

BOOK OF ABSTRACTS

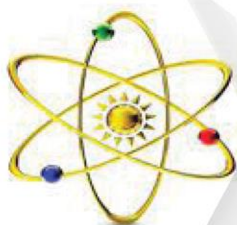
National Science Week

*Unleashing the full
Potential of Science*

07 - 10 November 2023
Main Campus, University of Namibia

Leisure Centre | Library Auditorium
Faculty of Science Foyer W-Block | X Block- 149

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SCIENTIFIC DEMONSTRATIONS, ACADEMIC AND INDUSTRY PRESENTATIONS

Dates: 7 to 8 November 2023

ALL SESSIONS ARE HYBRID EVENTS

<https://zoom.us/j/93481986516?pwd=dmFkR1hLcTdtdlVrWmUzdVh4ZGpLdz09>

Meeting ID: 934 8198 6516; **Passcode:** KQ2135

- Opening session: Zoom Link
- Leisure Centre- Room 1
- Parallel session- Library Auditorium – Room 2
- Parallel session- Room X149 -Room 3

FOURTH YEAR FINAL PRESENTATIONS

Dates: 9 to 10 November 2023

ALL SESSIONS ARE HYBRID EVENTS

Main Campus

<https://zoom.us/j/93481986516?pwd=dmFkR1hLcTdtdlVrWmUzdVh4ZGpLdz09>

Meeting ID: 934 8198 6516; **Passcode:** KQ2135

- Lecture Hall 1, Military Sciences, 1st Floor- Room 1
- Lecture Hall 2, Military Sciences, 1st Floor- Room 2
- Lecture Hall 3, Military Sciences, 1st Floor- Room 3
- Lecture Hall 4, Military Sciences, 1st Floor- Room 4
- X149, Room 5
- Library Auditorium Room 6

Geosciences, Southern Campus

<https://zoom.us/j/95613791831?pwd=L3JVTjBwajVMc1JuVUo0a2JvZER4Zz09>

Meeting ID: 956 1379 183; **Passcode:** 822395

Forestry and Rangeland, Ogongo Campus

<https://zoom.us/j/92436047971?pwd=Z0llalplN1UraG1qRkVKbko5aEowUT09>

Meeting ID: 924 3604 7971; **Passcode:** KQ2041

Fisheries and Ocean Sciences, Sam Nujoma campus

<https://zoom.us/j/93603593878>

Meeting ID: 936 0359 3878;

KEYNOTE ADDRESS

"Unleashing the full potential of Science: Forging a meaningful Scientific career in the age of Innovation."

Dr Eino Mvula,
Chief Executive Officer,
Namibia Standards Institution

INVITED SPEAKERS

"How to have a fulfilling career in STEM, a perspective from a University of Namibia Alumni."

Ms. Nansunga Kambinda,
Technical Discipline Manager-Hydrology & Hydrogeology (SLR Africa)
Manager: Hydrology and hydrogeology studies,
Osino Gold Exploration (Pty) LTD

"Start Up in STEM, the story of Green Team Consultants."

Mr. Sakaria Nalusha,
Managing Partner,
Green Team Consultants- [Virtual presentation](#)

"Looking to the future of energy Production: Green Hydrogen Production and Utilization."

Dr. Zivayi Chiguvare,
Senior Lecturer and Acting Director:
Namibia Green Hydrogen Research Institute (NGHRI)

"Shaping the science Industry and Bridging the gap between academia and Industry: The students' perspective".

Ms. Otilie, N. Fillipus,
Student Representative for the School of Science

"Employment opportunities for chemistry graduates in the Water Treatment Industry."

Mr. Tomas Amutenya,
Analyst (Chemistry) City of Windhoek

SCIENTIFIC DEMONSTRATIONS

Chemical reactions: Application of Chemistry in everyday life.

Dr Moola Nyambe and Ms Hilaria Hakwenye

Fungi as food, medicine, and cash crop.

ZERI Research Team

Green Hydrogen production by electrolysis using electricity produced by a solar panel.

Dr Zivayi Chiguvare & Ms. Cecilia C. Naule

*Activated Carbon from Wastepaper for the Removal of Methylene Blue and Methyl Orange
Dyes.*

Ms. Viola Willemse

Climate Agrometeorological Prediction Chatbot to Aid Small Scale Farmers.

Dr. Nalina Suresh

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Theme: Agriculture

EFFECTS OF DIFFERENT IRRIGATION LEVELS AND SOIL AMENDMENTS ON CABBAGE PERFORMANCE, SOIL WATER STORAGE, AND ECONOMIC BENEFIT IN SEMI-ARID CENTRAL NAMIBIA

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Abstract

In semi-arid Central Namibia, poor sandy soils limit sustainable crop production. Cabbage performance was assessed in two split-plot field experiments. In experiment 1, treatments comprised two irrigation levels, full irrigation watered three days a week and reduced irrigation watered two days a week as the main plot factor and six soil amendments (biochar, compost, zeolite, NPK, Be-Grow boost (L) hydrogel, and hoof and horn + bone meal (HHB)) as subplot factors in three replications. Full irrigation produced a significantly higher yield (21.1 t ha), head weight (0.958 kg), and larger head girths (42.1 cm). Biochar produced the highest marketable heads (24,884 heads ha⁻¹), WUE (76.0 kg ha), and largest head girths (42.7 cm). In experiment 2, water was applied five and four days a week for full and reduced irrigation; the application rates of compost, HHB meal, Be-Grow boost (L) hydrogel, and NPK were modified. The interaction of Be-Grow boost (L) hydrogel, NPK, and biochar with full irrigation and HHB meal with reduced irrigation produced more marketable heads (28,935, 28,009, 27,546, and 28,703 heads ha, respectively). Moreover, under reduced irrigation, Be-Grow boost (L) hydrogel, HHB meal, and NPK had relatively the highest BCR of 3.44, 3.29, and 3.26, respectively. Soil amendments did not significantly improve soil plant available water (PAW). Therefore, full irrigation with these amendments could be used for resilient cabbage production in Central Namibia. However, further research is needed to determine the fineness of these amendments required for improved WHC.

A COMPARATIVE STUDY ON THE FEED INTAKE, DIGESTIBILITY AND NITROGEN BALANCE OF KALAHARI RED GOATS FED WITH TYLOSEMA ESCULENTUM VERSUS MEDICAGO SATIVA AS A PROTEIN SUPPLEMENT

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Abstract

The intake, digestibility and nitrogen balance were evaluated in Kalahari Red goats fed grass hay (ad libitum) supplemented with *Tylosema esculentum* (Marama bean) or *Medicago sativa* (Lucerne) containing diets. Supplementary diets consisted of crushed yellow maize, marula oil cake, molasses, premix, and salt. Eight weaner goats were housed in individual metabolic cages and fed diets containing either Marama bean leaves/vines or Lucerne (as a control) in a randomized complete block design (RCBD). Four replicates were used, with sex being the blocking factor (4 males and 4 females). Adaptation and, faeces, urine and feed collection periods were 14 and 7 days, respectively. The dry matter intake did not differ significantly ($p > 0.05$) between treatments and gender. Goats fed Lucerne diet had a higher dry matter and organic matter digestibility (70.26% and 71.60%, respectively) compared to those fed Marama diet (65.88% and 66.41%, respectively). However, goats fed with Marama diet had a higher crude protein digestibility compared to those fed Lucerne diet ($p < 0.05$). Neutral detergent fibre digestibility and acid detergent fibre digestibility did not differ significantly ($p > 0.05$) among diets. Goats fed Marama diet had a higher nitrogen balance (14.76 g/day) compared to the Lucerne diet (7.52 g/day) ($p < 0.05$). Marama can effectively be used as a protein supplement to replace Lucerne which would lead to increased productivity in ruminant livestock and utilization of under-utilized legumes.

THE EFFECTS OF ENSILING *SENEGALIA MELLIFERA* WITH OR WITHOUT CARBOHYDRATE ADDITIVES AND LACTIC ACID BACTERIA (LAB) INOCULANT ON THE SILAGE PH, NUTRIENT COMPOSITION AND IN VITRO DIGESTIBILITY

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Abstract

The study investigated the effects of ensiling *Senegalia mellifera* with and without carbohydrate sources with or without lactic acid bacteria (LAB) inoculant on the pH, nutritional composition and in vitro digestibility of *S. mellifera* silage. The experiment was a completely randomized design in a 3 x 2 x 4 factorial arrangement, consisted of a total of three (3) carbohydrate additives (none, malted barley and molasses) with or without LAB inoculant (2) and four (4) incubation periods of 0, 21, 65 and 100 days with each treatment combination being replicated three times. The pH varied among treatments ($p < 0.05$). The ash, organic matter (OM) and crude protein (CP) content of the silages were not affected by the 3-way interaction of the carbohydrate additives x inoculant x ensilage period. The dry matter (DM), ether extract (EE), neutral detergent fibre (NDF), acid detergent fibre (ADF) and hemicellulose (HEM) of the silages were different ($p < 0.05$) for the 3-way interaction. The study concluded that, the pH, DM, EE, NDF, ADF and in vitro neutral detergent fiber content of *Senegalia mellifera* were significantly affected by the effects of carbohydrate additives with or without lactic acid bacteria (LAB) inoculant. Overall, *S. mellifera* can be effectively ensiled and the

silages achieved acceptable pH values of effectively ensiled forage.

SOIL AMENDMENTS IMPROVE CABBAGE YIELD, WATER USE EFFICIENCY AND PROFITABILITY IN SEMI-ARID NORTH CENTRAL NAMIBIA

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Abstract

Infertile sand soils limit agricultural productivity due to their low organic matter, low water and nutrient-holding capacity and a deficiency of essential plant nutrients needed to support normal plant growth. The rising global fuel prices are affecting the cost of irrigation and fertilizers. Soil amendments improve the soils water and nutrient retention capacity, thereby improving crop growth, yield, and profitability of crop farming enterprises. A field experiment was conducted at the University of Namibia Ogongo Campus to evaluate the effects of soil amendments on the yield and profitability of cabbage. Six Soil amendments, including Compost, Biochar, Zeolite, Be-grow Hydrogel, Horn + hoof + bone meal, and NPK + Urea and untreated control, were laid out in a split-plot design. Analysis of variance indicated that cabbage head size, head weight and yield were positively influenced by applying soil amendments. The compost treatment produced the highest yield (62.1 t/ha), but the difference was insignificant from biochar, zeolite, be-grow and HHB. The lowest yields (35 t/ha and 8.8 t/ha) were obtained from the NPK+UREA and the control treatments, respectively. All the soil amendments positively influenced profitability. The highest Benefit-cost ratios (5.1, 4.8 and 4.4) were obtained from be-grow, biochar and zeolite treatments under reduced irrigation. The study revealed that soil amendments can improve cabbage productivity while reducing required irrigation water and producing higher economic yields.

EVALUATING THE EFFECTS OF SOIL CONDITIONERS ON SOIL PROPERTIES AND CABBAGE PERFORMANCE UNDER DIFFERENT WATER REGIMES IN NORTHERN AND CENTRAL NAMIBIA

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Abstract

Climate change and its effects on climate and the environment have resulted in the loss of fertile soils. Further loss of fertile soil will severely impoverish millions of people. The study looked at the impact of soil amendment on the chemical characteristics of soil at four locations. Each field trial site had a total of 42 treatments; hence, 42 soil samples were taken per site each

season. A systematic soil sampling procedure was used to acquire data. Furthermore, the data was analyzed using the statistical program GENSTAT. The study discovered significant variations in total N, P, K, organic carbon, Ca, Zn, and pH across soil amendments at $p < 0.001$. Compost, Be-grow, Biochar, NPK, and Zeolite treatment all had a substantial influence on soil pH, with compost, Be-grow, Biochar, NPK, and Zeolite having the highest pH of 8.53, 8.52, 8.42, and 8.38, respectively. The interplay of irrigation and soil amendments had no significant influence on soil element concentration. The results show that applying various soil conditioners has a substantial influence on soil parameters. The research, on the other hand, discovered that there was no significant variation in soil pH across irrigation levels, indicating that soil pH can be altered by variables other than irrigation. As a result, while selecting soil amendments and irrigation systems, it is critical to consider the individual circumstances of a field. Because of their favorable interactions with soil elements, compost and biochar are recommended by the research.

ASSESSING FARMERS' PRODUCTION PRACTICES AND MARKETING ACTIVITIES OF CABBAGE (BRASSICA OLERACEA VAR.CAPITATA) IN OMUSATI REGION, NAMIBIA

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Abstract

Approximately 80% of fresh vegetables consumed in Namibia are imported, despite the increasing domestic vegetable consumption due to an increase in consumers' health-consciousness about reducing eating meat-based products in favour of healthier plant-based foodstuff. Cabbage plays economic and dietary importance in northern Namibia's local smallholder farming communities. However, the local vegetable industry is still underdeveloped due to the traditional emphasis on cereal and livestock production and insufficient production skills. A cross-sectional survey method will be conducted across the Omusati Region of Namibia to assess cabbage production practices, marketing activities and associated challenges among small- and medium-scale farmers. A mixed research design (qualitative and quantitative) and a structured questionnaire will be used to collect information from the cabbage farmers. Interviews will target at least 60 cabbage producers from the region to obtain data on socio-demographic status, production practices, marketing activities, and related challenges. The information generated by this study will help stakeholders, including policymakers, researchers, extension agents and farmers, improve the region's cabbage production.

AGRONOMIC PERFORMANCE OF BAMBARA GROUNDNUT VARIETIES TREATED WITH BRADYRHIZOBIUM STRAINS IN NAMIBIA

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Abstract

Rapid population growth, climate change, intensive monoculture cereal farming, and resource depletion are among the challenges that threaten the increasingly vulnerable food system in Namibia. Bambara groundnut (*Vigna subterranea* [L.] Verdc) is an underutilized crop cultivated by small-scale farmers in Sub-Saharan Africa for food and nutrition. Regardless of its importance, Bambara groundnut yield has declined due to biotic and abiotic factors such as high temperature, drought, salinity, and host specificity, which negatively impact crop productivity and hence food security. Therefore, the aim of this study is to assess the agronomic performance of Bambara groundnut treated with Bradyrhizobium inoculant strains. A field experiment was conducted at Mashare Agricultural Development Institute (MADI) during the 2022/2023 cropping season, to select rhizobia strains that are effective and have appreciable yield levels for the region. A split plot experiment involving three Bambara groundnut varieties and eight rhizobium strain, urea and uninoculated control in three replications was used. Parametric analysis of variance will be used to test the effects of varieties and rhizobium strains. The results of this study will be used to select the effective rhizobium strain that can contribute to the improvement of food production.

EVALUATING THE EFFECTS OF DIFFERENT SOIL AMENDMENTS ON SOIL PHYSICOCHEMICAL PROPERTIES, GROWTH, AND YIELD OF WHEAT (TRITICUM AESTIVUM L.) IN NORTH-CENTRAL NAMIBIA

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Abstract

Inherently poor soil fertility depletion have been identified as the major problem accounting for low agricultural productivity especially in small-scale farming communities in North-Central

Namibia. The soils are primarily sandy, low in organic matter, and highly stressed with nutrient deficiency, thus limiting crop production and sustainable agricultural development. Soil amendments can improve soil's physical and chemical properties, enhancing crop growth and yields. The field study was performed at the University of Namibia-Ogongo Campus to investigate the effects of different soil amendments on soil physical and chemical properties, growth, and yield of wheat for North-Central Namibian conditions. The study adopted the randomized complete block design (RCBD). Treatments comprised of biochar and compost rates 0, 10, and 20 t ha⁻¹ and N fertilizer 0, 120 kg N ha⁻¹. Analysis of Variance (ANOVA), correlation coefficient, and repeated measure analysis will be performed to test the effects of soil amendments. The results of this study will be used to help small-scale farmers and scientific researchers to contribute to the broader goals of achieving food security amidst global climate change.

Theme: Alternative Energy

ANALYSIS OF THE STATE OF BIOMASS PROCESSION AND TRADING IN NAMIBIA'S GROWING RECYCLING ECONOMY

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Abstract

Namibia among other countries in the world is striving to be a green sustainable country and one of the strategies being adopted to achieve this is promoting the use of Biomass products manufactured from recycled materials. While an observation is made on how the recycling economy is growing in Namibia, the question is posed on how this is impacting the biomass production and trading. This research explores and analyses the state of Biomass procession and how the cycling industry is impacting this trade. Observations and data analysis from primary and secondary sources methods were used in data collection for this study. Comparative analysis is used to measure improvement and changes needed in the analysis part. The results demonstrate that there are four types of sources that are currently being used in Biomass production in Namibia, the municipal solid waste, wood, animal dung and sewage. Demand for Biomass products which are cost efficient and sustainable promotes the recycling trading among locals and companies. There is still a limit in procession of the materials that is observed to be lack of enough plants thus pushing for exporting. Biomass market is expanding with facilitation of scientific research and international partnerships while commercialized recycling is also pushing for high demand in Biomass utilization and production.

Theme: **Biology**

ANTIOXIDANT AND ANTIBACTERIAL EVALUATION OF SELECTED HYDRAZONE LIGANDS AND THEIR METAL COMPLEXES

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Abstract

Hydrazone are compounds that possess an azomethine group and are considered as aldehyde and ketone derivatives. Hydrazone have diverse pharmacological properties and constitute an important class of compounds for new drug development; hence researchers are investigating them for different biological activities. Over the years, most bacteria species have developed resistance against available antibiotics. On the other hand, there is a need for better and safer antioxidants as those that are currently available are linked to side effects. The present study was designed to evaluate the antioxidant and antibacterial activities of selected hydrazone ligands and their metal complexes. Hydrazone ligands were synthesized by means of the Schiff base reaction, and each ligand metal complexes of Cu(II) and Ni(II) were synthesized. The structural confirmation of the compounds was done by ¹H-NMR and FT-IR. Antioxidant activity of the ligands and metal complexes was determined using the Ferric based reducing power and 2,2-diphenyl-1-picrylhydrazyl (DPPH) assays. The antibacterial activity was assayed by means of the Kirby Bauer agar disc diffusion method. All tested compounds demonstrated a concentration dependent antioxidant activity in the ferric reducing and DPPH free radical scavenging assays. Both ligands and metal complexes displayed appreciable antibacterial activity against strains of *Staphylococcus aureus*, *Streptococcus mutans*, *Nisseria gonorrhoea* and *Escherischia coli*. The results from this study show that hydrazone ligands and their metal complexes could be a potential source of novel antibacterial and antioxidant agents.

EVALUATING IMMUNE RESPONSES OF COVID-19, TUBERCULOSIS AND HIV INFECTIONS THROUGH CYTOKINE PROFILING

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Abstract

Coronavirus disease 2019 (COVID-19), tuberculosis (TB), and human immunodeficiency virus (HIV) are infectious diseases which are among the leading causes of death globally. Namibia is among the countries with a high burden of HIV and TB. Cytokines and other plasma proteins have been used as biomarkers for predicting disease progress of various viral and bacterial infections. The current study aims to conduct cytokine profiling in selected Namibian COVID-19, TB, and HIV patients by determining the inflammatory cytokine and plasma protein (D-dimer, Ferritin, Albumin and C-Reactive Protein) levels. The study also aims to correlate the levels of the cytokines and plasma proteins in patients with latent TB and those with post COVID-19 infection to those with active infections. The study will use existing blood (serum) samples collected from adult patients who attended Epako and Epukiro clinics in Gobabis, Omaheke Region, from August 2022 to May 2023. The inflammatory cytokines and plasma proteins levels will be measured using flow cytometry and immunological assays respectively. The study anticipates to identify potential inflammatory biomarkers markers that could aid in disease diagnosis and treatment monitoring of COVID-19, TB and HIV patients. The biomarkers are highly important in helping clinicians based at high-burden and low-resources setting to identify patients who are not responding to the treatment therapy earlier, allowing for the adjustment of treatment plans.

ACID-NEUTRALIZING AND CYTOTOXICITY PROPERTIES OF NOVEL SESAMUM CAPENSE MUCILAGE USED AS AN ALTERNATIVE TREATMENT FOR PEPTIC ULCERS AND AS ANTACIDS IN NAMIBIA

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Abstract

Hypersecretion of gastric acid damages the stomach lining, causing the formation of peptic ulcers. *Sesamum capense* mucilage is used by traditional health practitioners in Northern Namibia to treat acid refluxes and gastric wounds. Mucilage from medicinal plants offers a relaxing and soothing effect to the endodermal lining of the gut and has antacid properties, which can protect the mucosal lining from gastric acidity. This is the first report aimed to evaluate the physicochemical characteristics, acid-neutralizing, and cytotoxicity properties of traditionally used aqueous mucilage from *S. capense*. The physicochemical properties were determined by biochemical methods. Acid neutralizing and buffering capacities were determined by titration methods. Normal mouse embryonic fibroblast cells were used for cytotoxicity evaluation using the 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl-2H-tetrazolium bromide MTT assay. The physicochemical characterization confirmed the presence of carbohydrates, alkaloids, saponins, proteins, tannins, flavonoids, and glycosides. *S. capense*

mucilage exhibited potent artificial gastric juice neutralizing capacity pH of 4.62 ± 0.01 , 8.0 ± 0.00 acid neutralization capacity per gram of acid, and 30 minutes duration of acid neutralization. The aqueous mucilage from *S. capense* did not cause any significant cytotoxicity to 3T3 cell lines showing an IC_{50} value of 91.5 ± 0.06 μ g/ml, confirming the safe nature of the mucilage. These findings revealed that *S. capense* has the potential to neutralize gastric acid responsible for ulceration. In-vivo studies should be conducted to further validate the efficacy and safety of the novel mucilage.

TOTAL QUANTIFICATION OF BIOACTIVE COMPOUNDS IN SESAMUM CAPENSE AQUEOUS MUCILAGE: A STEP TOWARD UNDERSTANDING ITS TRADITIONAL USE IN TREATING GASTRIC CONDITIONS

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Abstract

Over 80% of the world's population relies on the use of medicinal plants as alternative treatment for different human diseases. *Sesamum capense* mucilage is used by traditional health practitioners in Northern Namibia to treat acid refluxes and gastric wounds. However, the bioactive compounds present in the mucilage are not quantified. Studies have linked bioactive compounds to the relaxing and soothing effect and antibacterial properties of mucilaginous plants. This study aimed to quantify the bioactive compounds linked to the gastroprotective properties of medicinal plants. Total flavonoid content was determined using the aluminum chloride colorimetric method. Total phenol content was determined using the Folin Ciocalteu method. Total alkaloid detection was done using acetic acid in ethanol. Tannin content was determined using the Follin-Denis reagent. Total saponin was determined using petroleum ether. The Bromohymol method was used to quantify Oses and Holosides. Total glycoside was determined using glacial acetic acid. Total Anthraquinone was detected using benzene in sulfuric acid. Antioxidant activity of the ethyl acetate and aqueous extracts was measured based on the scavenging activity of the stable 1, 1-diphenyl 2-picrylhyorazyl (DPPH). *S. capense* mucilage contained a wide range of bioactive compounds with lower flavonoid contents of 0.21 ± 0.02 and higher Alkaloid content of 0.6 ± 0.02 . Glycoside contents of 7.9 ± 0.02 were recorded, with oses and holosides of 0.02 ± 0.01 . The percentage of antioxidant activities recorded was 80.53 ± 0.114 . These findings revealed that *S. capense* is rich in compounds with gastro-protective properties.

A BIODIVERSITY AND ECOLOGICAL ANALYSIS OF ZOOPLANKTON, FISH AND SEABIRD COMMUNITIES ACROSS A TEMPORAL SCALE AT SELECTED OFFSHORE SITES IN LUDERITZ, NAMIBIA

A. September¹, C. Hay², L. Kandjengo³

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Abstract

The ocean is a receptor of increasing anthropogenic pressures leading to alterations of distribution, diversity, and abundance of marine fauna. Marine fauna play a vital role in preserving the health of marine ecosystems. Rehabilitation of marine fauna can be done through numerous methods including kelp cultivation particularly giant kelp (*Macrocystis Pyrifera*). Giant Kelp forests provide vital ecosystem services including habitats and boosting marine fauna biodiversity. The Benguela upwelling region, due to its unique features including its nutrient rich upwelling and cool temperature offer a suitable environment for artificial giant kelp cultivation. The ability of artificial cultivation to alter marine fauna, makes it essential to assess the existing environment by establishing baseline data to establish mitigation strategies. This study aims to assess the temporal biodiversity and ecology of zooplankton, fish, and seabirds at selected offshore sites in Lüderitz intended for giant kelp cultivation to provide a benchmark for future assessment of impacts and initiation of mitigation strategies. Zooplankton data will be collected using a WP2 net from 5m and 30m depths, fish data using eDNA and seabird data through species spotting along a transect. Additionally, oceanographic data; pH, total dissolved oxygen and temperature will also be collected monthly at all study sites. Species richness and abundance will be determined through the R package SpadeR and using the Shannon's Index (SI). Continued research on the presence of species is essential to track impacts of climate induced changes and provide necessary information for management and decision-making of marine resources.

SAND MINING AS A DRIVER OF ECOLOGICAL SUCCESSION AND SOIL QUALITY LOSS IN THE SUB-TROPICAL SAVANNA ENVIRONMENT, NAMIBIA

J. Nakanyala

University of Namibia

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Abstract

Anthropogenic disturbances such as habitat fragmentation and overexploitation of natural resources are a major threat to the stability of terrestrial ecosystems and biodiversity

conservation. Such disturbances result in biodiversity loss and the reduction of ecosystem services. This study investigated the ecological impacts of sand mining, one of the contemporary and alarming yet disregarded anthropogenic disturbance commonly found within many peri-urban zones. The aim of this study was to investigate the post-disturbance recovery of plant communities and soils at an abandoned sand mining site in the Zambezi Baikiaea savanna woodlands. A reconnaissance survey classified the study area into three categories: (i) the highly degraded site, (ii) moderately degraded site, and (iii) least degraded site, a degradation gradient along which vegetation and soil sampling took place. Results revealed a statistically significant variation ($p < 0.001$) in plant composition regarding attributes such as species richness, species diversity, canopy cover and abundance and soil carbon loss. The study concluded that sand mining is a highly intrusive activity, which significantly stresses the environment with no hope of a successful natural recovery, if no human intervention is undertaken. Those findings call for tightened environmental legislations to curb unsustainable sand mining operations. This study recommends that strict regulations, including an appropriate rehabilitation plan, should be implemented to address this environmental challenge.

ANTIOXIDANT, ANTIMICROBIAL, AND ANTIBIOFILM PROPERTIES OF OPUNTIA STRICTA AND VACHELLIA ERIOLOBA, AND CHEMICAL CHARACTERIZATION OF VOLATILE COMPOUNDS

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Abstract

Background: *Vachellia erioloba* commonly known as *Acacia erioloba* belongs to the family Fabaceae and is native to Namibia, Botswana, and South Africa. *Vachellia erioloba* is traditionally, used to treat ear infections, headaches, and toothaches. *Opuntia stricta* belongs to the family Cactaceae and is found in Namibia. *Opuntia stricta* is used to treat cancer, diabetes, and obesity. Objective: In this study, the antioxidant, antimicrobial, antibiofilm, and chemical characterization of *V. erioloba* and *O. stricta* were investigated. Methods: Antioxidant determined using 2, 2 -diphenyl-1-picrylhydrazyl (DPPH) and reducing power. Various microorganism was used for antimicrobial activity and *Staphylococcus aureus* was used for antibiofilm activity of the extracts. Gas chromatography-mass spectrometry (GC-MS) was used to characterize the volatile components of the *V. erioloba* seed extract. Results: Half-maximal inhibitory concentration (IC₅₀) values for extracts of *V. erioloba* found to be 1.973 \pm 0.012 and 972.0 \pm 22.3 μ g/mL for the seed pods and seed, respectively, while those for extracts of *O. stricta* ranged between 53.74 to \leq 1000 μ g/mL. Antimicrobial assay showed inhibition zones (IZ) ranging from 0 to 12 mm for *V. erioloba* and *O. stricta* indicating moderate antimicrobial activity and minimum inhibitory concentration (MIC) range from \approx 0.63 to 10 mg/mL. The extracts of *V. erioloba* and *O. stricta* had a minimum biofilm inhibition

concentration (BIC50) value that ranged from 0.08 to 0.498 $\hat{\pm}$ 0.017 mg/mL. The minimum biofilm eradication concentration (BEC50) values ranged from 0.08 to 0.172 $\hat{\pm}$ 0.008 mg/mL. Bioactive component present in *V. erioloba* seed extract, including phytosterols, $\hat{\pm}$ -tocopherol, and $\hat{\pm}$ -amyrin. Conclusion: The findings of this study demonstrate that extracts from *V. erioloba* and *O. stricta* exhibited biological activities.

EVALUATING ANTIMICROBIAL EFFECTS OF SELECTED INDIGENOUS MEDICINAL PLANTS AGAINST PATHOGENS ISOLATED FROM CLINICAL SAMPLES AT NAMIBIA INSTITUTE OF PATHOLOGY

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Abstract

Despite the importance of traditional medicine in African communities, there is still a high burden of infectious diseases. This study will focus on evaluating the antimicrobial activity of six medicinal plants, namely: *Harpagophytum procumbens*, *Azadirachta indica*, *Sclerocarya birrea*, *Ocimum basilicum*, *Aloe vera*, and *Eucalyptus camaldulensis*. The study aims to perform phytochemical analysis, assess antimicrobial activities, evaluate the pharmaceutical lifespan of bioactive ingredients, and elucidating the mechanism of action of the selected medicinal plant extracts. A true experimental design with post-test-only control will be utilized, incorporating both qualitative and quantitative approaches. Liquid Chromatography-Mass Spectrophotometry (LC- MS/MS) and Column Chromatography; Agar well diffusion; Broth dilution; Antimalarial activity assay, Anti-tubercular activity assay; and Mean Kinetic Temperature (MKT) approach will be employed. The data analysis will involve EpiData and STATA statistical software. A T-test and One-way ANOVA will be performed. The research is in progress, and it is anticipated to enhance literature on the antimicrobial potential of indigenous medicinal plants and give insights on future drug development and healthcare practices.

Theme: Chemistry

INVESTIGATIONS ON THE FABRICATION OF Al, Cr, AND Ni-DOPED ZnO THIN FILMS BY THE AQUEOUS SPRAY-COATING METHOD AND THEIR APPLICATIONS AS PHOTOANODES FOR HYDROGEN PRODUCTION VIA PHOTOELECTROCHEMICAL WATER SPLITTING

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Abstract

The development of novel technologies for green and sustainable energy has been considered one of the top priorities for mankind due to the increasing usage of fossil fuels and the release of greenhouse gases. In this work, various thin films were fabricated on quartz glass substrates via the aqueous spray-coating method. The study aimed to investigate the fabrication of Al and Ni-doped ZnO thin films via the aqueous spray-coating method and explore their potential as photoanodes for hydrogen production through photoelectrochemical water splitting. Aqueous precursor solutions were prepared, containing Zn²⁺ alone as well as Zn²⁺ with varying mole percentages (2–16%) of Al³⁺ or Ni²⁺, by dissolving the corresponding metal salts in distilled water. These precursor solutions were then spray-coated onto quartz glass substrates preheated to 180°C. Subsequently, the sprayed films were heat-treated at 450°C in air in a furnace for 30 minutes, resulting in the formation of well-adhered thin films. The characteristics of the resultant thin films will be discussed.

PREPARATION OF ACTIVATED CARBON (AC) FROM ACACIA ERIOLOBA SEED PODS USING POTASSIUM HYDROXIDE (KOH) AS AN IMPREGNATING AGENT FOR THE TREATMENT OF WASTEWATER

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Abstract

The aim of this research was to prepare activated carbon (AC) from Acacia erioloba seed pods using KOH as an impregnating agent for the treatment of wastewater. The prepared AC was characterized using various analytical techniques including Fourier transform infrared spectroscopy (FT-IR), scanning electron microscopy (SEM), Brunauer-Emmet-Teller (BET) and methylene blue (MB) for adsorption applications. MB was used in this study as a wastewater to

analyze the adsorption properties of the prepared AC's. Carbonization of the Acacia seed pods took place at 500°C for 1 hour in the furnace, thereafter it was impregnated with 15% KOH and afterwards HCl wash was done. From the results it was found that the MB dye was totally adsorbed by the prepared AC with the decolorization % ranging from 92.1% - 98.7%. The SEM showed a heterogeneous surface. BET surface area was found to be 3.1299 m²/g. The pore size of the AC was found to be in the range of 17 000 to 3 000 000 and the micropore volume was 0.014540 cm³/g. The preparation of AC from *Acacia erioloba* seed pods come out cheaper and is eco-friendly as it's an agricultural waste. From the results it can be concluded that activated carbon has good adsorption, due to the chemical agent, KOH which increases the AC surface area, creating a good porosity. This research will therefore be of good interest for the industry and for countries such as Namibia that have water stressed areas.

REMOVAL OF CONTAMINANTS FROM WASTEWATER WITH ACTIVATED CARBON PREPARED FROM ACACIA ERIOLOBA SEED PODS WITH H₂SO₄-H₃PO₄

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Abstract

The study's main purpose is to synthesize activated carbon (AC) from *Acacia erioloba* seed pods using a 5% H₂SO₄-5% H₃PO₄ activating agent and evaluate its efficiency for removing contaminants from wastewater. Two different-sized activated carbon (AC) was prepared at different carbonizing temperature. The prepared AC was characterized through physical, chemical, and physicochemical such as moisture content, PH, density, Acid and base soluble content, hygroscopic test, solvent recovery, and adsorption tests using 25mg/l methylene orange, methylene blue of 100mg/L and gammams water to evaluate its adsorption capacity. The AC was also characterized using analytical instruments such as scanning electron microscopy (SEM) to characterize the morphologies of the samples. The Brunauer-Emmett Teller (BET) evaluated the sample's surface area. The pore structure of AC was analyzed using a Transmission electron microscope (TEM), A Fourier Transform Infrared Spectroscopy (FTIR) instrument was used to characterize the functional groups on the surface of the adsorbents. A 0.2 g of 100Åµm prepared at 500° C adsorbed 34%, 33% and 87% of 25mg/l methylene orange, 100mg/l Methylene Blue and Gammams influent wastewater sample respectively. In conclusion a new method for the first time was developed with the combination of chemical agent with 5, 5 % H₂SO₄-H₃PO₄ and an environmentally friendly and economical method was developed to enhance the AC efficiency toward wastewater treatment.

**ESTIMATION OF THE NET PRIMARY PRODUCTION OF GIANT KELP (*MACROCYSTIS PYRIFERA*) AT
THE KELP BLUE SHEARWATER BAY FARM IN LUDERITZ, NAMIBIA**

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Abstract

Net primary production (NPP) is the amount of biomass or carbon produced by primary producers per unit area and time. Macroalgae such as giant kelp are one of the most productive marine macrophytes on a global scale due to their previously estimated NPP. This study aims to estimate the net primary production (NPP) potential of giant kelp (*Macrocystis pyrifera*), determine the concentrations of dissolved organic carbon (DOC), and identify the primary sources of carbon based on the comparison of stable isotope ratio measurements of DOC at the Kelp Blue Shearwater Bay farm in Lüderitz, Namibia. Remote sensing (satellite multispectral and hyperspectral images) will be downloaded and converted to Normalized Difference Vegetation Indexes (NDVI) and Enhanced Vegetation Indexes (EVI). A Multiple Endmember Spectral Mixture Analysis (MESMA) will be done on the images to get kelp canopy preliminary biomass amount. Monthly time series of kelp biomass will be generated for the farm over the study period using a combination of functions from remote sensing and field data. Further images analysis will be done to get chlorophyll to carbon ratios and the NPP will be estimated from models. The DOC concentrations will be measured using a total organic carbon (TOC) analyzer, while the stable carbon isotopic composition of DOC (DOC- $\delta^{13}\text{C}$) will be measured using an isotope ratio mass spectrometer (IRMS). Results from this study are expected to contribute to the global understanding of carbon sequestration by Giant kelp both as managed natural carbon pools and as deployable carbon capture assets.

**TOXICOLOGICAL EVALUATION OF THE POISONOUS PLANT DIPCADI GLAUCUM (WILD ONION)
USING A BRINE SHRIMP LETHALITY ASSAY**

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Abstract

Dipcadi glaucum, a notorious poisonous plant with harmful effects on livestock, was subjected to a comprehensive toxicity investigation. This study focused on the assessment of toxic compounds in the DCM (dichloromethane) and methanol extracts of *D. glaucum* bulbs and

leaves, utilizing the Brine Shrimp Lethality Assay. Toxicity was quantified in terms of LC₅₀ (Lethal Concentration for 50% mortality) through probit analysis. Each concentration of the extracts was tested with ten nauplii, and after 24 hours, the surviving shrimp were enumerated to determine mortality percentages and LC₅₀ values. The LC₅₀ values for the DCM and methanol extracts of the leaves were found to be 200 µg/mL and 329 µg/mL, respectively. In contrast, the DCM and methanol extracts of the bulbs exhibited much lower LC₅₀ values of 0.238 µg/mL and 9.77 µg/mL, respectively. The results conclusively demonstrate the profound toxicity of all the tested extracts, with the bulb extracts displaying significantly higher toxicity than the leaf extracts. These findings align with existing literature, which identifies the bulb as the most toxic component of the *D. glaucum* plant. Notably, the DCM extracts were found to be more toxic than the methanol extracts, which suggests that the most toxic compounds are relatively non-polar and hence further research to isolate toxic compounds from the DCM extract should be pursued.

**EVALUATION OF ALGINATE-MODIFIED STARCH COMPOSITE AS SHELL MATERIAL FOR
ENCAPSULATION OF MFA-DEGRADING BACTERIA FOR THE PREVENTION OF DICHAPETALUM
CYMOSUM POISONING IN RUMINANTS**

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Abstract

Dichapetalum cymosum is a poisonous plant that causes stock losses for farmers. Currently, there is no remedy or effective method for counteracting *D. cymosum* poisoning. Many studies have demonstrated the positive effect of bacteria inoculants inducing resistance in ruminants against *D. cymosum* poisoning. However, this technology has not been commercialized due to, in part, the limitations of inoculants provided in liquid form. This study reports the physicochemical characteristics and diffusion kinetics of alginate, alginate-starch composite, and alginate-modified starch (AMS) composite microcapsules for their potential use as encapsulating material to protect bacteria inoculants. The functionality of the microcapsules was evaluated by analyzing their shape, structural characteristics, size, and diffusion kinetics. The prepared microcapsules were spherical to elliptical with sufficiently different structural characteristics. Larger microcapsules were obtained from the AMS composites of sizes of about 13 µm (dry) and >29.7 µm (wet), while alginate microcapsules were the smallest, i.e., 8 µm (dry) and 17.6 µm (wet). Furthermore, it was noted that the dye release from all microcapsule formulations were by diffusion, with the composites giving the fastest dye release compared to the alginate formulation. Finally, it was concluded that AMS has great potential as an encapsulating material.

PHYTOCHEMICAL CHARACTERISATION AND ANTIMICROBIAL ACTIVITY OF *NIGELLA SATIVA* SEEDS

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Abstract

Nigella sativa is one of the medicinal plant species that gained popularity for a wide range of medicinal applications due to its seeds which are rich in phytoconstituents. Continuous scientific investigations on *N. sativa* seeds are needed to better understand its many medicinal potentials. This will also form a composition-based foundation that support several old and/ or new case beneficial histories of its seeds. In this study, the antimicrobial activity of *N. sativa* seeds was phytochemically characterised and evaluated. Different extracts of *N. sativa* seeds were obtained by maceration and soxhlet extraction methods using different extraction solvents. The obtained extracts were tested using UV-Vis, FTIR, TLC, and GCMS techniques. Antimicrobial analysis against pathogenic bacterial strains (*E. coli*, *P. aeruginosa*, *S. aureus* and *B. subtilis*) was carried out by disc diffusion method using different preparations of *N. sativa* seeds. The screening analysis revealed the presence of all the tested phytochemicals. FT-IR analysis of *N. sativa* seeds oil extracted with absolute ethanol revealed functional groups that are associated with active ingredients of medicinal value. The GC-MS chromatograms revealed different chemical constituents whose known bioactivities and/or applications are essential in the management of life-threatening infections. Different extracts of *N. sativa* seeds showed antimicrobial activity with different efficacy against the tested pathogenic bacterial strains. Therefore, this study shows that extracts of *N. sativa* seeds contain a variety of chemical components and functional groups linked to their antimicrobial properties, and they might be natural precursors of nutraceuticals.

Theme: Computing

AUGMENTED REALITY IN TEACHING OBJECT-ORIENTED PROGRAMMING CONCEPTS

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Abstract

Augmented Reality (AR), known for overlaying computer-generated content onto the real world, has shown potential in revolutionising education by making abstract concepts more tangible. One such area facing comprehension challenges is Object-Oriented Programming (OOP), a foundational concept in computer science. Through rapid prototyping approach, the study aims to develop an AR application that enhances students' understanding of OOP by allowing them to identify real-world objects and attributes and relate them to OOP

concepts. With objectives centered around designing engaging AR application features and creating an interface for real-world object and attribute identification tied to OOP, the research also aims to evaluate the accuracy of the integrated machine learning model responsible for these recognitions. Though the research is still preliminary, The AR application aims to substantially reduce the challenges students encounter in grasping OOP, potentially resulting in improved learning outcomes and increased retention rates. This study underscores the transformative capacity of AR in enhancing computer science education, seamlessly connecting abstract theories with practical real-world applications.

DEVELOPMENT OF AN AUDIO VIRTUAL ASSISTANT CHATBOT

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Abstract

Powered by OpenAI, this is a pioneering endeavour tailored to augment computer literacy among first-year students at the University of Namibia. This study introduces an intelligent chatbot designed to deliver a personalized educational experience. The chatbot's functionalities encompass interactive voice-based guidance through core computer operations, software proficiency, web browsing, research skills, coding, and troubleshooting techniques. With a focus on accessibility and convenience, this AI-driven assistant ensures 24/7 availability, real-time progress tracking, and personalized learning pathways, fostering a transformative approach to computer literacy education.

STATISTICS IN R

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Abstract

R is a popular and widely used open-source software for statistical data analysis. The aim of the talk will be about enticing interest and popularising R as a programming language. Furthermore, the overarching objective of the talk will be to illustrate the powerful capabilities of the R software to both statisticians and non-statisticians. More in particular, the presenter will briefly give tutorials on the following:

- how to import data in R from other format sources
- how to export data from R to other format sources
- how to generate and manipulate data in R

- how to use the R rbind(), cbind() and matrix() functions
- how to use the R apply () functions
- how to create own functions in R
- how to use loops in R
- how to generate graphics in R
- how to install packages in R
- introducing R-Studio as an R-programming environment

ARTIFICIAL INTELLIGENCE, CYBERSECURITY, AND ACCREDITATION

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Abstract

With the release of OpenAI's ChatGPT in November 2022, interest in Artificial Intelligence (AI) skyrocketed. AI is predicted to become a multi-trillion-dollar industry within five years. What is the hype about? Is it justified? Should one be worried? The cybersecurity industry's value is also expected to reach trillions. Child pornography, credit-card fraud, intellectual-property infringements, information and identity theft, harassment and cyberstalking, denial of service, online extortion, network takeovers via botnets, fake news, stolen funds, and ransomware impact over one billion Internet users. What is the threat? How does one cope? As university programs spring up to educate students in AI and cybersecurity, how do we know they are quality, legitimate programs? Accreditation is part of the answer. This talks ties together AI, cybersecurity, and accreditation in a seamless manner, while providing a history of computing along the way in order to gauge where computing is heading in the future.

ADAPTING PROGRAMMING TO AID STUDENTS IN PREPARING FOR FUTURE PROFESSION IN STEAM FIELDS

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Abstract

Namibia faces a significant decline in STEM (Science, Technology, Engineering, and Mathematics) graduates in recent years, primarily due to ineffective student engagement, inadequate resources, and a lack of awareness about STEM career prospects. To address this issue, this study aims to adapt a programmable tool, PictoBlox, for preparing students for STEM

careers. It involves integrating PictoBlox into STEM education to enhance learning and engagement while developing a pedagogical framework aligning it with STEM concepts. Additionally, a user interface for STEM experiments and simulations will be created.

This research is significant as it contributes to national efforts in preparing for the Fourth Industrial Revolution (4IR) by improving STEM education. The study employs a mixed-methods approach in Human-Computer Interaction (HCI) and targets educators and students in grades 3-7 who lack prior experience with PictoBlox in STEM education. Data collection includes pre and post surveys and focus group discussions to assess the impact of PictoBlox on STEM learning and engagement. Data analysis encompasses descriptive statistics for survey responses, inferential statistics, and thematic analysis of interviews and focus group discussions.

In summary, this research seeks to address Namibia's STEM education challenges by adapting PictoBlox to enhance student preparation for STEM careers. It carries the potential to significantly impact the nation's readiness for the 4IR through improved STEM learning and engagement.

Theme: Geology

GEOCHEMICAL AND ISOTOPIC CONSTRAINTS ON THE WATER BALANCE OF WETLANDS IN THE CUVELAI ETOSHA BASIN, NORTHERN NAMIBIA

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Abstract

Wetlands in Southern Africa are highly productive and biologically diverse ecosystems that contribute significantly to livelihood and economic development. During this study we propose to focus on identifying and assessing environmental constraints on wetlands in the Cuvelai Etosha Basin (CEB) located in northern Namibia. Wetlands can either serve as a recharge or discharge point for groundwater. The importance of identifying wetland/surface water groundwater interaction and dynamics is vital for groundwater management practices especially in areas of shallow water table. Sustainability of wetlands in study area has not been assessed, thus this proposed study aims to quantify and understand the geohydrological processes, fluxes, the lateral and vertical extents and interactions of wetland-groundwater ecosystems in northern Namibia. A combination of hydrochemistry, stable isotopes ($\delta^{2}\text{H}$ and $\delta^{18}\text{O}$) and geophysics (namely electromagnetics and magnetism) will be employed to assess major hydrological processes, and structures significantly influence the lateral and vertical extent of wetland-groundwater ecosystems, which in turn, play a crucial role in regulating groundwater recharge/discharge dynamics and water quality. Then field trips will be concentrated at two study sites: areas covering Lake Oponono, which is situated about 70 kilometres north of Etosha Pan and the areas surrounding Okongo, which has identified perched aquifers. Both these locations are classified as wetland ecosystems.

INVENTORY AND QUALITATIVE ASSESSMENT OF THE GROUNDWATER MONITORING STRATEGIES AND NETWORKS IN THE KARST AQUIFER: A SOURCE TO THE CENTRAL AREA OF NAMIBIA

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Abstract

The protection and control measures of groundwater sources are started by locating groundwater-monitoring networks and making sure, they are in good working conditions. A better understanding of groundwater monitoring strategies and networks is needed to protect resources from over-abstraction and deterioration. The study focused on doing an inventory and an assessment of the groundwater monitoring strategies and networks available for the Karst Aquifer, in Namibia. This is an aquifer of importance as it supplies millions of cubic meters per year to the Central Areas of Namibia (CAN), including Namibia's capital city Windhoek. An inventory was conducted by collecting available information on the groundwater monitoring strategies and networks for the Karst Aquifer. It found that the institutions responsible for groundwater monitoring in the Karst are the Ministry of Agriculture, Water, and Land Reform (MAWRL), Namibia Water Corporation (NamWater), farmers, and municipalities. It also found that there are groundwater-monitoring networks for MAWRL and NamWater, that are collecting data on groundwater levels, abstraction volumes, and groundwater quality. The assessment found that there is no clear knowledge of how the monitoring networks were set up, however, the monitoring data collected from these networks still provide relevant information that influences groundwater management decisions. In addition, there are clear institutional practices on data collection, storage, analysis, and dissemination, as well as laws, policies, and acts that mandate the responsibility of monitoring.

Theme: Mathematics

OPTIMIZING RUIN PROBABILITY THROUGH REINSURANCE WITH INCLUSION OF INVESTMENT AND DIVIDEND PAYMENTS

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Abstract

We consider an insurance company whose reserves dynamics follow a diffusion-perturbed risk model. To reduce its risk, the company chooses to reinsure using proportional or excess-of-loss reinsurance. Using the Hamilton-Jacobi-Bellman (HJB) approach, we derive a second-order Volterra integrodifferential equation (VIDE) which we transform into a linear Volterra integral equation (VIE) of the second kind. We then proceed to solve this linear VIE numerically using the block-by-block method for the optimal reinsurance policy that minimizes the ultimate ruin probability for the chosen parameters. Numerical examples with both light- and heavy-tailed distributions are given. The results show that proportional reinsurance increases the survival of the company in both light- and heavy-tailed distributions for the Cramer-Lundberg and diffusion-perturbed models.

Theme: *Statistics*

STATISTICAL MODELING THE PERFORMANCE OF UNIVERSITIES: A CASE STUDY

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Abstract

Resource management is a planning process leading to the allocation of resources such as money, technology, and people to achieve optimal organizational performance. Statistical information such as student-to-staff ratio and staff expenditure-to-student ratio are used as measures of academic resource distribution within a university setup. Thus, the study analysed student academic performance in relation to student-to-staff ratio and staff expenditure-to-student ratio. The study's methodological approach involved a quantitative cross-sectional descriptive research design, applying secondary quantitative data (2022 academic year) from the university. The study has demonstrated and supported the education hypothesis; student-to-staff ratio is negatively associated with student academic performance. Staff expenditure-to-student ratio is positively associated with student academic performance. There is a need to reduce the student-to-staff ratio to achieve improved student academic outcomes. Educational programmes need to adopt self-directed learning philosophy, so that staff expenditure-to-student ratios are reduced.

Theme: *Others*

A BIBLIOMETRIC ANALYSIS OF RESEARCH AT THE UNIVERSITY OF NAMIBIA

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Abstract

Bibliometric analyses of journals and research institutions have been carried out in several studies and countries. These studies mainly use mainstream bibliographic databases (Scopus and Web of Science [WoS]) as the primary sources for their bibliometric analysis. However, such studies are yet to be conducted for Namibian journals, research institutions, and Namibia as a country. Much more, bibliometric analyses and mapping to examine the research output of a research institution in Namibia are yet to take place. In addition, no existing bibliometric studies in Africa have combined data from Scopus, WoS, and Institutional Library Repositories. This thesis addresses these limitations within a study on research output, specifically, the evaluation of the University of Namibia. In order to achieve this aim, this thesis conducted a bibliometric analysis of the University of Namibia (UNAM)'s research output for the duration of (2010 to 2019). The investigation included various research aspects such as the volume of research output, authorship patterns, and whether the publication outlets are national or international. In doing so, the study developed the first comprehensive database of UNAM's research output from 2010-2019 and the first such knowledge database in Namibia. Data for the bibliometric analysis were obtained from three bibliographic databases: UNAM-IR, Scopus, and WoS. UNAM-IR was added to reflect the value of using institutional research databases as additional bibliometric data sources. Patterns of research production and research collaboration of UNAM staff members were profiled. This enabled the identification of the collaboration patterns of UNAM staff members as depicted in the publications. The author-level analysis compared the percentages of articles with research collaboration and the authors involved in research and publication. The study's results can potentially enrich further bibliometric studies on research evaluation for other research institutions in general and in Namibia particularly. They equally have the potential to further the national bibliometric studies for Namibia as a whole. The developed comprehensive database of UNAM's research output can also be used as a background for developing a national knowledge database. However, the study's most significant contribution is integrating two mainstream bibliographic databases (Scopus and WoS) with the UNAM-IR to create a new database of Namibian-authored articles. Fittingly, recommendations with a view of further study and research policy generally and specifically for UNAM have been made.

ANALYZING THE INFLUENCE AND EFFECTIVENESS OF REGIONAL ECONOMIC COMMUNITIES IN ADVANCING THE IMPLEMENTATION OF THE SINGLE AFRICAN AIR TRANSPORT MARKET

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Abstract

The African continent is currently undergoing a period of significant change in the field of aviation due to the establishment of the Single African Air Transport Market (SAATM). This initiative, which is a key project of the African Union's (AU) Agenda 2063, aims to dismantle the historical obstacles that have hindered air travel within Africa according to International Air Transport Association (IATA). This study undertook a comprehensive analysis of the influence and effectiveness of Regional Economic Communities (RECs) in advancing the implementation of SAATM . The objective was to conduct a thorough analysis of the impact and efficacy of RECs in promoting the realization of SAATM and to offer perspectives on aligning continental and regional aviation policies. The study revealed the valuable insights for policymakers at both continental and regional levels regarding the optimization of collaboration between the African Union and RECs. These insights can inform the development of more effective policies and strategies aimed at harmonizing aviation regulations, fostering competition, and enhancing air connectivity. Authoritative sampling was used wherein the researcher selected units to sample based on their prior knowledge or professional expertise in order to examine the fragment aviation phenomenon. Data was acquired through comprehensive semi-structured interviews that supplemented some reflective journals.



*Compiled by Mr. Petrus S Shanika
Edited by Dr Mwangala Nalisa
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