of information, the final sample was composed of 30 firms drawn from the four remaining sectors of NSE. The researcher used secondary data obtained from published sources i.e. financial statements of listed firms for the period of five years (2003 to 2007). The data was analyzed with the help of ratio analysis which is related to the models in the study and also through application of statistical tools such as T-test, F-test, mean and standard deviation. From the 30 companies analysed, only 5 companies were considered in good financial health, 16 companies were in the gray area such than 10 were in the grey area distress zone and 6 in grey area non-distress zone. Nine companies were in distress zone indicating corporate failure. The study recommended that the NSE should adopt the financial distress model to detect the financial distress of these companies and thereby enlightens the investors on the real financial position of these companies and the practical applicability of financial distress models should be checked after some period of time as the economy changes.

Keywords: Financial Distress, Multi-Discriminant Analysis
Isolation and Identification of Fungal Dermatological Agents among Patients Attending Thika District Hospital Thika, Kenya

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Abstract
Fungal dermatological conditions are caused by a group of fungi called dermatophytes. They cause infections in almost all parts of the body. The most common cause of skin infections are dermatophytes and opportunistic fungi. Dermatophytes are not life threatening but they affect the quality of life of the patients as they can cause depression, lack of self confidence and isolation incidence of deep lesions. In Kenya the prevalence and distribution of the infections as well as the common dermatological agents are not known. The main objective of this study was to isolate and identify fungal dermatological agents from clinical samples from patients presenting with suspected fungal skin infection in Thika District Hospital. The study also examined the possible predisposing factors to fungal infections in patients attending Thika District hospital. Clinical samples from 126 patients were subjected to Potassium hydroxide (KOH) preparation and culture. The KOH digested specimens and fungal colonies were examined and identified macroscopically and microscopically. Patients completed questionnaires to record information on age, gender, site of infection, residence, level of education and occupation. The obtained results were analyzed by SPSS 12 software. The average age of the patients was 15.5 years and the ratio of male to female was 1.7:1. The highest isolation was from the scalp 56(44.4%) others were trunk 35(27.8%), hands 31(24.6%), neck 26(20.6%), feet 14(11.1%) and face 9(7.1%). Out of 126 samples 107(84.9%) were KOH positive and 106(84.1%) were culture positive. Trichophyton spp. had the highest isolation of 67(62.6%), with T. verrucosum being the most common 21(16.3%) followed by T. sudanenses and T. mentagrophytes each at 26(9.3%). The other fungal organisms isolated were yeast 26(24.3%), Epidermophyton spp. 3(2.8%), Microsporum spp. 3(2.8%) and others that were non-dermatophyte were 8(7.5%). There was statistical association between isolation from hands, scalp and neck infection. The p-values were 0.04, 0.02 and 0.012 respectively. The association of gender, residence, age, occupation, knowledge of infection, education and infection was not statistically significant and the P-values were 1.0, 0.81, 0.64, 0.26, 0.36 and 0.11 respectively. The isolation rate of fungal infection was 84.1% indicating that dermatophytosis in Thika District Hospital is a major cause of morbidity warranting intervention. This study recommends routine mycological investigations in both adults and children with suspected mycoses for better management of dermatological conditions in Thika District Hospital.

Keywords: Dermatological, Dermatophytes, Fungal colonies
Home Automation Using Mobile Phone

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Abstract

Today’s busy world is an assemblage of many communication networks; some are yet to have their entries. The amazing thing is that all this are all being used for various communication purposes only, though it is possible to extend their impacts in a variety of manner by the manifestation of interesting systems where we can directly have an aid from these. I am coming up with one of such interesting systems by which we can access even our bedroom electronic devices even from the most far off places in the world, provided the network under use has good range everywhere. Here the designer is demonstrating a system called RANS as an abbreviation for Remote automation using Networks. In this demonstration, the transmitter chosen is a mobile phone and the decoding receiver is another phone. One can have two mobile phones or two land phones for the same purposes. This system utilizes what is called DTMF signals. DTMF (dual tune multi frequency) which is usually generated by the phones keypads. Each key has a DTMF tone of a certain frequency. DTMF tone is sent from the transmitter phone over the network to the receiver phone. The receiving phones “listens” to the DTMF” tunes. The tunes received are decoded by a DTMF decoder processor (mt8870) which is connected to the receiving phone. This processor is then interfaced to a microcontroller chip which is responsible for triggering specified electrical loads.

Keywords: Automation, RANS, DTMF, Control.

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Abstract
Anemia in pregnancy is defined as a hemoglobin concentration of less than 11gm/dl. Anemia is directly or indirectly responsible for maternal deaths. Maternal anemia is associated with poor intrauterine growth and increased risk of preterm births and low birth weight rates. This in turn results in higher perinatal morbidity and mortality, and higher infant mortality rate. The purpose of this study was to determine the anemia prevalence with the associated causes in pregnant women. The study was carried out in Emusanda dispensary, Kakamega Central District, Kakamega County. Retrospective study of 38 healthy pregnant women attending antenatal clinic from 1st March 2013 to 30th May 2013 was done and the data collected entailed age of the mother, number of visit, parity and gestational age. Blood was drawn for H.B measurement. Ethical consideration included obtaining consent and maintaining confidentiality. Prevalence of anemia was found to be higher among pregnant women above 30 years (67%) and lower among pregnant women aged 25-29 years(14%), higher in women on their 3rd trimester(63%)than the 1st trimester (30%) and higher in pregnant women attending clinic for the 1st time(63%) than those making more than three visits (36%). Inadequate dietary iron and folate due to poor diet and poor socio-economic status, close birth spacing of less than 2years, previous history of heavy menstrual bleeding were found to be the major causes of anemia in pregnancy.

Keywords: Anemia, Hemoglobin, Pregnant women
Education for All (EFA) remain elusive for pastoral communities: A case of Laikipia North District

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Abstract
This paper based on an investigation on how the implementation of various education policies has impacted on the attainment of EFA goals in a pastoral community. Early studies have shown that inadequate schools, early marriages, FGM, moranism, child labor and negative attitude towards education are main reasons for some children to be out of school. In order to re-investigate pertinent issues that still hinder access to and completion of primary education, a study was conducted in Laikipia North District by interviewing government officials and other local leaders, collecting primary school information and visiting about 30 households whose children had neither enrolled in primary school nor completed primary education. The findings show that distance to school and insecurity in the region are some of the reasons. The other reasons are early marriages, FGM, moranism, child labor and negative attitude towards education by parents. However, the study also finds out that many parents and children recognize the importance of education. It is the high level of poverty which unnecessarily hinders some children’s access to and completion of primary education. The study suggests that, for EFA goals to be attained, the clan elders and women will need to be sensitized and be made part of the decision-making Initiatives in planning successful strategies in the region. Moreover, there is need to develop an alternative approach to education provision that addresses the peculiar issues in the region, by targeting school-age children who are currently out of school. Each county needs to develop a specific education policy that meets the need of children in their regions especially in the context of the new legislation on free and compulsory education at the basic level.

Keywords: Primary Educational Access, Dropout, Completion