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Webpage: email: *dean@sabs.jkuat.ac.ke*

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COLLEGE OF ENGINEERING AND TECHNOLOGY (COETEC), JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY (JKUAT).

MESSAGE FROM THE OUTGOING DEAN, SABS

Professor Gerryshom Munala (Dr. Techn), MAAK, Reg. EIA/EA-Lead Expert.
Dean, School of Architecture and Building Sciences (SABS).

This inaugural Book of Research Abstracts for the School of Architecture and Building Sciences is a demonstration of growth that has been taking place since the inception of the Faculty. I would like to take this opportunity to thank the editorial team for compiling these abstracts. What we are having is a testimony of the magnificent contribution of faculty researchers and students – questions/inquiries, research, creativity, and critique of the built environment.

Our Faculty is built on the commitment and excellence of all its current members and those who came before us. Our research spans from pure artistic research and investigations in aesthetic questions in architecture to technological research in developing sustainable built environment for the future. As we launch this inaugural edition of Book of Research Abstracts, we are now perched on a magnificent springboard for escalating to new heights as we welcome a much-needed influx of resources and people.

Many events of the recent past have taught us that we need not to be complacent but more vigilant as we look into the future. We need to look down the line and start rethinking now what our school should be like in five, 10 and 25 years. What training will be necessary for the future built environment profession? What areas should our research efforts be directed towards? Where will our opportunities lie and how can we make the most of our position as a leading school in the region.

For now, the excitement is overwhelming. I look forward to a very exciting prospect for more inclusive Books of Research Abstracts in the coming years. I see a bright future for SABS. Hongera!

MESSAGE FROM THE INCUMBENT DEAN, SABS

Professor Titus Kivaa Peter (PhD), RQS, FICPMK, PIQSK.
Dean, School of Architecture and Building Sciences (SABS).

In SABS research is conducted by staff and students alike in varying degrees of intensity. Featured here is a collection of executive summaries of recent research undertaken in the school. The effort seeks to foster internal sharing of the research outputs within SABS while boosting dissemination of the research findings to the public. This should enhance injection of ideas by researchers into sustainable development initiatives in the Kenyan society and beyond.

Research activity in SABS is purposefully driven to address various individual, corporate, institutional, national, and global research questions exhaustively, and to form concrete foundations for synthesizing innovations for dynamic and sustainable development. Accordingly, the Editorial Board has highlighted the sustainable development goal (SDG), which is addressed in every research work presented here. This highlight underscores the contribution of SABS researchers in the production of data-based sustainable development solutions for Kenya. Consequently, innovations and entrepreneurships based on the research findings should increase the SDG Achievement Index for the sector and Kenya considerably. Further, this documentation feeds into the endeavour of the Sustainable Development Solutions Network (SDSN) Kenya Chapter.

The reader is invited to reflect and critique the research issues addressed. While author liability for content and authenticity here holds, the Editorial Board assures the reader of the quality of author submissions. Where arguments are unclear or interest for further information emerges, SABS may be consulted for additional content, and the full research reports.

SABS members whose research works were not captured in this inaugural edition are encouraged to peruse this collection, and to submit their research works for inclusion in the future editions. We are leaving no one behind.

Editorial Note

Jomo Kenyatta University of Agriculture and Technology (JKUAT) aspires to be a hub of global excellence in Training, Research, Innovation and Entrepreneurship for development. Accordingly, it seeks to participate in the discovery, transmission and preservation and enhancement of knowledge. Integral to this aspiration is the venture to stimulate the intellectual participation of students in the economic, technological, agricultural, professional, and cultural development of Kenya. On its part, the School of Architecture and Building Sciences (SABS) at the JKUAT aims to undertake research in various areas of the built and natural environment as well as in allied disciplines, while keeping abreast of national development by engaging in various academic discourses.

The value of scholarly inquiry and publication that is emphasised at both the school and university level will most effectively flourish when entrenched at the very foundational level of undergraduate learning through a dynamically adapting, empirical and contextually relevant research-based learning orientation. This paradigm is ideally then progressively integrated into learning and research up from the undergraduate and graduate to the doctoral and post-doctoral levels.

Alignment to the sustainable Development Goals (SDGS), that are cascaded down to Agenda 2063, the New Urban Agenda (UN HABITAT III, Quito 2016), GoK vision 2030 and NACRA 2020-24, in learning and research that is represented in this ensemble of inquiry provides suitable local and global anchorage to pertinent, current developmental themes. The inquiry that is featured here interrogates the subject area of environmental planning and provides novel solutions along diverse themes and sub-themes emanating from SDGs 2, 3, 4, 6, 9, 11,13, and 15 and their equivalents in the Agenda 2063. The endeavour to develop knowledge at a doctoral level examines prevailing reality for SDGs 9 & 11, in the context of facilitating sustainable and resilient infrastructure development and supporting domestic technology development, research, and innovation.; access to natural and contrived green spaces; urban resilience and sustainability; sustainable transport planning; conservation of heritage and cultural identity; and sustainable cities and human settlements. At the master's degree level inquiry embraces SDG 6 & 11 pursuing knowledge in respect of climate change and population growth impacts on access to quality drinking water; and inclusive, safe, resilient, and sustainable cities and human settlements. The undergraduate level in its turn contemplates the local context and its theoretical underpinnings within SDGs 2, 3, 4, 11, 13 & 15 and their equivalents in the Agenda 2063, along the themes of, Zero hunger, health and population; inclusive education; safe, resilient, and sustainable cities and human settlements; urgent action to combat climate change and its impacts; and sustainable management of forests-combating desertification-reversing land degradation-and halting biodiversity loss. urbanism.

The scientific discourse that is laid out here enjoys the benefit of a multidisciplinary approach within the subject area of the built environment. This is beneficial a disposition that presents opportunity to examine every situation with rigour and to offer more holistic solutions. This series of Annual Books of Abstracts and its related complements of SABS Journals, Policy Briefs as well as Research and Innovation Dialogues are designed to promote precisely such an outlook.

Research that is presented here is anchored on the intensified application of the Science, Technology, and innovation (STI), a foundation that is designed to raise productivity and efficiency across all three pillars (economy, society & governance – politics) of Kenya's vision 2030. It provides proceeds of research for development that can accelerate economic development of a newly industrialising nation, Kenya.

The research work specifically aligns to the social pillar of Kenya's Vision 2030. This pillar seeks to attain a just and cohesive society, enjoying equitable social development in a clean and secure environment. It's intentions are variously addressed in research here as articulated in a social strategy that purposes to invest in the people of Kenya through the diverse goals of (1) education & training; (2) an efficient and high-quality health care system; (3) conservation and management and improved access to safe water and sanitation; (4) a clean secure and sustainable environment; (5) adequate, decent and high quality urban livelihoods; (6) and finally equality of opportunity in accessing public services and providing income generating activities in a drive to achieve equity and poverty elimination.

Research here also embraces research in the key technical disciplines of the National Construction Research Agenda (NACRA). These include (1) construction technology and materials; (2) capacity development; (3) construction management; (4) risk and safety management; (5) Environment; (6) construction economics; (7) legal and regulatory framework; and (8) governance.

Editor-in-Chief
Prof. Paul Mwangi Maringa (PhD), CBS, FAAK, MKIP,
Adjunct Professor of Architecture and Planning

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Sustainable Development Goal (SDG) 09

Industry, Innovation, and Infrastructure

Build Sufficient Resilient Modern infrastructure, Promote Sustainable Industrialisation and Foster Innovation without damaging the Environment and its Biodiversity.

Themes:

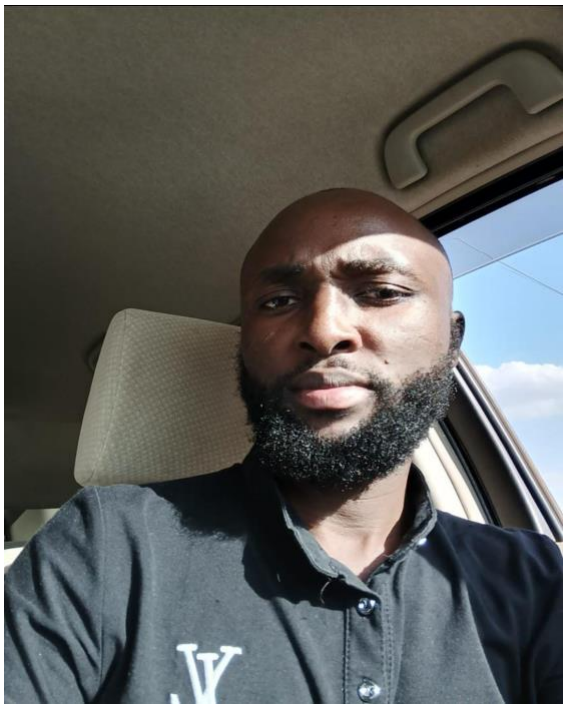
1. Facilitate Sustainable Resilient Infrastructure Development.
2. Support Domestic Technology Development, Research, and Innovation.

Agenda 2063 Goal 04

Transformed Economies

Theme:

Science Technology & Innovation (STI) driven Manufacturing, Industrialisation, and Value addition.



A FRAMEWORK FOR ENHANCING THE ORGANIZATIONAL PERFORMANCE OF LOCAL CONTRACTORS IN KENYA.

Researcher: Shadrack Mutungi Simon, BCM, MCPM, Ph.D. CPM, JKUAT, smutungi@sabs.jkuat.ac.ke

Supervisors: Titus Kivaa Peter, BA, MA (UoN), PhD (JKUAT), RQS, MAAK, CIQSK, kivaambiti@gmail.com, tkivaa@jkuat.ac.ke & Prof. Mugwima Njuguna Bernard, B.Arch. (Hons), M.A. Planning, Cert CMHB, Ph.D., MAAK (A), M.ICOMOS, Registered Architect, JKUAT, mugwima@sabs.jkuat.ac.ke.

SDGs 9: Industry, Innovation, and Infrastructure/**A-2063 G 4:** Transformed Economies.

SDG 9 Theme: Facilitating Sustainable and Resilient infrastructure development/**A-2063 G4 Theme:** STI driven manufacturing, industrialization, and value addition.

Sub-theme: Generating employment and income through innovation.

BIOGRAPHY:

Mutungi holds a Bachelor's degree in Construction Management, Master of Construction Project Management, and Ph.D. in Construction Project Management, all from the Jomo Kenyatta University of Agriculture and Technology (JKUAT). He is a lecturer at the Department of Construction Management, JKUAT and the current convenor of the School of Architecture and Building Sciences (SABS) Post graduate Committee. He is a practicing Construction Project Manager and a Managing Director of a construction contracting company. He is a corporate member of the Association of Construction Managers of Kenya (ACMK). Mutungi has been a key resource person for the Research Department at the National Construction Authority (NCA).

ABSTRACT:

Foreign construction firms have increasingly dominated the Kenyan construction industry over the last couple of years. The main reason for the continued foreign dominance in the local construction industry has been attributed to poor organizational performance by the local contractors. Some of the weaknesses associated with local contractors include poor workmanship, below-par management capability, deficient planning, inadequate mechanization, and project abandonment among others. Whilst it is generally agreed that the organizational performance of local contractors is insufficient, such a notion is arbitrary and most of the time based on anecdotal evidence. This study, therefore, sought to evaluate the organizational performance of local contractors, establish its determinants, and propose a framework for enhancing it, to ensure they compete favourably with their international counterparts. Reviewed literature established ten major dimensions of organizational performance and ten determinants drawn from both the internal and external environment of the contractor. Philosophically, this research was anchored on objectivism and positivism. While a quantitative research strategy was adopted, a survey research design was selected. Questionnaires were chosen as the data collection instruments. A sample size of 612 drawn from NCA1, NCA2, and NCA3 local contractors and registered consultants who had worked with these contractors in current or previous projects was adopted. Quantitative data was analysed using descriptive statistics,

bivariate correlations, multiple regression, and structural equation modelling. Qualitative data was analysed thematically. Based on ten dimensions drawn from both financial and non-financial aspects, the overall level of organizational performance of local contractors in Kenya was established to have a mean of 6.374 when measured on a scale of 1 to 10. Such performance was described as suboptimal. The determinants which represent the environment in which local contractors operate were found to have a mean of 6.468. Further results indicated there were significantly strong positive relationships between the determinants and dimensions of organizational performance. It was therefore concluded that the organizational performance of local contractors can be improved by enhancing the internal and external environment in which they operate. A framework for achieving such was formulated and validated. It was recommended that there was a need for local contractors to constantly evaluate their organizational performance regularly and continuously seek to improve their internal environment while at the same time adapting to the prevailing external environment.

Keywords: Determinants; Dimensions; Local Contractors; Organizational Performance; Structural Equation Modelling

MODEL FOR EVALUATING PERFORMANCE OF CONSTRUCTION PROJECTS INITIATED BY THE CONSTITUENCIES DEVELOPMENT FUND IN KENYA: A CASE STUDY OF SIAYA COUNTY.

Researcher: James Ouma Okaka, BA, MA (UoN), PhD (JKUAT), RQS, MAAK, CIQSK, oumaokaka@gmail.com, jokaka@jkuat.ac.ke

Supervisor: Prof. Titus Kivaa Peter, BA, MA (UoN), PhD (JKUAT), RQS, MAAK, CIQSK, kivaambiti@gmail.com, tkivaa@jkuat.ac.ke & Dr. Ahmad Alkizim, BA, MA (UoN), PhD (JKUAT), RQS, MAAK, CIQSK, aalkizim@gmail.com, ahmad.alkizim@jkuat.ac.ke

SDGs 9: Industry, Innovation, and Infrastructure/**A-2063 G 4**: Transformed Economies.

SDG 9 Theme: Facilitating Sustainable and Resilient infrastructure development/**A-2063 G4 Theme:** STI driven manufacturing, industrialization, and value addition.

Sub-theme: Generating employment and income through innovation.

BIOGRAPHY:

Dr. James Ouma Okaka is a registered, practicing Quantity Surveyor with 20^{+} years' experience in the construction industry. He is currently the Chairman of the Department of Construction Management at the JKUAT where he taught Quantity Surveying and Construction Management since 2005. He specializes in construction project planning and control, construction measurement and costing, construction project monitoring and evaluation, and affordable housing. He is currently supervising several post graduate students and has published several papers in peer reviewed journals. Prior to joining JKUAT Dr. Okaka worked as a Quantity Surveyor at the National Housing Corporation, supporting the implementation of housing policies and programmes in Kenya.

ABSTRACT:

Evaluation of projects initiated by the National Government Constituencies Development Fund (CDF) is critical to the assessment of their performance levels, offer public accountability, maximize benefits, and generate feedback for future improvements. Despite providing for public participation in monitoring and evaluation of the projects, the CDF Act does not provide a framework to be followed. This situation has led to individuals and organizations giving their subjective outcome of evaluations based on varied criteria. As a result, the criteria for evaluating the performance of construction projects executed through the CDF remains vague. For this reason, this study aimed at developing a standardized post-project review framework that can be utilized to evaluate the performance of construction projects initiated by CDF and identify the project management practices (performance factors) that are critical for the success of the projects. The specific objectives were: (1) to describe performance criteria for construction projects initiated by CDF; (2) to describe the determinants of performance for the construction projects; (3) to explain the relationship between project performance and its determinant factors; and (4) to develop a regression model for evaluating project performance. Similarly, the study reviewed related pieces of literature focused on performance evaluation of similar projects to identify the various types of frameworks that have been developed over time and assessed each for its suitability in evaluating the performance of CDF construction projects. However, none of the existing frameworks was found to suit the evaluation of the performance of CDF construction projects. Besides, the study proposed an eclectic conceptual framework which is a modification of Baccarin's model of measuring construction project performance. The conceptual framework is for postimplementation review and forms the basis on which the variables measured during fieldwork were developed. The study drew evidence from survey responses of 51 construction projects within Siaya County in Kenya. Statistical Package for Social Sciences (SPSS) software was then used to analyse the data, and the research findings generated presented in tables and figures. The study sampled all the 51 projects for analysis. Besides, the research also utilized descriptive and inferential analysis methods in data synthesis. Under the inferential analysis, Pearson's correlation and Regression analysis were used to determine the significant factors affecting the performance of a project as well as establish a predictive model. Descriptive statistics, such as mean and variance, were used to describe project performance and the factors determining the performance of a project. The findings of this study sought to benefit project implementers, members of the public, policymakers as well as academia as it forms a basis for further research. xvii The findings of this study suggest that there was a positive and statistically significant linear relationship between the performance level and monitoring and control, financial resource, community involvement, stakeholder management, feedback capabilities, and knowledge of CDF management guidelines. A model was then established using these variables and was found to explain 73.3% of the variation in the project's performance level and, therefore, the model was good at predicting project performance. It was concluded that monitoring and control, financial resources, community involvement, stakeholder management, feedback capabilities, and knowledge of CDF management guidelines are critical factors for the performance level of CDF construction projects in Kenya. A recommendation was made that the model should be adopted for the evaluation of the performance of CDF construction projects. Apart from being an evaluation tool, the developed model can be useful in predicting performance level of a project at any stage of implementation; controlling the critical factors to improve the performance of a project; and, providing an explanation for decision-making in planning and policy formulation relating to CDF construction projects.

Keywords: **Constituencies Development Fund, Project Performance Criteria & Factors.**

INFLUENCE OF PERSONAL ETHICS OF CONSTRUCTION PROJECT PARTICIPANTS ON PROJECT PERFORMANCE IN KENYA

Researcher: Adeline Mercy Dindi, B. LArch. (Hons.), M.E.P.D, PhD, MAAK (Landscape Chapter), M.EIK, JKUAT, adindi@jkuat.ac.ke.

Supervisors: Prof Gerryshom Munala, B.Arch., MEPM, Dr. Techn., MAAK, JKUAT, gmunala@sabs.jkuat.ac.ke; Prof. Titus Kivaa Peter, BA, MA (UoN), PhD (JKUAT), RQS, MAAK, CIQSK, kivaambiti@gmail.com, tkivaa@jkuat.ac.ke & Dr. Ahmad Alkizim, BA, MA (UoN), PhD (JKUAT), RQS, MAAK, CIQSK, aalkizim@gmail.com, ahmad.alkizim@jkuat.ac.ke; Prof Christine Gichure, B. LArch. (Hons.), M.E.P.D, PhD, MAAK (Landscape Chapter), M.EIK, Strathmore University; cgichure@strathmore.edu.

SDGs 9: Industry, Innovation, and Infrastructure/**A-2063 G 4:** Transformed Economies.

SDG 9 Theme: Support Domestic Technology Development, Research, and Innovation /**A-2063 G4 Theme:** STI driven manufacturing, industrialization, and value addition.
Sub-theme: Generating employment and income through innovation.

BIOGRAPHY:

Dindi has a PhD in Construction Project Management from the Jomo Kenyatta University of Agriculture & Technology (Kenya), a Master's degree in Construction Management from University of Nairobi (Kenya) and a degree in Building Economics from the University of Nairobi (Kenya). At the JKUAT in the School of Architecture and Building Sciences, she teaches in the department of Construction Management in areas of Construction Law, Construction Management and Quantity Surveying. She is the Post Graduate coordinator for the department. She is a registered Quantity Surveyor and member of the Board of Registration of Architects and Quantity Surveyors in Kenya.

ABSTRACT:

Personal ethics of participants in a construction project is likely to influence delivery of the construction project. However, this ethics has hitherto not been well captured in explanations of variability of project performance. Project management success is an area of big concern, not only in Kenya, but in the whole world since there seems to be recurring issues of cost overruns and time delays and a different way of looking at things is needed to try and improve delivery. A lot research has been done on factors that affect project success, yet the industry seems to experience the same kind of problems in delivery and in spite of extensive research, it does not seem to improve as witnessed by continued unethical incidents in construction. There is a school of thought, however, that proposes looking more in to the soft side of these factors, in order to improve delivery. One of these soft, non-technical issues is the personal ethics of project participants. This study investigates the place of personal ethics of project participants in project management success using a virtue ethics approach. The specific objectives of the study are (i) to establish the performance of construction projects in Kenya ii) to determine the personal ethics of construction project participants in Kenya iii) to establish the relationship between personal ethics of project participants and project performance iv) to develop an ethics scale for construction participants in the industry. A survey

research design was adopted in the data collection and analysis. A structured questionnaire was used to collect the data. Statistical analysis, specifically correlations and regression analysis were used to establish the relationship between project performance and personal ethics. The data analysis results showed that there was no significant relationship between the virtues of participants and project management success (performance), however, there was a significant positive relationship between the behaviour of participants and project success, and by implication between personal ethics of project participants and project performance. In theory virtue manifests in people's behaviour. However, the respondents' association of project performance and behaviour was easier than their associating project performance and virtue hence the difference in correlations. The results also show that generally a construction participant is someone who should have integrity, affable, accommodating, and fair. The researcher recommends that personal ethics be included amongst the factors that affect project performance, in professional practice of construction project management and research work. Additionally, the researcher recommends a virtue scale that could guide in the choice of participants in future projects.

Keywords: **Behaviour, project management success & performance, virtues ethics scale.**

MODELLING OF CONCRETE PERFORMANCE BASED ON QUALITY ATTRIBUTES OF DIFFERENT FINE AGGREGATES.

Researcher: James Maina Kiambigi, BSc. Civil Engineering, MTB, MBA, PhD, MIEK, MKIP, MICPMK, MEIK, JKUAT, mkiambigi@jkuat.ac.ke

Supervisors: Dr Abednego Oswald Gwaya, B.Qs, MA, PhD, Reg.Qs, JKUAT, agwaya@jkuat.ac.ke & Prof. David Otieno Koteng, B.Sc., Civil, MIEK, CE, PhD, TUK, David.koteng@tukenya.ac.ke.

SDGs 9: Industry, Innovation, and Infrastructure/**A-2063 G 4:** Transformed Economies.

SDG 9 Theme: Support Domestic Technology Development, Research, and Innovation /**A-2063 G4 Theme:** STI driven manufacturing, industrialization, and value addition.

Sub-theme: Generating employment and income through innovation.

BIOGRAPHY:

Maina Kiambigi, with over twenty-eight years of experience in Training and Consultancy in the field of Engineering, Planning and Environment, and driven by integrity, respect and quality engineering has delivered illuminating Lectures, professional training, and consultancy in various projects in the built environment. He has a PhD in Construction Project Management, Masters in Planning, Professional Masters in Tall Buildings, Masters in Business Administration and BSc., In Civil Engineering. He is a registered professional with the Engineers Board of Kenya (EBK), Physical Planners Registration Board (PPRB), National Environmental Management Authority (NEMA), and a member of their pertinent professional bodies (IEK, EIK, ICPMK, & KIP).

ABSTRACT:
Fine aggregate has extensively been used in the construction industry as a key component in concrete production. One of the major sources of fine aggregates is river sand. The use of river sand as the primary source of fine aggregate has resulted in over-exploitation leading to diminution and environmental degradation. This has led to exploration of other sources to safeguard depletion and reduce the negative impacts on the environment. This research was conducted on a variety of river sands and other fine aggregates used in Nairobi Metropolitan to assess their suitability for use in concrete manufacture. The fine aggregates were sourced from six locations that popularly supply the Nairobi Metropolitan area; natural river sands from Mwingi (S2), Kajiado (S3) and Machakos (S5); rock sand and quarry dust (S4 and S7) from Mlolongo and Sand from Naivasha quarry (S6). An experimental approach was adopted to test the physical, chemical, and mineralogical properties of the fine aggregates and the resultant concrete strength after 7, 14, 28, 56, 112, 180 and 360 days was recorded. The physical properties were established in accordance with the British Standards test methods while chemical properties were obtained using Atomic Absorption Spectrometry (AAS) and validated using X-Ray Fluoresce (XRF) method. The mineralogical properties were determined using the X-Ray diffraction (XRD) method and counter checked with the secondary data on the geological formation of the catchment areas. Concrete mix design using the different samples was done for C30/37 concrete using Department of Environment (D.O.E.) /British method. A universal testing machine (UTM) was used to determine the compressive strength of the concrete. To achieve reliability, three cubes for each sample were crushed and the mean of the values taken as the compressive strength for that particular batch. All the fine aggregates not only had different physical and chemical properties but also failed to meet permissible limits for concrete production. The target mean strength of concrete 30/37 was achieved at different ages due to the variation in properties. Mlolongo rock sand (S4), Naivasha sand (S6) and Mlolongo quarry dust (S7) took longer to achieve the strength with S7 taking 180 days. A multiple linear regression analysis was conducted with the inclusion of Physical and chemical properties on the data sets to predict the compressive strength of concrete at 7, 14, 28, 56, 112, 180 and 360 days. The model yielded satisfactory coefficient of determination and curves were comparable to ACI and BS model.

Keywords: **Concrete, concrete products, SHM, graphene, environment, AI.**

Sustainable Development Goal (SDG) 11

Sustainable Cities and Communities

Theme:

Inclusive, safe, resilient, and sustainable cities and human settlements.

Agenda 2063 Goal 01

A high standard of living, quality of life and well-being of all citizens

Theme:

Modern, affordable, and liveable habitats and quality basic services

INFLUENCE OF SPATIAL CHARACTERISTICS ON UTILIZATION OF URBAN PARKS IN NAIROBI CITY COUNTY.

Researcher: Stella Kasiva Mbiti, B. LArch. (Hons.), M.E.P.D, PhD, MAAK (Landscape Chapter), M.EIK, JKUAT, mbitistella@sabs,jkuat.ac.ke, mbitistella@gmail.com

Supervisor: Dr. Micah Makworo, B.Arch., M.A., PhD., MAAK, JKUAT, micahmakworo@sabs.jkuat.ac.ke, & Prof. Caleb Mireri, B.Arch. (Hons), M.A. Planning, Ph.D., MKIP, JKUAT, calebmireri@yahoo.com

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Universal access to safe, inclusive, and accessible, green, and public spaces.

BIOGRAPHY:

Stella holds a PhD degree in Landscape Architecture from Jomo Kenyatta University of Agriculture & Technology (JKUAT), and a Masters of Environmental Planning & Management from Kenyatta University. She is a graduate landscape Architect, and a lecturer in the department of Landscape Architecture at the JKUAT. Currently, she is the National Manager, Sustainable Development Solutions Network (SDSN) Kenya, a member of the secretariat, Food, Land Use Coalition (FOLU) Kenya and the Kenyan representative, Food Environment, Land & Development (FELD) Catalyst Programme. She is mission - driven with 10+ years of teaching, research, innovation and providing expertise in implementing SDG's and the Paris Agreement in Climate Change.

ABSTRACT:

In spite of the vital roles of urban parks in cities, parks in Nairobi City County (NCC) continue to suffer excessive variation in use. However, the factors influencing this variability are not yet explained empirically. In practice, the design, management, and rehabilitation processes of urban parks within NCC are based on unstructured methods such as periodic survey, to establish the challenges facing the parks and possible intervention measures. These processes are subjective and unreliable and are therefore likely to give unauthentic practices such as park designs, rehabilitation, and management guidelines since they do not adequately take into account the many factors that influence park use. Eventually, this may lead to fast decline in quality, congestion, under use and obsolescence. This study investigates the contribution of spatial characteristics on urban parks utilization in NCC in Kenya. From literature, 13 spatial characteristics were observed for analysis namely: size of space, surface material, accessibility, visual connectivity, adjacent neighbourhood characteristics, vegetation characteristics, environmental quality, built environment, distance to park spaces, security, overall design layout, space aesthetics and park features. In order to achieve the study aim, three specific objectives were set as follows: to analyse independent variables that have a significant relationship with the dependent variable for use in regression analysis in the study of urban parks; to determine the extent to which particular independent variables predict park

utilization and to formulate guidelines for enhancement of utilization of urban parks in NCC in Kenya. The study adopted a quantitative research strategy and a survey research design. Data were collected from a random sample of convex spaces generated from the six gazetted urban parks base maps. An observation schedule and an interview schedule were used to collect the data and analysis carried out using the Statistical Package for Social Sciences (SPSS for Windows Version 20). Statistical procedures adopted in the study include correlation analysis and multiple linear regression and the significance of the relationships was tested at 95 percent confidence level. Results of the study reveal a significant relationship between spatial characteristics and urban park utilization. Eight independent variables were found to have a significant correlation with the dependent variable hence considered for regression analysis. Nine (9) predictive models useful in explaining which specific predictor variable explains a specific response surrogate and to what measure were development. Eventually, design guidelines that inform park designs at various stages of park development were formulated. It is concluded that spatial characteristics play a significant role in park utilization. To optimize park utilization in NCC, these factors should be purposively considered in park design and the development process, following the models developed in this study. Finally, further research should be pursued to increase the explanatory power (R2 values) of the independent variables, and to establish other empirical models for parks in other 46 counties of Kenya. Key terms: Urban parks, park utilization, spatial characteristics, park participation, engagement in park activities.

KEY TERMS: **Urban parks utilization, participation, spatial characteristics & activity engagement**

CONTRIBUTORS TO SUSTAINABILITY OF PUBLIC OPEN SPACES IN NAIROBI, KENYA: AN EVOLUTIONARY APPROACH.

Researcher: Teckla Muhoro, B.Arch. (Hons.), M. Arch. (Hons), PhD, JKUAT, PhD, MAAK, JKUAT, tmuhoro@jkuat.ac.ke.

Supervisor: Prof. Bernard Otoki Moirongo, B.Arch., M.A., Dr. Techn., MAAK, JKUAT, bmoirongo@jkuat.ac.ke & Prof. Mugwima Njuguna Bernard, B.Arch. (Hons), M.A. Planning, Cert CMHB, Ph.D., MAAK (A), M.ICOMOS, Registered Architect, JKUAT, mugwima@sabs.jkuat.ac.ke.

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Universal access to safe, inclusive, and accessible, green, and public spaces.

BIOGRAPHY:

Muhoro holds a Bachelor's degree in Architecture (Hons), a Master's degree in Architecture (Hons), and a Doctorate in Urban Design (JKUAT). She is also a post-doctoral fellow from the University of

Witwatersrand, SA. At JKUAT School of Architecture and Building Sciences she is a lecturer in the areas of building design, research methodology, urban theory/history, and urban space/ city morphology. She is a member of Women in Real Estate Kenya and the Mentoring Network for African Women in Academia.

ABSTRACT:
Public open spaces play a significant role in the life, form, and human experience of cities. Growth of towns and cities results in greater urbanization within countries. Urban growth means increased numbers of people in cities who require access to social amenities. These social amenities include public open spaces in cities such as Nairobi. In Nairobi's case, multiple public open spaces in its Central Business District (CBD) are under-utilized. These spaces do not fully perform their role as publicly accessible areas for commerce, transportation, transit, and recreation. There is therefore a dichotomy comprising an increased demand for public open spaces on one hand and a non-optimal use of such existing spaces on the other. This research focused on elements of urban form and usage that entailed study of public open spaces and surrounding environments. Fifteen public open spaces in the Nairobi CBD were investigated. Six key variables were identified for analysis namely connectivity, density, enclosure, land use, space size, and tree cover. Through these, the research established the spatial evolution of public open spaces in the CBD from 1963-2015. It then established the social, economic, environmental, and governance factors that influence the sustainability of public open spaces. Thirdly it established the relationship between spatial evolution and sustainability of public open spaces in the CBD. The thesis hypothesized that the sustainability of public open spaces in Nairobi CBD is influenced by social, economic, environmental, and governance factors. A descriptive and quantitative approach was employed in this research. Therein, social, economic, environmental, and governance variables were used to measure characteristics of public open spaces. Observation forms and interview schedules were the instruments used for data collection. Maximum variation sampling was used to determine sample size and selection of subjects of study. Photographs and maps were reviewed to pattern spatial changes over the 1963-2015 timeframe. From these, base maps, figure-ground maps, land use maps, and 3-Dimensional (3D) models were developed and analysed for each space. Research results indicate that from 1963-2015, CBD public open spaces have become more sustainable with regards to connectivity, enclosure, density, mixed use, and tree cover. They have however become less sustainable in terms of space size. Results also indicate that social sustainability is influenced by spatial and economic factors. The specific predictors of sustainability are the number of services in ground floors of buildings facing space, number of connectors to the space, and number of users of sidewalks surrounding the space. Results further indicate that environmental sustainability and governance sustainability are influenced by spatial factors. The former predictors are the area of the space and the longest distance of the space, while the latter predictors are proximity of space to the public transport hub, the number of parking spaces in the space, and area of paved pathways in the space. Lastly, results indicate that economic sustainability is influenced by social and economic factors. The number of users of the space, number of service businesses in the space, and number of retail shops in ground floors of buildings facing the space are its predictors. Research conclusions indicate that the social, economic, and environmental sustainability are not necessarily concurrent but that one aspect of sustainability can be dominant at a time. In addition, improvement in social sustainability means economic, environmental, and social improvement of public open spaces in Nairobi CBD. Also concluded was that achievement of socially sustainable spaces is the most complex and comprehensive of the four aspects of sustainability. Research recommendations are that more mixture and diversity of uses be encouraged around public open spaces. In addition, in order to enhance social sustainability, creation of environments that enhance economic activities are recommended. Also recommended is that efforts to enhance sustainability of spaces can be undertaken in phases. Lastly, as spatial factors are significant predictors of three aspects of sustainability, spatial interventions should be prioritized in improvement of the sustainability of public open spaces.

KEY WORDS: **Public Open Space, Sustainability, Spatial Evolution.**

INFLUENCE OF URBAN FORM ON CLIMATE CHANGE VULNERABILITY IN THE CITY COUNTY OF NAIROBI.

Researcher: Sunday Julius Abuje, B. LArch. (Hons.), M.E.P.D, PhD, MAAK (Landscape Chapter), M.EIK, JKUAT, sunabuje@gmail.com, sunabuje@sabs.jkuat.ac.ke

Supervisors: Prof. Bernard Otoki Moirongo, B.Arch., M.A., Dr. Techn., MAAK, JKUAT, bmoirongo@jkuat.ac.ke & Prof. Mugwima Njuguna Bernard, B.Arch. (Hons), M.A. Planning, Cert CMHB, Ph.D., MAAK (A), M.ICOMOS, Registered Architect, JKUAT, mugwima@sabs.jkuat.ac.ke.

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Ameliorate the Impact of Cities on Environment and Ecosystems while Enhancing Biodiversity.

BIOGRAPHY:

Abuje holds a Bachelors in Landscape Architecture (Hons), a Master degree in Environmental Planning and Management, and a Doctorate in Urban Planning and Development. He is a Lecturer at the Department of Landscape Architecture in JKUAT and the current Chairman of Department. He has also served as Convenor of the School of Architecture and Building Science Postgraduate Committee. He is a practicing Landscape Architect and a registered Environmental Impact Assessment expert with over 14 years of professional practice. Abuje has been a resource person for UN-Habitat, the Landscape Architects Chapter of the Architectural Association of Kenya, and the Kenya Bureau of Standards Graphics Standards Committee.

ABSTRACT:

Urban form has the potential to influence urban climate. This in turn affects climate vulnerability. Urbanization characteristics pertinent to this relationship include imperviousness, reduced concentration of vegetation, increased density of built-up areas, and a socio-economically vulnerable population. The City County of Nairobi is rapidly urbanizing more reactive than through anticipatory physical planning regime. Together with the city's unique biophysical and socioeconomic dynamics, Nairobi has remained susceptible to climate related hazards. The objectives of the study included examining the evolution of Nairobi's urban form, the climatic trends and patterns, and the relationship between urban form and climate. The study hypothesized that urban form significantly influences climate vulnerability. The survey used a descriptive case study design for the period between 1988 and 2018. The main variables were urban form, socioeconomic characteristics, and climate. The elements of urban form were landcover, soil, elevation, slope, and Normalized Difference Vegetation Index. The parameters of climate were average annual maximum, average annual minimum, highest annual and lowest annual temperatures, and rainfall. With the unit of analysis as sublocations, data were collected using observation checklists, self-administered questionnaires, and archival review. Data analysis methods included cross-tabulation, change detection analysis, time-series analysis, correlation, and regression. Hypothesis was tested at 95% confidence

interval. The findings revealed an evolving urban form and changing climatic patterns. Urban form evolution manifested as 147% increase in built-up areas, 46% reduction in vegetation cover, and a 21% reduction in the Normalized Difference Vegetation Index. With the current trends held constant, 2048 projections revealed 21% reduction in open space, 60% reduction in Normalized Difference Vegetation Index and 44% increase in Built-Up Area. Climatic trends and patterns showed a 1.5℃ rise in average annual minimum and lowest annual temperatures between 1988 and 2018 with 5% - 14% increase in the minimum and extreme temperature values for the year 2048. The correlation and regression analyses showed, in descending order, Normalized Difference Vegetation Index, Forest and Built-Up Area as the influencers of climate. These relationships led to varying levels of flooding and thermal stress vulnerability at the sublocation level. Ninety five percent of the sublocations showed moderate to very high thermal stress vulnerability while only 13% showed low vulnerability to flooding. The study findings strongly by supported the Integrated Urban Ecosystems Theory and advocated for the triangulation research approach in climate vulnerability assessment studies. It recommended an overall strategy of ecosystem-based urban planning and development to take advantage of ecosystem services offered by the green urban systems. These would be realized through distributive open space planning, green and blue system planning.

KEY WORDS: **Climate Change, Nairobi, Vulnerability, Adaptation, Urban Form.**

THE TYPO-MORPHOLOGICAL ELEMENTS OF URBAN SPACE AND NON-MOTORISED TRANSPORT (NMT)

Researcher: Martin Ochieng Mbidhi, B. Arch. (Hons.), MA Planning. PhD. Architecture. M.A.A.K (Architects Chapter). Reg. Architect, BORAQS, mmbidhi@jkuat.ac.ke. mmbidhi@gmail.com

Supervisors: Dr. Susan Njeri Kibue BArch, (Hons). March Housing. PhD. M.A.A.K (Architects Chapter). Reg. Architect, BORAQS, JKUAT. skibue@jkuat.ac.ke. snkibue@yahoo.co.uk & Dr. Leah Akinyi Onyango, BA. U&RP (Hons). MA. Planning. PhD. MIPK, Maseno University, leahonyango@gmail.com

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services. **Sub-theme:** Safe, Affordable, Accessible and Sustainable Transport.

BIOGRAPHY:

Mbidhi holds a Bachelor's degree in architecture, a Master's degree in Planning and Project Management and a doctorate in Architecture. He is a lecturer at the Department of Architecture at Jomo Kenyatta University of Agriculture and Technology where he has taught for many years. He is the current Chairman of Department of Architecture. His interest in sustainability has led him to research on the subject at all scales; from sustainable urban mobility to sustainable building materials especially plant based. He is also a practising architect and has consulted for a number of government and private institutions.

ABSTRACT:
The world is urbanizing at an accelerated pace. It is predicted that by year 2030 all developing regions will have more people living in urban than rural areas. The rapid urbanization has led to change in urban structures of most cities. One of the problems brought about by this change is urban sprawl which has created challenges of mobility and access to work opportunities and services. The challenge faced by urban planners and designers, therefore, is how the urban space can be transformed to solve the mobility problem in the midst of incalculable complexity found in the cities. Presently, two philosophical schools of thought are engaged in a polarising debate on how a sustainable, lively, and engaging urban life can be developed. While the "Modernists"' focus on the large scale by promoting car use for fast and efficient movement, the "New Urbanists" focus on the smaller scale by promoting Non-Motorised Transport (NMT) through mixed use developments which reduce travel distances and create a fine urban grain. This study was based on a premise of a relationship between the travel environment faced by NMT users in Nairobi and its urban structure. The main objective was to establish the relationship between typological and morphological elements of urban space and NMT users perception of the travel environment in the Eastlands area of Nairobi city. The specific objectives were, to establish and map the main NMT routes used by industrial area workers' on journey to work trips; to establish the typological and morphological characteristics of the NMT routes and to establish the NMT users' perception of their travel environment and its influence on their route choice. The study covered selected neighbourhoods from Nairobi's Eastlands as trip origin and the industrial area as the trip destination. Data was collected through structured and non-structured interview schedules; and observation using a check list. Descriptive statistics was used in analysis and multiple regression applied to establish the relationships. The study established four major routes where 8.5% of the respondents used route one, 14.4% route two, 34.3% route three and 42.8% route four. The study found that NMT users in Nairobi's East lands walk or cycle considerably farther distances to access job opportunities than has been assumed by other studies. The study also established that the most critical attribute of a route is safety, followed by attractiveness and comfort, and to a lesser extent directness and coherence. When the routes were ranked, route two had the highest score for the independent variable of typological and morphological characteristics of the travel environment at 33% while route three had the lowest score at 17%. On NMT user perception, route two was 55.6% while route three 54.3% favourable. However, no significant relationship between typological and morphological characteristics and NMT user perception was established. Overall, 54% of the responds perceived the travel environment as favourable. The findings deviate from other studies which have established significant correlation between urban space elements and user perception. The study recommends that planners trying to improve NMT travel environment should focus on creating safe, comfortable, and direct routes that minimize travel distances. The findings of this study may be used to determine where people walk or cycle and why they move through the specific spaces thus providing guideline on how public resources can be best prioritized and allocated to achieve the planning goals of the city and create a safe and attractive travel environment for NMT users.

Keywords: **Typo-Morphology, Urban space, Innovative, Complexity, Computations.**

CONTINUITY AND CHANGE IN CONSERVATION: A STUDY OF THE RELATIONSHIP BETWEEN ATTITUDES AND THE BUILT ENVIRONMENT IN HISTORIC OLD TOWN OF MOMBASA INFLUENCE.

Researcher: Bernard Mugwima Njuguna, B.Arch. Hons., M.A. Planning, Cert., CMHB, Ph.D., MAAK (A), M.ICOMOS, JKUAT, mugwima@sabs.jkuat.ac.ke, mugwima@gmail.com.

Supervisors: Dr. Francis Mwangi Mburu, B.Arch. Hons., M.A. Planning, PhD, MAAK, JKUAT, fburu2002@yahoo.com & Dr. Ephraim Wachira Wahome, PhD, UoN, ewahome@uonbi.ac.ke, ewahome2013@gmail.com.

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Conservation of heritage and cultural Identity in urban regeneration and conservation.

BIOGRAPHY:

Prof. Arch. Mugwima Njuguna, MAAK (A), M.ICOMOS, an architect, conservator and planner, is based at the Centre for Urban Studies, Department of Landscape Architecture, JKUAT. He is a founder member of the research organization Heritage Conservation and Human Rights. A Registered Architect, he runs the firm phi Architecture + Heritage. He has extensively researched the conservation of historic sites and has published widely on this subject. Currently, he is investigating the conservation of the railway and industrial heritage in Kenya. Other research interests are urban ecology and nature conservation. https://orcid.org/0000-0002-1878-6457

ABSTRACT:

Dynamics of growth and development put enormous strain on land use activities in urban historic areas. New spatial patterns emerge that lead to both visual and functional contradictions, which are manifest in the inappropriate scale in urban historic areas. New spatial patterns emerge that lead to both visual and functional contradictions, which are manifest in the inappropriate scale in urban historic areas. The variety and complexity inherent in traditional cities is being replaced by insipid high-rise accommodation. Old Town of Mombasa, Kenya, is one such historic area that is losing its historic built heritage and individuality at an alarming rate. Mombasa has been for centuries a leading trading town on the East African littoral, bearing an architectural legacy of historic buildings and spaces having Arabic, Indian, European and Swahili heritages. Its old town has ornately carved doors, covered balconies, narrow streets, and alleyways, rendering it a truly unique area. The study posits that the current situation is occasioned by lack of local community participation in the formulation of the standards and guidelines that govern conservation, hence the social disconnect. This study seeks to establish the typo-morphological characteristics of the historic built environment, and the residents' attitudes towards this environment. It further endeavours to establish the factors underlying the resident's perception of their urban historic neighbourhood. A field survey was conducted, whereby a sample of 693 residents was interviewed along a semantic differential scale, in order to elicit attitudes towards their built environment. Principal Component Analysis, based on correlation

matrices, was used to uncover the latent structure of a large set of variables that influence the residents' perception of their conserved area. The results indicate that conservation in the old towns should strive to achieve appropriate order, maintenance and upkeep, scale, create serial vision, open views, and panoramas where possible, enhance orientation and continuity, and achieve the necessary complexity without creating information xxvii overload or monotony. This flexible approach forms the basis of a framework for conservation of the local distinctiveness, so that the built heritage is experiential and not habitual.

KEY WORKDS: **Conservation, attitudes, likability, factor analysis, complexity**

THE INFLUENCE OF SOCIAL COHESION ON THE QUALITY OF THE UBRAN ENVIRONMENT – A CASE OF THE CITY OF NAIROBI, KENYA.

Researcher: Paul Mwangi Maringa, B.Arch. Hons., M.A. Planning, PhD, FAAK, CBS, JKUAT, pmmaringa2013@gmail.com, pmmaringa2013@jkuat.ac.ke

Supervisors: Dr. Francis Mwangi Mburu, B.Arch. Hons., M.A. Planning, PhD, MAAK, JKUAT, fburu2002@yahoo.com & Dr. Robert Wambugu Rukwaro, B.Arch. Hons., Masters of Architecture, PhD, MAAK, UoN, rrukwaro@yahoo.com, rukwaro@uonbi.ac.ke

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Urban Growth Management.

BIOGRAPHY:

Prof. Maringa, retired Principal Secretary for Infrastructure in the Kenyan government, led key State Departments such as Public Works and Transport. Notably, he oversaw the completion of stalled and new novel projects nationwide, including the SGR phase 1 & II, LAPSSET & Kilindini CT I & II ports and JKIA achieving Category 1 status. In Public Works, he restructured the supply branch, enhancing value for money. Later, at Infrastructure, he oversaw significant projects like the Nairobi Expressway and the road 10,000 LVSR. Maringa, An architect planner with over 37 years of experience, played a pivotal role in establishing architecture schools.

ABSTRACT:

This research responded to present, real problems of an urban society with mounting signs of dysfunction. Society that lacks social cohesion is increasingly unable to forge a common front for all to work together, in order to achieve the basic common goals of health, and well-being. Dysfunctional urban societies fail to promote social equity, justice, integration, and stability. Alongside this dismal profile of the urban society, is an associated experience of significant environmental abuse and subsequent degradation. Such a combination of challenges is inimical to sustainable urban growth, touching as it does on social and environmental sustainability, two of its principal aspects. In recognition of this malady, the study set out to determine the relationship that prevailed between social and environmental sustainability in the city of Nairobi. It expected to identify potent variables that could be utilised to promote positive social change

and also to advance quality in the urban environment. These relationships were then modelled in a manner that was comprehensible to the urban planner. The study ventured to realise sustainable urban growth that was uniquely adapted to the historical peculiarities, and present socio-spatial character of cities. There was a recognised need therefore, to ascertain the nature, configuration, and internal character of this city. Accordingly, the study established the urban social and environmental stratification, by social status and therefore by social cohesion with regard to social inclusion or exclusion-inequality, social cohesion in respect of social capital, and the quality of the urban environment, respectively. It also delineated their corresponding spatial distribution within the urban scape.

This study revealed conformity of the city of Nairobi with the western industrial city typology where social status and for that reason social cohesion in the manner of social inclusion or exclusion-inequality, was ascribed by social rank. Population was shown to submit to ranking by prestige value. Families here existed at different stages of the family life cycle, generating variable residential needs. Residential segregation that was founded on consistent ranking by social class, urbanisation, and ethnicity entailed, complete with distinct social areas. A correspondingly variable and spatially segregated housing stock was therefore underscored. The urban population then enjoyed sufficient mobility to match differentiation in society and the housing market. In keeping with the characterisation of growing industrial cities, the urban structure was revealed to be mainly ordered on the basis of one dominant axis that combined social rank, life cycle characteristics, and ethnic status, the three primary concepts of social status and consequently of social cohesion in terms of social inclusion or exclusion-inequality. In this posture, social closure mostly adopted its conceptual form of colonies. Another secondary axis was also identified for this city. This axis created poverty and ethnic domains that fitted well into the enclave concept of social closure.

A definite, measurable definition of social cohesion in respect of social capital was evolved here, using suitable principal component factor analysis model solutions. Articulate, reliable, and valid scalograms with which to detect it, were also approved. This social capital feature of social cohesion was shown to principally derive meaning from, and hence respond primarily to the disposition of public participation, and then community structure, with group structure and dynamics contributing the least. A precise, measurable definition of quality in the urban environment was also fashioned, whereby efficiency in refuse management had superior value to resource use efficiency. The study clearly confirmed the hypothesis that there was association between social and environmental sustainability in the city of Nairobi. It established that a cohesive society was strong on consensus building and was therefore socially sustainable. Such a society emerged here as one that negotiated its priorities, and could therefore, maintain a well-managed and sustainable urban environment. In this way, this study demonstrated that cohesive societies were associated with enhanced urban environments, and that both improved along a rising hierarchy of social status and therefore of social cohesion in the sense of social inclusion or exclusion-inequality, with falling dissimilarity and exposure. Multiple linear regression relationships were drawn out to successfully produce appropriate mathematical models of social status and for that reason of social cohesion in terms of social inclusion or exclusion-inequality and its three principal dimensions (economic, family, and ethnic status), as well as the urban environment. They were also used to relate social status and in this regard social cohesion of the form of social inclusion or exclusion-inequality, the social capital aspect of social cohesion, and the quality of the urban environment. This complement of models embodied vital predictive instruments, which planners could use to effectively tackle social dysfunction and environmental degradation.

The study concluded by recommending the social status and therefore social cohesion in terms of social inclusion or exclusion-inequality, as the prime aspect with which to positively stimulate the social capital aspect of social cohesion, similarity, and also quality of the urban environment. Priority areas for intervention in these aspects of a city were exposed and then ranked. Quality of dwellings in social rank, fertility in family status, and nationality in ethnic integration were some such areas that wielded maximum impact on social change. Public participation was influenced in diminishing order by community services

activity, citizen civic-political action, social participation, and finally, leisure participation. Community structure responded with declining consequence to community goodness, community solidarity, and eventually, community progressive attitude. Group structure and dynamics was principally controlled by, circumstantial association, and secondarily by spontaneous choice. Efficiency in solid wastes management was the most compulsive influence over quality in the quality of the urban environment. It was followed in order, by efficiency in, hazardous wastes management, energy use, and finally in water use. These then constituted a guide by which to combat social dysfunction and environmental degradation most efficiently, and achieve social and environmental sustainability, that ensured sustainable urban growth.

KEY WORKDS: **Social cohesion, inclusion, exclusion, inequality, dysfunction.**

Master's degree Research Abstracts here feature:

Centre for Urban Studies - Masters of Urban Studies.
James Shikuku, Ochieng, Victor Nyakundi, Wallace Gathu Mochu, Muhammad Ali, Watetu Gachoki, Maina Onguso, Raphael Mirera Binyanya, Derrick Amani Ngala Chondo, Mermiya Hussein, Beatrice J Kirongon, Mugambi Mureti, and Wallace Njiiri.

Masters of Urban Design
Carolyne Wanza Nthiwa, Nadi Omar Hashim, Omollo Noel Japheth Okello, Alfayo Uruji Makdii.

Sustainable Development Goal (SDG) 06

Clean Water and Sanitation:

Sufficient safe drinking water in resilience to climate change & population growth.

Themes:

1.Climate change and population growth impacts on access to quality drinking.

2.Inclusive, safe, resilient, and sustainable cities and human settlements.

Agenda 2063 Goal 07

Environmentally sustainable and climate resilient economies and communities

Theme:

Water Security

COST BENEFIT ANALYSIS OF WATER CONSERVATION SYSTEMS INSTALLED IN HOUSEHOLD BUILDINGS IN NAIROBI COUNTY

Researcher: James Shikuku Ochieng, B.Arch. Hons., M.Sc. MSUD. M.AAK, james.shikuku@jkuat.ac.ke

Supervisors: Prof Gerryshom Munala, B.Arch., MEPM, Dr. Techn., MAAK, JKUAT, gmunala@sabs.jkuat.ac.ke; & Prof. Bernard Mugwima Njuguna, B.Arch. Hons., M.A. Planning, Cert., CMHB, Ph.D., MAAK (A), M.ICOMOS, JKUAT, mugwima@sabs.jkuat.ac.ke, mugwima@gmail.com.

SDG 6: Clean Water and Sanitation/**A-2063 G7:** Environmentally sustainable and climate resilient economies and communities.

SDG 6 Theme: Climate change and population growth impacts on availability and sustainable management of water and sanitation for all/**A-2063 G7 Theme:** Water Security.

Sub-theme: Water conservation for sufficient safe drinking water.

BIOGRAPHY:

Arch. James Shikuku Ochieng, M.AAK (A), M.Sc MSUD, an architect, Green Building Enthusiast, is based at the Department of Architecture, JKUAT. A Registered Architect, he runs the firm Tetra Designs Ltd. He has widely researched on Conservation of water in buildings with several Publication. Currently, he is investigating the sustainable water management strategies for water optimization in green buildings. Other research interests are environmental behavioural studies. https://orcid.org/0000-0002-2048-6971

ABSTRACT:

Cost benefit analysis of installed water conservation systems is an important tool that can help management of water resources in urban areas to offset increasing challenges to water security due to population growth and climate change. Piped water storage system, water recycling system and rainwater harvesting systems have been identified for many years as viable solutions for water conservation and management. However, their adoption has been at a low rate due to perceived lack of their economic benefits, high investment costs and long payback periods. This study was thus conducted with the aim of analyzing the costs and benefits accrued by water conservation systems installed in households in Nairobi County. A survey of 200 households was undertaken and data collected using observation checklists and questionnaires. The study results indicated that the average benefits score for piped water storage system were 5001-6000L water quantity, quite high-water cleanliness, and quite high-water availability. Water recycling system benefits were 1001-2000L water quantity, quite low water cleanliness and quite low water availability. Rainwater harvesting system benefits were 3001-4000L water quantity, neither low nor high water cleanliness and neither low nor high water availability. Benefit-cost ratio analysis indicated that piped water storage system was viable with high benefits at 2.8, water recycling system was also viable with benefits at 2.03 while water recycling system was not viable at 0.8. The study recommends that piped water storage systems and rainwater harvesting systems should be installed in the household building because they result in higher water conservation benefits. Their installation will ensure that quality reliable water is available to households in high quantity within viable economic costs.

KEYWORDS: Cost-Benefit Analysis; Water Conservation; Household Buildings; Nairobi.

QUASI-DELEGATED WATER MANAGEMENT FOR SUSTAINABLE DISTRIBUTION OF QUALITY DRINKING WATER IN UMOJA INNER CORE ESTATE, NAIROBI.

Researcher: Arch. Victor Nyakundi, Principal Architect- Sketchscope Architects LTD., Arch | MSUD, JKUAT | B. Arch (Hons), JKUAT| M. A. A. K (A) JKUAT, Dept. of Arch, victor.nyakundi@sabs.jkuat.ac.ke.

Supervisors: Prof Gerryshom Munala, B.Arch., MEPM, Dr. Techn., MAAK, JKUAT, gmunala@sabs.jkuat.ac.ke & Prof. Mugwima Njuguna, B.Arch. Hons., M.A. Planning, Cert., CMHB, Ph.D., M.AAK, M. ICOMOS. mugwima@sabs.jkuat.ac.ke.

SDG 6: Clean Water and Sanitation/**A-2063 G7:** Environmentally sustainable and climate resilient economies and communities.

SDG 6 Theme: Climate change and population growth impacts on availability and sustainable management of water and sanitation for all/**A-2063 G7 Theme:** Water Security.

Sub-theme: Sustainable water management practices for sufficient safe drinking water within Households in Urban areas.

BIOGRAPHY:

Architect Nyakundi is the Lead Partner, Sketch Scope Architects, and a Lecturer at the Department of Architecture, JKUAT. He holds a Master's degree of Sustainable Urban Development from the Centre of Urban Studies, JKUAT, and a Bachelor's degree in Architecture, JKUAT. His interest lies in community wellbeing and urban resilience. He guides undergraduate research in diverse areas of the built industry. He has published research papers in peer reviewed journals in the areas of sensory architecture for the visually impaired, water quality, management, conservation, and use of water saving devices in urban households, cost-benefit analysis, and flood resilient architecture in flood prone areas (https://orcid.org/0000-0003-3138-3641).

ABSTRACT:

Management of drinking water in its distribution pathways is one of the main indicators of the quality of service provided to the consumer. Managing quality is important since human health and livelihoods depend on adequate, clean, reliable water supplies. Unfortunately, this is not true to many neighbourhoods in developing countries and the quality of water distributed in Umoja Inner core is no exemption. This research sought to evaluate how management of water affects its distribution in the entity from source to the household. 6 borehole owners and 5 water bowsers were interviewed, and 156 households' questionnaires were administered in a survey carried out over a duration of 10 days. The study found that residents get supplies from Nairobi City Water and Sewerage Company directly to households or to private vendors to

households or from private vendors sourcing it from boreholes to households. pH and temperature measurements were analysed in-situ while turbidity, bacterial and chemical examination were conducted in laboratories. Whereas many households can easily access improved water sources directly from the county, access to safe drinking water especially from water points is still a major challenge. The study found that 100% of boreholes recorded unsatisfactory water with up to 1100 of Escherichia coli showing high contamination with faecal coliforms and 83% of boreholes recording pH of up to 9.53. Dissolved oxygen was 5.08mg/L below recommended 12.0mg/L, salinity of 0.47mg/L and 0.03mg/L for boreholes and households respectively. The study further revealed that 29.3% of respondents get treated water directly from Nairobi City Water and Sewerage Company (NCWSC), 32.7% and 25.3% get untreated water from water bowsers and water carts through jerrycans, 10 % indicated water kiosk and 3% from rainwater. Cost of water ranges from Kshs 20 per 20-liter jerrycan to Kshs 50 during scarce periods. 89% of sampled households treat all water out of which, 52% boil water, 20% use filtration cans, 26% further chlorinate the water and 3% strain water through sieve clothe. The study reveals inconsistency of monitoring by NCWSC of the available sources of water and unregulated cartels compromising water quality. The study reveals the poor management and insufficient of control of available sources of water available to the residents. The study recommends regulating and incorporating private boreholes distributors to the network through a through a quasi-delegated model using an inter-estate bulk treatment for quality measures before supplying to households, digital water monitoring, aligning septic tank walls with concrete and bio-sand filtration material.

KEYWORDS: **Drinking Water Quality, Quasi-Delegated Management.**

DOMESTIC WASTEWATER MANAGEMENT IN SATELLITE TOWNS AROUND NAIROBI CITY: A COMPARATIVE STUDY OF MLOLONGO AND RUIRU TOWNS IN KENYA.

Researcher: Wallace Gathu Mochu, MSUD, JKUAT, mochuwallace@gmail.com.

Supervisors: Prof Gerryshom Munala, B.Arch., MEPM, Dr. Techn., MAAK, JKUAT, gmunala@sabs.jkuat.ac.ke & Mugwima Njuguna, B.Arch. Hons., M.A. Planning, Cert.: CMHB, Ph.D., M.AAK, M. ICOMOS, JKUAT, mugwima@sabs.jkuat.ac.ke.

SDG 6: Clean Water and Sanitation/**A-2063 G7:** Environmentally sustainable and climate resilient economies and communities.

SDG 6 Theme: Climate change and population growth impacts on availability and sustainable management of water and sanitation for all/**A-2063 G7 Theme:** Water Security.

Sub-theme: Improve water quality by reducing pollution, eliminating dumping, and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and substantially increasing recycling and safe reuse globally.

BIOGRAPHY:

Wallace Mochu is a Senior Physical Planner with the County Government of Kiambu, Kenya. He has previously worked for UN-Habitat as a GIS-Analyst, Nairobi City County Open Spaces Programme. His

interests are in Solid & Wastewater Management & application of ICT in Urban Governance & Management.

ABSTRACT:

Management of domestic wastewater has a direct impact on the environmental health of urban dwellers and the general physical condition of an urban settlement. This paper analyses domestic wastewater management in Mlolongo and Ruiru towns in Kenya. The methodology applied for the study was by survey through observation of wastewater systems in the neighbourhood, and interviews of homeowners and tenants, and selected key County Government informants. The study revealed Mlolongo relied entirely on decentralized systems while Ruiru had a hybrid system consisting of pockets with centralized system but the larger areas relying on decentralized systems. The study revealed that 98% of the residents in Mlolongo rely on septic tanks, conservancy pits, and pit latrines while 48% of residents in Ruiru depend on septic tanks and communal toilets for their domestic wastewater management. The domestic wastewater systems were rated to be very poor by over 50% of the residents with little or no participation by the residents in their management. The study demonstrated that the decentralized wastewater systems covered the entire satellite towns under study. 68% of residents in Mlolongo and 48% of the residents in Ruiru share their wastewater collection facilities with more than 15 persons. On sustainability, the study revealed low score from managerial, organizational, environmental, planning, and financial perspective. A sustainable model of managing domestic wastewater in satellite towns has been developed that aims at recognizing the need of recovering resources from the domestic wastewater while minimizing the user costs.

KEYWORDS: **Decentralized management, domestic wastewater, Mlolongo, Ruiru, satellite towns.**

WATER USAGE AND CONSERVATION METHODS - A CASE OF EASTLEIGH NAIROBI.

Researcher: Arch. Muhammad Ali | B. Arch (Hons), JKUAT| MSUD, JKUAT| M. A. A. K (A), JKUAT, mohdyali12@yahoo.com.

Supervisors: Prof Gerryshom Munala, B.Arch., MEPM, Dr. Techn., MAAK, JKUAT, gmunala@sabs.jkuat.ac.ke & Dr. Tekla Muhoro, B.Arch. (Hons.), M. Arch. (Hons), PhD, JKUAT, PhD, MAAK, JKUAT, tmuhoro@jkuat.ac.ke

SDG 6: Clean Water and Sanitation/**A-2063 G7:** Environmentally sustainable and climate resilient economies and communities.

SDG 6 Theme: Climate change and population growth impacts on availability and sustainable management of water and sanitation for all/**A-2063 G7 Theme:** Water Security.
Sub-theme: Water conservation for sufficient safe drinking water.

BIOGRAPHY:

Muhammad Ali is working on Architectural projects within the country. He holds a Master of Sustainable Urban Development from the Centre of Urban Studies from Jomo Kenyatta University of Agriculture and Technology, Nairobi, and a Bachelor's degree in Architecture. His interest lies in water conservation practices including re-using and recycling His research papers include water Conservation in urban

households, cost-benefit analysis and water management in urban households touching on household water saving devices.

ABSTRACT:
Water conservation measures are rapidly becoming a necessity in urban environments all over the world. There is little innovation and available information for homeowners, building professionals and practitioners to guide towards water conservation. Water scarcity has progressively increased over periods of time in Eastleigh due to more high-rise building being built. The study sort to establish how water usage patterns and water conservation devices can potentially reduce water consumption levels. In the study area of Eastleigh neighbourhood, families are faced with problems related to water supply hence are forced to come up with conservation strategies due to the scarcity of water and also adaptation strategies for water usage. The study used survey and descriptive research design, collected data on water usage patterns and water conservation devices from a total of 230 households in Biafra and Sewage estates and 7 hardware shops in Eastleigh neighbourhood. The results indicated that 76% of the households did not have water saving devices while the other 24% had water saving devices such as the dual flash toilets, low flow high-efficiency faucet aerators, low flow plumbing fixtures and automatic shut-off nozzles. A unit increase in water saving devices will lead to a 0.512 decrease in water consumption level. The study recommends that low-income households to use water saving devices and develop water management strategies such as water-saving plumbing fixtures, rainwater harvesting, and grey water reuse.

KEYWORDS: **Water usage, Water usage patterns, Water conservation, Water conservation practices, Water supply.**

Sustainable Development Goal (SDG) 11

Sustainable Cities and Communities

Theme:

Inclusive, safe, resilient, and sustainable cities and human settlements.

Agenda 2063 Goal 01

A high standard of living, quality of life and well-being of all citizens

Theme:

Modern, affordable, and liveable habitats and quality basic services

FACTORS INFLUENCING SUSTAINABLE MUNICIPAL SOLID WASTE MANAGEMENT IN RUIRU SUB COUNTY, KIAMBU COUNTY.

Researcher: Watetu Gachoki, Urban Planner, B.A Urban and Regional Planning, MSUD, JKUAT watetujei@gmail.com.

Supervisors: Dr. Dennis Karanja, B.Arch. Hons., M.A. Planning, Ph.D., MAAK (L/A), JKUAT karanjak@gmail.com; & Dr Micah Makworo, B.Arch. Hons., M.A. Planning, Ph.D., MAAK (L/A), JKUAT, micahmakworo@sabs.jkuat.ac.ke

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Ensure availability and sustainable management of water and sanitation for all /**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Improve water quality by reducing pollution, eliminating dumping, and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and substantially increasing recycling and safe reuse globally.

BIOGRAPHY:

Watetu Gachoki is an urban planner and sustainability expert having founded Eliye Consults where she is the team leader and managing consultant. Eliye Consults is currently working on various sustainability matters such as, green building certification, sustainable solid waste management strategies, sustainability reporting, advocacy and awareness creation on sustainability among others.

ABSTRACT:

Proper municipal solid waste management is critical for building sustainable and liveable cities, but this remains a challenge especially in developing countries and cities. Rapid urbanization in developing countries has led to increased generation of municipal solid waste. Developing countries are being overwhelmed by their own waste. In Kenya policies and regulations have been put in place to manage solid waste. However, aspects of poor waste management are still evident in residential and commercial zones of urban areas such as Ruiru. Counties are mandated to manage their waste. Ruiru is a sub-county in Kiambu County. The overall objective of this study was to find out how governance, community factors and modern technology influence sustainable municipal solid waste management in Ruiru Sub-County. Further, the study sought to establish the state of municipal solid waste, challenges, and opportunities in MSW in Ruiru sub-county. The study used descriptive research design, purposive and quota sampling to identify research respondents. The study used questionnaires, key informants' interviews, phone interviews, observation, and photography as data collection methods. Questionnaires were either self- administered or administered by the researcher through an online platform Kobo Collect. A total of Eighty respondents and six key informants were interviewed. The results indicated that MSW in Ruiru sub-county mainly consist of food waste, plastics, paper and cardboard and electronic waste. There was diversification of MSW to include medical waste such as masks, sanitary towels, and diapers. Eighty per cent of the respondents do not separate waste at source. According to the study findings community participation, training, and engagement in matters of municipal solid waste was also not done in the study area. There was also limited application of existing modern technology by the stakeholders: the community, the government, and the waste handlers. The County is facing various challenges related to management of municipal solid waste.

The major ones are lack of prioritization of waste; limited finances and human resource; and slow uptake of technology. Therefore, this study recommends an integrated approach to handling municipal solid waste management. An integrated approach is one that will use appropriate management programs, technologies, and techniques to achieve sustainable municipal solid waste management.

KEYWORDS: Sustainable integrated municipal solid waste management, community factors, governance, technology

SUSTAINABLE URBAN AGRICULTURE LAND USE PRACTICE FOR THIKA TOWN

Researcher: Pln. Onguso M. Maina B.A, MSUD, MTCPAK (Hon. Registrar) malti7ca@gmail.com

Supervisors: Prof Gerryshom Munala, B.Arch., MEPM, Dr. Techn., MAAK, JKUAT, gmunala@sabs.jkuat.ac.ke & Prof. Bernard Mugwima Njuguna, B.Arch. Hons., M.A. Planning, Cert., CMHB, Ph.D., MAAK (A), M.ICOMOS, JKUAT, mugwima@sabs.jkuat.ac.ke, mugwima@gmail.com.

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Environmental Conservation in the urban ecology.

BIOGRAPHY:

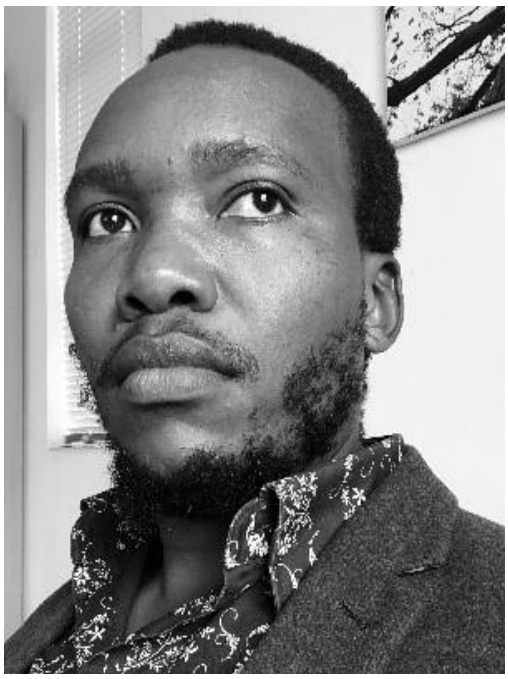
Planner. Onguso M Maina MTCPAK, BA, MSUD is a registered physical planner based at Homa Bay County. He has previously worked for Kiambu County as a Senor Planner, Kakuma Refugee Camp as a camp Planning Officer. Currently, he is involved in preparation of Kabunde Airstrip Buffer Zone Local Physical Development Plan and the inaugural county spatial plan for Homa Bay County.

ABSTRACT:

The current Integrated Strategic Urban Development Plan for Thika and Kiambu County Spatial Plan have not provided for urban agriculture as a land use except in peri-urban and other areas. Development applications at Thika Sub-county office indicate that there has not been an application for change of user to agricultural purposes. Land subdivisions continue to go beyond that which can support conventional agriculture. There was no data on sustainable urban agriculture land use regime practices within Ngoingwa. Thika Water and Sewerage Company prohibits residents from utilizing their water mains for agricultural purposes. There is unpredictable food prices in the market in the wake of recent increase in tax on petroleum products. The purpose of this study, therefore, is to determine a sustainable urban agricultural practices land use regime in Thika Town's Ngoingwa Estate. Thus, it is recommended that building designs take

cognizance of the sunlight needs of the urban farmers, adoption of building material that do not increase solar radiation in the urban farms, exploration of vertical and rooftop farms, raw water be tapped from existing Chania and Thika rivers be supplied to the urban farmers. A regime that incorporates administrative framework adjustments to provide for urban agriculture, policies, and provision for a regulatory framework in the development control section to accept and promote urban farming be adopted.

KEYWORDS: **Food Security, Land Use, Sustainable Practices, Urban Agriculture, Urban Area.**



A FRAMEWORK FOR URBAN FORESTS CONSERVATION IN NAIROBI CITY.

Researcher: Binyanya Mirera Raphael, B.Arch. Hons., M.Sc MSUD, M.AAK. raphael.mirera@jkuat.ac.ke.

Supervisors: Prof. Mugwima Njuguna, B.Arch. Hons., M.A. Planning, Cert.: CMHB, Ph.D., M.AAK, M. ICOMOS, JKUAT, mugwima@sabs.jkuat.ac.ke; Dr. Dennis Karanja, B.Arch. Hons., M.A. Planning, Ph.D., MAAK (L/A), JKUAT karanjak@gmail.com; Dr. Stella Mbiti, B.Arch. Hons., M.A. Planning, Ph.D., MAAK (L/A), JKUAT, mbitistella@sabs.jkuat.ac.ke.

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Environmental Conservation in the urban ecology.

BIOGRAPHY:

Arch. Mirera Raphael, MAAK (A), M.Sc MSUD, an architect, environmentalist, is based at the Department of Architecture, JKUAT. A Registered Architect, he runs the firm Hybrid Architects. He has researched the conservation of urban forests and has published on this subject. Currently, he is investigating the ecosystem services provided by urban forests in mitigation and adaptation of Nairobi city to climate change. Other research interests are green architecture and climate change.

ABSTRACT:

Urban forests face numerous threats and competing needs in the ever-expanding urban landscapes despite their benefits to urban environments. They therefore need protection through sustainable conservation which is guided by the attitudes of urban residents. This is because attitudes and values attached to something predict its protection. This study therefore sought to investigate attitudes urban residents in Nairobi have towards urban forests and the prevailing character of these forests. This was done through a factor analysis of attitudes on a 7-point Likert scale and data on urban forests components and attributes collected using a ranking questionnaire and observation methods. Six underlying factors were extracted with a factor loading of greater than 0.5, constituting the concepts used to provide a framework for the conservation of urban forests. The findings further show favourable attitudes towards urban forests in Nairobi, with most residents believing that urban forests are beneficial and need protection. Consequently, this study recommends protecting the existing urban forest ecosystems while expanding and increasing its

quality, biodiversity, and habitat richness through the proposed sustainable urban forest conservation framework.

KEYWORDS: **Attitudes, Conservation, Conservation Framework, Factor Analysis, Urban forest**

THE IMPACT OF MOTORIZED TRANSPORT ON HERITAGE IN AN URBAN CONSERVATION ZONES - THE CASE STUDY OF OLD TOWN MOMBASA.

Researcher: Derrick Amani Ngala Chondo B. Econ & Stats., MSc. MSUD., Global Reporting Initiative (GRI) Certified Sustainability Professional, dchondo75@gmail.com.

Supervisors: Prof Gerryshom Munala, B.Arch., MEPM, Dr. Techn., MAAK, JKUAT, gmunala@sabs.jkuat.ac.ke, & Prof. Mugwima Njuguna (Prof), B.Arch. Hons., M.A. Planning, Cert.: CMHB, Ph.D., M.AAK, M. ICOMOS. mugwima@sabs.jkuat.ac.ke.

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Environmental Conservation in the urban ecology.

BIOGRAPHY:

Derrick Chondo is a Corporate Planning Officer with the Kenya Ports Authority. He has a wealth of experience in technical advisory work through a multi-disciplinary approach of economic planning, strategy, sustainability and data analytics. He also runs Blucon Consulting Limited, a management consulting outfit, as a Director in charge of Project Management and Sustainability. His interests are in supporting corporate entities build an understanding of their role in Sustainable Development, and align their goals to their environment, communities and cities towards contributing to Sustainable Urban Economic Development.

ABSTRACT:

The vagaries of motorized transport, the veritable example of modern desires, has had a detrimental effect on the physical infrastructure, environmental factors, social aspects, and the conservation efforts of urban historic areas. This is in addition to the danger of deterioration through neglect, urban renewal, and regeneration exercises, heavily influenced by the desire for development through infusion of modern infrastructure. This study presents the contemporary transport issues within Old Town Mombasa. It seeks to assess the existing conservation and transport management efforts and the simultaneous impact of motorized transport, in order to propose feasible solutions through sustainable urban mobility in the town. Two key theories, the theory of conservation and the theory of sustainable development were examined. The conservation theory provides the tenets for the protection of natural and heritage features while the sustainable development theory advocates for reasonable resource utilization amid increasing modernization, spatial limitations, and social integration in order to minimize adverse effects such as pollution and congestion. A good 117 respondents were interviewed to assess their perceived correlation of the presence of motorized transport and the conservation efforts of Old Town. Additionally, field study

observation was utilized to gather raw data of the transport situation. The findings indicate comprehensive awareness of Old Town as a conservation zone and its definitions, dissatisfaction with existing transport management efforts and concurrence on the negative impacts of motorized transport on the quality of life. Congestion, fumes, and noise pollution defined the loss on quality of life while physical damage and chaotic movements of vehicles had an undesirable effect on the built and cultural heritage of the predominantly Swahili settlement. The study recommends Sustainable Urban mobility to be at the core of strategies deployed in bridging conservation and transport management efforts. Spatial concerns will be addressed through innovative measures and legislative frameworks while social reorganization will be key in enhancing a participative approach to both traffic management and conservation in Old Town.

KEYWORDS: Heritage, conservation, motorized transport, traffic management, sustainable urban mobility.

FACTORS INFLUENCING COMMUNITY PARTICIPATION IN REDEVELOPMENT PLANNING OF NAIROBI'S INNER-CITY ESTATES: A COMPARATIVE STUDY OF KALOLENI AND MUTHURWA ESTATES.

Researcher: Mermiya Hussein, B.Arch. M.Sustainable Urban Development, meremiya.hussein@un.org, husseinmeremiya@gmail.com.

Supervisors: Dr. Samson Mukeku, B.Arch. (Hons.), M. Arch. (Hons), PhD, JKUAT, PhD, MAAK, JKUAT, tmuhoro@jkuat.ac.ke & Prof. Stephen Diang'a, B.Arch. (Hons.), M. Arch. (Hons), PhD, MAAK, JKUAT, sdianga@sabs.jkuat.ac.ke.

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Community Participation in redevelopment planning.

BIOGRAPHY:

Miss. Meremiya Hussein is an architect and Urban Development Specialist. Her core interests and experiences are in WASH, Urban Resilience and Disaster Risk Reduction for African cities. Meremiya Spearheaded the research, review and development of the sanitation sector brief for the Mukuru Special Planning Area Project (MSPA) which is currently being implemented at a regional scale in Kenya. She served as a member of the WASH in Schools' technical working group commissioned by DFID, USAIS and OXFAM. She is currently working as an Urban Resilience Specialist at the UN-Habitat's Regional Office for Africa.

ABSTRACT:

A history of neglect by past and current city governments, an influx of Nairobi's population in recent years and obscurity of tenure occasioned by colonial master plans have led to the dilapidation and degradation of Nairobi's inner-city estates. Now ripe for redevelopment, the Nairobi County Government (NCG) has been

making plans for redevelopment since May 2012, citing the need for densification. On the other hand, inner city resident associations are spearheading resistance to redevelopment, bringing up compensation claims and the lack of proper participatory processes. Despite support of devolution and participatory development process, the NCG has not quite institutionalized people-centric development culture. Since the NCG carries out participatory processes through resident, there are also concerns about the Socio-economic factors influencing involvement in resident associations by the wider community. The aim of this study, therefore, was to assess the socio-economic, political, and institutional factors influencing the effectiveness of community participation in the redevelopment planning of Nairobi's inner-city estates, which when clearly understood would contribute towards the development of a context specific community participation framework for urban redevelopment that would support the EURP. The study employed purposive sampling due to a limited pool of resident association members. Based on the findings, this study recommends that the NCG strengthen its institutional capacity and communication with communities and that the resident associations adopt measures to ensure women, the poor and recent tenants participate more in redevelopment planning.

KEYWORDS: **Participation, Inner-City Planning, Redevelopment Planning.**

THE ROLE OF SPATIAL RELATIONS IN INFLUENCING CRIME IN PUBLIC OPEN SPACES OF JUJA SETTLEMENTS.

Researcher: Beatrice J Kirongon, B.Arch. Hons., M.Sc MSUD, M.AAK. beatrice.kirongon @jkuat.ac.ke.

Supervisors: Prof. Bernard Otoki Moirongo, B.Arch., M.A., Dr. Techn., MAAK, JKUAT, bmoirongo@jkuat.ac.ke & Dr. Teckla Muhoro, B.Arch. (Hons.), M. Arch. (Hons), PhD, JKUAT, PhD, MAAK, JKUAT, tmuhoro@jkuat.ac.ke.

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Universal access to safe, inclusive, and accessible, green, and public spaces.

BIOGRAPHY:

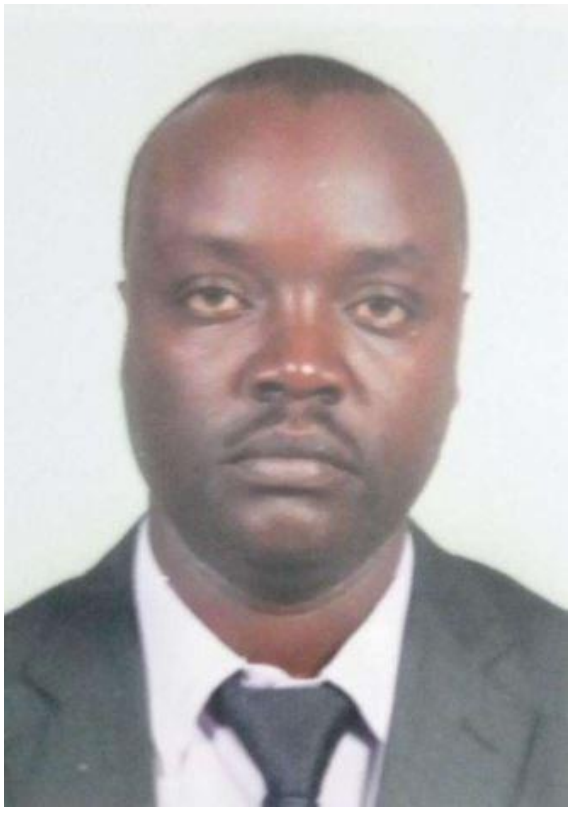
Arch. Beatrice J Kirongon, MAAK (A), MSc MSUD, an architect, lectures at the Department of Architecture, JKUAT and a Sustainability enthusiast at urban and building level. She runs Benty Systems ltd. She has extensively researched the urban crime and spatiality with several publications on the subject. Currently, she is investigating the urban vitality by researching on urban informality of street vendors in Nairobi City. Her other research interests are in Biophilic design, and Inclusive design.

ABSTRACT:

Urban areas worldwide face complex challenges related to crime and safety, with public open spaces, mainly streets often serving as focal points for criminal activities. Understanding the influence of urban

spatial relations on crime is essential for developing effective crime prevention strategies and enhancing urban safety. In this context, Juja settlement in Kenya presents a pertinent case study due to its rapid urbanization and growing concerns regarding crime prevalence. Methodologically, axial analysis component of space syntax method has been adapted to establish integration and connectivity measures of public open spaces in Juja settlement, while observation method established the land-use, surveillance levels, build-up densities, and physical traces of urban crime. Results show that Juja town has poor connectivity with the highest connectivity rate being 40 m/street connection and the lowest being 125 m/connection. Correspondingly, global integration levels sampled street segments in Juja town is moderate 1.306521 to low of 0.915067. The study findings indicate that poor connectivity and choice measures predispose Juja town to increased crime together with poor street luminance levels that prevent inter-visibility of public open spaces especially in the evening and morning hours of the day. The study also found that presence of idle land use patterns along public open spaces discourages people from using the street segments hence robing the street segments from street guardianship resulting in increased crime incidences. The findings of this study contribute to the development of targeted strategies aimed at reducing crime rates and creating more secure and liveable urban environments in Juja settlement and similar contexts globally.

KEYWORDS: **Urban Crime, Spatial Relations, Public Open Spaces, Surveillance, Inter-Visibility.**



EXAMINING RATE OF BUILT-UP AREAS ON THE VEGETATION COVER ALONG RIVER RIARA RIPARIAN WITHIN KIAMBU TOWN, KENYA.

Researcher: Mugambi Mureti, B.A. Urban & Regional Planning Hons., M.Sc., MSUD, MKIP & Registered Physical Planner, chasmureti@gmail.com.

Supervisors: Prof. Mugwima Njuguna (Prof), B.Arch. Hons., M.A. Planning, Cert.: CMHB, Ph.D., M.AAK, M. ICOMOS. mugwima@sabs.jkuat.ac.ke & Dr. Dennis Karanja, B.Arch. Hons., M.A. Planning, Ph.D., MAAK (L/A), JKUAT karanjak@gmail.com.

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Enhance inclusive and sustainable urbanization and capacity for participatory, integrated, and sustainable human settlement planning and management.

BIOGRAPHY:

Planner Mugambi Mureti is an Assistant Director in the directorate of physical planning with the County Government of Kiambu. A registered planner, he is in charge of development control within the County

and key contact in the County liaison committee. He has interest in Climate change and environmental conservation studies.

ABSTRACT:

Urban river riparian spaces and their natural systems are valuable to urban dwellers; but are increasingly affected and ruined by human activities and in particular, urbanization processes. In this research, land sat and sentinel satellite imagery apt for change detection in vegetation cover, both lad sat and sentinel imagery, covering the period between 1970 and 2021 in epochs of 1973,1984,1993,2003,2015 and 2021 years were used to establish the correlation between vegetation cover, and built-up area along River Riara river reserve. The images were analysed to extract the built-up areas along the river reserve, including the buildings, and the rate of human settlements, which influenced vegetation cover. Normalized Difference Built-Up Index (NDBI) and Normalized Difference Vegetation Index (NDVI) were computed using the Short-Wave Infrared (SWIR) and the Near Infra-Red (NIR) bands to show the rate of change over the years. Results indicate NDVI values were high, compared to NDBI values along river Riara in the years 1973 and 1993 implying that there was more vegetation cover then. However, in the year 2021, the NDVI indicated the highest value at 0.88, with the complementary NDBI indicating the highest NDBI value as 0.47. This represent a significant increase in built up areas since 2015 more than previous epochs. There was a significant increase in NDBI values, from 0.24 in 1993 to 0.47 in 2021. More so, the R-squared value at 0.80 informed 80% relationship between NDBI and NDVI values indicating a negative correlation.

Key Words: Ecological conservation, Urban Riparian reserves, Vegetation Cover Index, Built up area Index, Normalized Difference Vegetation Index, Normalized Difference Building Index.

RESIDENTS' VISUAL PREFERENCE DIMENSIONS OF HISTORIC NAIROBI.

Researcher: Arch. Wallace Njiiri B. Arch (Hons), |MSUD|, M.AAK, Lecturer, Dept. of Architecture, JKUAT; creative producer at Urban Moon LTD, njiri.wallace@jkuat.ac.ke

Supervisors: Prof. Mugwima Njuguna (Prof), B.Arch. Hons., M.A. Planning, Cert.: CMHB, Ph.D., M.AAK, M. ICOMOS. mugwima@sabs.jkuat.ac.ke & Dr. Dennis Karanja, B.Arch. Hons., M.A. Planning, Ph.D., MAAK (L/A), JKUAT karanjak@gmail.com.

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Conservation of Heritage and Cultural identity in Urban regeneration and conservation.

BIOGRAPHY:

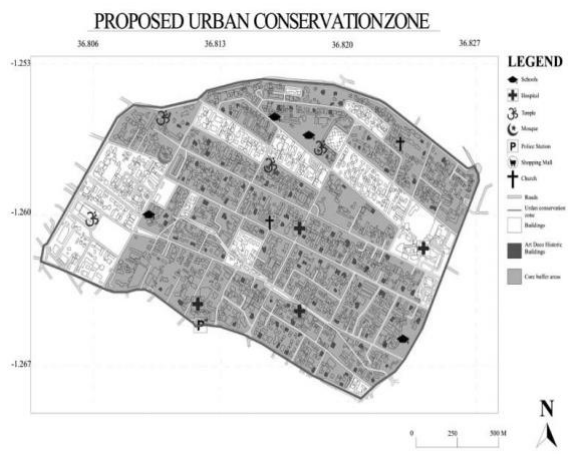
Wallace Njiiri is the creative producer at Urban Moon and a Lecturer at the Department of Architecture in Jomo Kenyatta University of Agriculture and Technology (JKUAT), Nairobi Kenya. He holds a Master degree of Sustainable Urban Development from the Centre of Urban Studies, JKUAT and a first-class

honours degree in Architecture, JKUAT. He has been honoured with the international creativity awards of, Heritage Interpretation of Shimoni Slave Caves in Coastal Kenya, Ahmedabad, India; Union of International Architects (UIA) 2016 Cape Town, South Africa. East Africa Institute of Architects (EAIA) Presidential Award, 2018 Dar es Salaam, Tanzania; and Innovation for Better Quality of Life in Cities (UN-Habitat), 2019 Durban, South Africa. His academic research interests include urban heritage conservation, cultural tourism, heritage economics and spatial planning for climate change.

ABSTRACT:

The colourful history evident in art-deco architectural heritage in historic neighbourhoods such as Parklands in Nairobi is barely discernible now. Swamped in drab tenements, this heritage has faced an avalanche of economic and development pressure used to justify its destruction to pave way for contemporary edifices. Discrepant intrusions have overloaded the heritage space detracting its scale, historic colour, and visual quality. This paper sought to assess the range of visual preferences for the built environment in historic Parklands in an aim to identify values necessary for urban conservation. Two theories, the Informational Processes Theory and Tuan's Topophilia theory were examined and are drawn from environmental psychology. The first considers how environmental image affects the perception of individuals in relation to urban space, whilst Topophilia was used to identify cognitive landscape concepts. 302 study respondents were exposed to a photo-based schedule containing 25 old and 25 contemporary building scenes rated on a 7-degree Likert scale designed for responses. Statements with shared variances were grouped together under factor analysis and the degree of variability within shared variances distilled 4 visual preference dimensions. Coherence as a predictor of landscape preference scored the highest mean of 5.4 followed by verdancy with a mean of 4.8, historicity with a mean of 4.7 and finally complexity with the lowest mean of 2.34. The results established that, one, contradictions between built heritage and contemporary edifices resulted in a low preference. Two, historicity is an important preference predictor ascertained by the age, rarity, and diverse detailing of built heritage. Three, verdant spaces whose vegetation component is highly fragmented and ill maintained is a reducer of landscape preference. This study recommends designation to classify, protect and conserve the built heritage in an established urban conservation zone. There should be aesthetic control regulated under architectural character appraisals to restrict unsympathetic character of proposed developments and protect patrimony from discrepant intrusion. Finally, complementary adaptive re-use to enhance continuity with change to preserve heritage image, history, and cultural values.

KEYWORDS: Eclecticism, topophilia, historicity, complexity, values.



Proposed urban conservation zone in historic Parklands, Nairobi

Proposed complementary Development in Westlands, Nairobi

INFLUENCE OF PHYSICAL CHARACTERISTICS OF EDGES ON ACTIVITIES OF PUBLIC URBAN OPEN SPACES - A CASE OF MOMBASA TOWN PUBLIC OPEN SPACES.

Researcher: Carolyne Wanza Nthiwa, B. L. Arch. Hons., MUD, M.AAK, IFLA, JKUAT, cwanza@sabs.jkuat.ac.ke.

Supervisors: Prof. Mugwima Njuguna (Prof), B.Arch. Hons., M.A. Planning, Cert.: CMHB, Ph.D., M.AAK, M. ICOMOS. mugwima@sabs.jkuat.ac.ke & Dr. Susan Njeri Kibue; B.Arch. Hons., M.A. Housing Studies, PCHE, Ph.D., MAAK, JKUAT, skibue@jkuat.ac.ke

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well-being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Universal access to safe, inclusive, and accessible, green, and public spaces.

BIOGRAPHY:

L. Arch. Carolyne Wanza, MAAK (L.A.), MUD, a landscape architect and urban designer, lectures at the Department of Landscape Architecture, JKUAT. She is a sustainability enthusiast, environmentalist, and conservationist with special interest in community participation and gender equity in both rural and urban areas. She runs Ecoarch Solutions Limited, a consultancy firm in Nairobi, with presence in Eastern Africa. Her research interests are in conservation, ecology, nature-based solutions in design and edible landscapes.

ABSTRACT:

Public urban open spaces are gradually deteriorating as edges progressively lose their value as part of the open spaces they define due to prioritization of economic activities, as opposed to recreation. This study sought to establish the physical characteristics of edges defining public urban open spaces within Mombasa town in Kenya; activities carried out within the public open spaces; and the relationship between the two parameters. The research methods included Structured Interviews, Observation and Archival Research. Data was collected by use of standardized questionnaires, photographs, and mapping. Graphs and tables were used to present the collected data. Findings and conclusions were then drawn. It emerged that edges majorly determine linkage to the open spaces, degree of enclosure, size, shape, and quality of building facades, and hardness or softness of the space, hence affecting functional use. The study concluded that there exists a relationship between physical characteristics of the edges and activities within public urban open spaces. It recommended inclusion of edges in the design of public urban open spaces.

KEYWORDS: Edges, Physical Characteristics, Public Urban Open spaces.

URBAN DESIGN CHARACTERISTICS THAT INFLUENCE HUMAN ACTIVITIES IN SWAHILI STREETS - THE CASE OF OLD TOWN MOMBASA.

Arch. Nadi Omar Hashim, B.Arch. (Hons), MUD, M.AAK, Lecturer, Dept. of Architecture, JKUAT, nhashim@jkuat.ac.ke

Supervisors: Prof. Bernard Otoki Moirongo, B.Arch., M.A., Dr. Techn., MAAK, JKUAT, Email: bmoirongo@jkuat.ac.ke & Prof. Crispino Ochieng' B.Arch. (Hons, UoN), M. Arch (Katholieke Universiteit-Leuven, Belgium), PhD (University of Cape Town, South Africa), MAAK (A), Reg. Arch. Email: crispinoochieng@gmail.com

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Universal access to safe, inclusive, and accessible, green, and public spaces.

BIOGRAPHY:

Arch. Nadi Omar Hashim is a lecturer at the department of architecture. He has served at the department of architecture in various capacities since his employment as a tutorial fellow in 2006 and later promoted to a lecturer position in 2010. He served as the Chairman of the department from 2017 to 2023. He has been actively involved in teaching and mentoring both undergraduate students and graduate architects. His main thematic areas are building technology, architectural conservation, and urban design. He is also a registered architect with over 15 years of experience in the built industry.

ABSTRACT:

Mombasa is a city along the East African Coast. The city has rich Historical, Architectural and Cultural attributes that make it one of the significant civilizations of the world. Due to these attributes, the city has experienced physical, social, economic, and environmental challenges in trying to preserve itself for future generations. For example, the streets within the old town of Mombasa are unique in nature and provide settings for various social and economic activities. However, these activities are not seen to take place in some parts of the streets within the old town. These streets form part of the urban spaces within the old town. The study establishes the characteristics of these urban spaces that influence human activities within the streets. The study combined both qualitative and quantitative research methods to investigate the urban design elements along the streets, the number of columns per meter length of the street, the average building height, and the average height of windows, along the streets influence human activities at different levels. The study also established the types of activities that take place within these urban spaces.

Key Words: **Urban spaces, Architectural conservation, Swahili culture, Old town.**

THE IMPACT OF EARTH TECHNOLOGIES ON THE PROVISION OF HOUSING TO THE URBAN POOR - THE CASE OF EAST AFRICA.

Researcher: Arch. Omollo Noel Japheth Okello, B. Arch (Hons), M.UD, Ph.D., M.AAK, Lecturer, Dept. of Architecture, JKUAT, noelokello@sabs.jkuat.ac.ke, noelokello@gmail.com

Supervisors: Dr. Francis Mwangi Mburu; B.Arch. Hons., M.A. Planning, Cert. Ud: Ph.D., M.AAK, fburu2002@yahoo.com & Dr. Susan Njeri Kibue; B.Arch. Hons., M.A. Housing Studies, PCHE, Ph.D., MAAK skibue@jkuat.ac.ke

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Ensure access for all to adequate, safe, and affordable housing and basic services and upgrade slums.

BIOGRAPHY:

Noel J. O. Okello (Ph.D.) is an architect and urban designer for Motif Architects (Kenya). Since 2004 he has been a faculty member at the School of Architecture and Building Sciences (SABS) of JKUAT. He served on Technical Committees for Kenya Bureau of Standards (Clay and Clay Products; Concrete Products) and Export Promotion Council (Kenya Pavilion; Expo Zaragoza, 2008 "Water and Sustainable Development" and Expo Shanghai, 2010 "Better City - Better Life"). He is advisor and critic for *Kaza Mwendo*, a collaborative community design workshop, run jointly by University of McGill, University of Montreal, JKUAT and Kaza Mwendo Cooperative. He designed urban public space projects for Central Bank of Kenya, the former Nairobi City Council and Nairobi Central Business District Association. He has written articles on design and urbanism for the Institute of Quantity Surveyors of Kenya, the National Construction Authority (Kenya), the African Habitat Review Journal and the Architectural Association of Kenya. He is an avid sketcher with his sketches featured in the World of Urban Sketching, 2023. His research interests span materiality, architecture, urban infrastructure, and urbanisms in the South.

ABSTRACT:

The shelter crisis in the developing world is indisputable. Housing stocks in towns and cities in the South, in particular, are under considerable pressure from rapid urbanization. This situation has been shown to be most critical with regard to low-cost housing. Consequently, a number of strategies have been discussed and attempted in order to assuage associated shelter problems. The foremost of these strategies has entailed, *inter alia*; research, development, and demonstration of affordable, easily obtainable, and easy-to-use materials for the design and construction of satisfactory low-cost housing. While documented research in this area shows promise, actual construction is somewhat dormant. The effects of earth as a material on city form and spatial quality, in particular, and urban design, in general, are not documented. It is these seemingly inherent discrepancies in earth construction for low-cost housing that the study herein explores. Man's use of earth construction for shelter is described by several protagonists as ubiquitous. Earth is, supposedly, a material that is accessible, versatile, easy to use, structurally satisfactory, and affordable the urban poor. It therefore, potentially, performs satisfactorily as a material employed to avail adequate shelter

to the urban poor. This study uses case studies to comparatively assess the challenges, assumptions, and successes of the use of earth in two variant East Africa contexts: Nairobi and Kampala. The general objectives of the study are to establish the contextual feasibility of earth as a material for low-cost housing in East Africa's towns and cities and to analyse the concomitant urban forms and their spatial qualities. The study finds several oversights that characterize the promotion of earth as a construction material. It explores usually disregarded but critically concatenated aspects of earth construction and subsequently reveals potent reasons for the discrepancies between research and implementation. It then makes objective recommendations governing the use of material in residential projects in order to achieve quality urban design.

KEYWORDS: **East Africa, earth, shelter, low-cost, housing**

INFLUENCE OF THE PHYSICAL CHARACTERISTICS OF URBAN OPEN SPACES ON RESIDENTS PERCEPTION AND USAGE: A CASE OF 'OLD TOWN' MOMBASA

Researcher: Arch. Alfayo Uruji Makdii, B.Arch.(Hons.), MUD, Senior Lecturer TUM – Department of Architecture & Built Environment, alfayouruji@tum.ac.ke almakdii@yahoo.com

Supervisors: Dr. Francis Mwangi Mburu; B.Arch. Hons., M.A. Planning, Cert. Ud: Ph.D., M.AAK, JKUAT, fburu2002@yahoo.com & Dr. Susan Njeri Kibue; B.Arch. Hons., M.A. Housing Studies, PCHE, Ph.D., MAAK, JKUAT, skibue@jkuat.ac.ke

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Universal access to safe, inclusive, and accessible, green, and public spaces.

BIOGRAPHY:

Architect Alfayo Uruji Makdii is a Senior Lecturer at the Technical University of Mombasa. Prior to joining the academia in 2012, Alfayo served as a Chief Superintending Architect in the Ministry of Public Works and was the District Architect who covered Tana River and Mombasa districts from 1988 to 2004 supervising other consultants and contractors in execution of public projects. Apart from Architecture and Urban Design, he also has an interest in Climate Change and Environmental Conservation issues.

ABSTRACT:

'Old Town' Mombasa is a densely built-up historic area with inadequate public open spaces for recreation. Nevertheless, even the few existing open spaces are profoundly underutilized by the residents for recreational purposes. This discrepancy is what prompted the researcher to establish

whether the physical characteristics of the open spaces have any influence on the residents' perception and their usage. The study is based on multiple-methods approach that entailed observation, interview, archival information, and measurements in Old Town Mombasa. First the physical characteristics of the sampled open spaces and the residents' perception of the same were established. Then the analysis of the results through discussion established that there is a relationship between the physical characteristics and residents' perception. Consequently, the residents' perception of the physical characteristics influences the usage of these open spaces. The study findings indicate that the residents prefer: Large open spaces with low sense of enclosure; soft as opposed to hard spaces; perforated edges with complex built forms and interesting buildings around the open spaces; natural and varied floorspaces; diverse and well-maintained soft landscaping; variety of urban furniture with sheltered benches; minimal vehicular traffic and parking; and secure and serene atmosphere. The study concludes that the findings can be used to regenerate the public open spaces into vibrant appealing sustainable developments while at the same time discourage illicit use. The recommendations include enactment of legislation to regulate redevelopment of public open spaces; develop urban design policy that will guide preparation of development plans for all urban public open spaces; and involvement of all stakeholders in the regeneration of public open spaces. The study can be taken to be a model and tools based on community's perception that can be used to revitalise urban historic open areas to meet the residents' recreational needs.

Key Words: **Public open space, Edges, urban furniture, vehicular circulation.**

Bachelor's degree Research Abstracts here feature:

Department of Architecture

Sharon Wanjiru Irungu, Sharon Cherotich, Japheth Langat Kiprotich, Eddah Diana Kwendo, Connie Wangechi Njuguna, Isaac Maina Njoroge, Teddy Tavan Juma, Grace Wanjiku Kabiro, Joseph Kiarie Wainaina, Oscar Cheruiyot, Juliet Kariuki, Kelvin Kithome Nzioka, Kipngetich Edmund, Cindy Crawford Ouma, Lawrence Nderitu Mureithi, Nicholus Muchiri Rugendo, Kimberly Nyanchama Mong'are, Jerome Kariuki Kimani, Stephanie Bosibori Onyambu, Jessicah Nyambura Gichuki, Emmanuel Wekesa, and Harriet Awino Omondi.

Department of Landscape Architecture

Njenga Waweru, Nasibi Morris Ochonya, Wainaina Arnold Gitau, Simon Peter Gitonga Mureithi, Sharon, Cherotich Mitei, Christine N. Mwangi, Kenedy Mutwiri Mwobobia, Ivy Nyambura Gitau, Wekulo Jacquelyne Okutoyi, Lagho Emily Mghoi, Maureen Muthoni Mwai, Cynthia Vinaywa Ogola, Elsie Anyango Owili, Kimanthi Gardner Abraham, Shadrack Mwendwa Mutinda, Jacinta Margaret, Bunde A Beldine, Oduor Kenneth Otieno, Irene Waeni Ndolo, Odemba Esther Lukania, Nyamwange Jane Kwamboka.

Sustainable Development Goal (SDG) 02

Zero Hunger

Intended food sufficiency is accompanied by risks of environmental degradation and destruction of the ecosystems (biodiversity & climate change)

Theme:

Food sufficiency with environmental protection and enhancement of the ecosystems (biodiversity & climate change)

Agenda 2063 Goal 01

A high standard of living, quality of life and well-being of all citizens

Theme:

Poverty, inequality, and hunger

INFLUENCE OF URBAN AGRICULTURE ON FOOD SECURITY IN URBAN INFORMAL SETTLEMENTS - A CASE OF MUKURU KWA REUBEN, NAIROBI.

Researcher: Nyamwange Jane Kwamboka, B.L.Arch. Hons.,2024, JKUAT, nyamwangej2@gmail.com

Supervisor: Dr. LArch Sunday Abuje, BSc. LArch. Hons., MSc., PhD., JKUAT, sunabuje@sabs.jkuat.ac.ke

SDG 2: Zero Hunger/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG 2 Theme: Food sufficiency with contained risks of environmental degradation and destruction of the ecosystems (biodiversity & climate change)/**A-2063 G1 Theme:** Poverty, inequality, and hunger.

Sub-theme: Sustainable urban agriculture in urban informal settlements.

BIOGRAPHY:

Janet Kwamboka holds a bachelor's degree in Landscape Architecture from Jomo Kenyatta University of Agriculture and Technology. She also possesses certificate in computer studies from the Sacred Heart Computer College, Babadogo, Nairobi, with a distinction in all computer packages. She did industrial attachment with Align Architects in Nairobi, Ecoarch Solutions Limited in Nairobi and Karura Forest Station in Nairobi. Janet has a strong interest in research that involves informal settlements especially on aspects of community-initiated projects to improve livelihood.

ABSTRACT:

Food security is a critical challenge especially in developing countries whose urban population is rapidly increasing. Issues of acute food shortages need urgent be redress, ensuring access to safe, sufficient, and nutritious food. Urban agriculture, a growing practice, offers potential solutions and sustainable measures to address issues of food security. The study sought to investigate the influence of urban agriculture on food security in urban informal settlements, with a specific case study of the Mukuru Kwa Reuben informal settlement in Nairobi. The study aimed to establish the status of urban agriculture in the defined geographical area and its influence on the local food security situation. The study employed the observation, interview, and archival data collection methods A sample size of 20 respondents was interviewed. The data collected was treated to comparative analysis and presented using charts and graphs. It was observed that the study area faced issues of food security due to vulnerability arising from climate change. This was reflected in the poor food safety and low quality of nutrition, high levels of pollution, poor quality of sanitation, flooding, and very poor waste management. Urban poverty significantly occasioned lack of food for residents. The study recommended such strategies as transforming the streets and roads to urban farms by designing multi-functional street furniture that would have space to farm. Further, it proposed the design of vertical farms for institutions such as schools, churches, and industries to ensure they locally practice sustainable urban agriculture.

KEY WORDS: **Urban agriculture, food security, urban population growth**

Sustainable Development Goal 03

Good Health and Wellbeing

Ensure healthy lives and promote wellbeing for all ages

Theme:

Health and population

Agenda 2063 Goal 3

Healthy and well-nourished citizens

Theme:

Health and Nutrition

SUPPORTIVE DESIGN FOR PSYCHOLOGICAL WELLBEING IN PEDIATRIC PALLIATIVE CARE CENTRES.

Researcher: Sharon Wanjiru Irungu, B.Arch. Hons., 2024, JKUAT, irungu.w.sharon@gmail.com

Supervisor: Arch. Marylyn Musyimi, B.Arch. Hons., MA., MAAK, 2024, JKUAT, marylyn.musyimi@jkuat.ac.ke

SDG 3: Good Health and Well-being/**A-2063 G3:** Healthy and well-nourished citizens.

SDG 3 Theme: Health and Population/**A-2063 G Theme:** Health and Nutrition.

Sub-theme: Promotion of mental health and well-being.

BIOGRAPHY:

Sharon Irungu is a graduate architect from the Jomo Kenyatta University of Agriculture and Technology. Having honed her skills at Concise Architects Limited, she developed notable expertise in innovative and sustainable design solutions. Her passion lies in environmental behavior studies focusing on the psychological impact of the built environment on its occupants. With an creative spirit and an eye for human centered design, she pursues unique insights in the realm of architecture, crafting environments that elevate the human experience. In research, Sharon seeks to unravel the intricate relationship between the built environment and the well-being of its users.

ABSTRACT:

Studies show that in Kenya, the Kenya Hospice and Palliative Care Association has been focusing on establishment of pediatric palliative care units in government hospitals to cater to the increase in number of children with life limiting conditions. Spaces used for a previous function are adapted and converted to these units with little changes made to cater to the children's psychological needs. This study seeks knowledge on how a therapeutic environment can be provided for children in these units through supportive design. It uses both the qualitative and quantitative approach in three selected case studies in Nairobi County. Data was collected through observation and interviews of children that had life limiting conditions, their parents, and caregivers. The data was thematically analyzed to understand how supportive design components were applied to help children cope with stress. It helped determine how spatial design of these spaces affected aspects of psychological wellbeing and how children perceived and interacted with space. The study found that the supportive design components including sense of control, social support and positive distractions in the surroundings help to create a psychologically healing environment for the children. To create a supportive environment for these children, their spatial needs and preferences needed to be considered during design. The study recommended for the inclusion of play areas, use of warm and vibrant colours in public areas, spaces that respect the children's scale, rough textures on walls for sensory stimulation, creation of spaces that promoted user privacy, connection to nature and social interaction.

KEYWORDS: **Supportive design, psychological wellbeing, Therapeutic environment**

THE ROLE OF DESIGN FOR WAYFINDING IN ENHANCING USER EXPERIENCE: a case of Maternal Healthcare Facilities in Nairobi.

Researcher: Cherotich Sharon, B.Arch. Hons., 2024, JKUAT, cherotichlangat06@gmail.com

Supervisor: Martin Ochieng Mbidhi, B. Arch. (Hons.), MA Planning. PhD. Architecture. M.A.A.K (Architects Chapter). Reg. Architect, BORAQS, mmbidhi@jkuat.ac.ke. mmbidhi@gmail.com

SDG 3: Good Health and Well-being/**A-2063 G3:** Healthy and well-nourished citizens.

SDG 3 Theme: Health and Population/**A-2063 G Theme:** Health and Nutrition.

Sub-theme: Mitigating Maternal Mortality**.**

BIOGRAPHY:

Sharon Cherotich is a graduate architect from the Jomo Kenyatta University of Agriculture and Technology. With a passion for human-centered design, she has refined her skills through experience at Sycum Solutions. Her expertise is in environmental behaviour anchored on the principle that sustainable design influences the behaviour and well-being of its users. She promotes in the significance of user-centric design in creating spaces that enhance positive experiences for its occupants. Further, she engages in research with an aim of contributing to the comprehension of the relationship between occupants, architecture, and the natural world.

ABSTRACT:

Studies show that Nairobi's maternal mortality ratio stands at a high 390 deaths per 100,000 live births. Utilization of maternal healthcare facilities by expectant women plays a vital role in mitigating maternal mortality. The likelihood of an expectant mother seeking services from a healthcare facility for a second time is however dependent on their user experience. Research indicates that the architecture of maternal healthcare facilities has been focused on impacting the efficiency of medical care ,ignoring user experience which is vital in meeting the psychological needs of expectant mothers. This calls for an enhanced user experience that ensures an environment that positively impacts user perception of the facilities. This research investigated how user experience in the facilities could be enhanced through design for wayfinding. The study explored the concepts of wayfinding and perception among expectant women, utilizing the Gestalt principles of perception to establish a clear understanding of specific wayfinding needs among expectant women. The study employed a case study design on selected cases with data collected using the observation and survey methods. Data was analyzed using comparative, thematic and descriptive analysis and presented through the tables, diagrams, and annotated texts. The study found that wayfinding challenges were dominant in maternal healthcare facilities in Nairobi. Wayfinding design is vital then for enhancing user experience in the facilities. Design for physical comfort and safety, sense of urgency, visual continuity, visual legibility, social comfort, mental mapping, and memory are recommended for efficient wayfinding among expectant women in maternal healthcare facilities.

KEY WORDS: User experience, Legibility, continuity, Gestalt Principles.

IMPACT OF MULTISENSORY DESIGN ON WAYFINDING FOR THE VISUALLY IMPAIRED.

Researcher: Kiprotich Japheth Langat, B.Arch. Hons., 2024, JKUAT, kiprotichjay@gmail.com

Supervisor: Arch. John Wamwangi, M. Arch (TKK, Helsinki), B.Arch. (UoN), jmwamwangi@yahoo.com

SDG 3: Good Health and Well-being/**A-2063 G3:** Healthy and well-nourished citizens.

SDG 3 Theme: Health and Population/**A-2063 G Theme:** Health and Nutrition.

Sub-theme: User Experience and Social Impact.

BIOGRAPHY:

Kiprotich Langat is a Graduate Architect of Jomo Kenyatta University of Agriculture and Technology, holds a degree in architecture. Demonstrating a fervent interest in designs fostering inclusivity and elevating user experience, he has honed his skills through practical experience at Erash Builders Limited and Gisal Harlem Holding Limited. His expertise is centered on intricate details that contribute to the inclusive well-being of users. He underscores the significance of user-centric design in crafting spaces that elevate the sensory experiences of their occupants. Through his research, he advocates for designs that transcend aesthetics, striving to enhance the lives of those who inhabit them.

ABSTRACT:

This thesis explores the application of multisensory design principles to enhance wayfinding experiences for individuals with visual impairments, drawing inspiration from Juhani Pallasmaa's emphasis on sensory perception (Pallasmaa, 2005) and Passini's concepts of environmental legibility (Passini, 1992). The research aims to develop design strategies that improve spatial understanding, orientation, and mobility for the visually impaired, challenging the ocular-centric paradigm prevalent in contemporary culture (Pallasmaa, 2005). The study establishes a framework for integrating multisensory design into wayfinding systems, emphasizing inclusivity and accessibility. Through a comprehensive literature review and field investigations, the research assesses the effectiveness of various multisensory cues—such as tactile, auditory, and olfactory elements—in providing non-visual spatial information and aiding navigation. It also explores the role of architectural and urban design in creating environments that foster independent mobility and reduce reliance on visual cues. Utilizing interviews, observations, case studies, and archival data analysis, the researcher gains insights into how diverse built forms approach multisensory wayfinding and explores the perspectives of visually impaired individuals on wayfinding. The study concludes with a discussion of how sensorial designs are translated into architecture. This research significantly contributes to the knowledge base on designing for visual impairments, underscoring the potential of multisensory design in creating inclusive spaces that empower visually impaired individuals. The insights gained can inform architects, urban planners, and designers in developing guidelines and strategies that facilitate independent wayfinding and enhance the overall quality of life for individuals with visual impairments.

KEYWORDS: **Wayfinding, multisensory cues, ocular-centric paradigm.**

INSIGHTS INTO SPATIAL DESIGN FOR WELLNESS: A case of Shelters for Victims of Domestic Violence in Kenya.

Researcher: Eddah Diana Kwendo, B.Arch. Hons., 2024, JKUAT, zindzi991@gmail.com

Supervisor: Arch. James Shikuku, B.Arch. Hons., M.Sc., JKUAT, shikukujames25@gmail.com

SDG 3: Good Health and Well-being/**A-2063 G3:** Healthy and well-nourbmished citizens.

SDG 3 Theme: Health and Population/**A-2063 G Theme:** Health and Nutrition.

Sub-theme: Trauma Informed Design for Holistic well-being.

BIOGRAPHY:

Eddah Kwendo is a graduate architect from the Jomo Kenyatta University of Agriculture and Technology, with a diploma from the Nairobi Institute of Technology. She is therefore well enabled to bridge the gap between design and construction. Her projects with Morphosis Ltd secured the AAK Duaracoat and a Gold Star Award in 2022. Passionate about human-centered designs, she currently holds a key position at Morphosis Ltd, where she advances her knowledge on the needs, behaviours, and experiences of space users. She is committed to creating effective solutions that particularly address social problems, resulting in empowerment and social equity through design.

ABSTRACT:

Globally, 30% of women experience Domestic Violence (DV), with 40.7% being similarly affected in Kenya. It is reported that Nairobi County has an even higher proportion. Past studies show that domestic Violence inflicts adverse physical health effects on the victims, with mental illness being prevalent. Whereas the challenges faced by victims are complex, present shelters serve as hiding places for victims, only addressing their primary needs. A more focused spatial design that comprehensively supports the needs of victims is necessary. This research addresses the inherent failure of spatial design to foster the healing process. It explores the history of DV, delving deeper into the recovery steps of victims, employing Maslow's theory for comprehensive support, and aligning the trauma-informed theory for unique needs of the victims of DV. A healing framework, with measurable variables that guided data collection emerges here. A phenomenological approach to understand the interactions of victims with spatial design was used. Case studies on Maisha Girls safe house, the gender violence recovery centre, and Kamukunji police station gender-based violence venter in Nairobi were conducted. Behavioural responses were sought for using unobtrusive observations. Guided interviews were conducted on a sample size of forty-five respondents. Data collected was analysed thematically, and presented using tables, charts, maps, sketches, and photos. The study established that spatial design plays a critical role in the healing process of the victims and recommended for a revolutionized design, highlighting as spatial features such as planning, openings, materials, and colour, that contribute to the well-being of victims.

KEY WORDS: Human Centred Design, Trauma Informed Design.

SOCIAL DESIGN FOR CHILD WELLNESS - A case of Children Homes in Nyandarua County.

Researcher: Connie Wangechi Njuguna, B.Arch. Hons., 2024, JKUAT, connie.sheshi@gmail.com

Supervisor: Arch., Wycliff Nyaigoti Nyachwaya, M.U.D., B.Arch. Hons, M.A.A.K, JKUAT, wnyachwaya@jkuat.ac.ke

SDG 3: Good Health and Well-being/**A-2063 G3:** Healthy and well-nourished citizens.

SDG 3 Theme: Health and Population/**A-2063 G Theme:** Health and Nutrition.

Sub-theme: Social Design for Child wellbeing.

BIOGRAPHY:

Connie Njuguna is a graduate architect from Jomo Kenyatta University of Agriculture and Technology (JKUAT). Eager to learn and passionate about humanitarian architecture and human-centered design, she has cultivated her skills not only through academic pursuits but also through experience at Space Form Studios. Her dedication to the field is reflected in her commitment to learning. Her expertise lies in merging architectural principles focusing on improving human well-being. She holds a strong belief in the transformative power of design for the betterment of communities. Currently engaged in furthering her research interests, she strives to create spaces that positively impact society.

ABSTRACT:

A healthy and safe home environment is essential for development during childhood. Studies have shown that children need stable, supportive social environments and access to resources within the home to enhance cognitive, emotional, and physical development. This thesis investigated the relationship between social design elements in Architecture and the wellbeing of abandoned children residing in children's homes. Recognizing that children's wellbeing comprises both physical and psychological dimensions, the study focused on the role of spaces in promoting social development which in turn shapes the psychological aspects of children. The research methodology involved an analysis of various social design aspects within children's homes. Interviews of children, staff, and community members gauged their perspectives on how different social design elements impact the children. The study explored elements such as transparency, circulation, play areas, social spaces, scale, colour, surface detail, texture, and materiality. The findings revealed a correlation between social design aspects and child wellness in Children homes. Transparency in spatial openness, creation of common circulation patterns, play areas and social spaces emerged as factors positively influencing the psychological development of abandoned children. The study emphasizes the importance of considering scale, colour, surface detail, texture, and materiality in designing environments conducive to child wellness. Also of value was the necessity of implementing social design strategies within children's homes to foster a supportive and nurturing environment. The study recommended incorporation of transparency, free circulation, play areas, and social spaces that increased the rate of human interaction thus encouraging wellness of the vulnerable, abandoned children.

KEYWORDS: **Social Design, Child Wellbeing, Psychological Development.**

MAINSTREAMING USER SPATIAL NEEDS IN THERAPEUTIC GARDENS AT THIKA LEVEL 5 HOSPITAL, KENYA.

Researcher: Hillary Njenga Waweru B. LArch., Hons. 2024, JKUAT. waweruhillary1@gmail.com

Supervisor: Dr. Arch. Dennis Karanja, B.Arch., MLA, PhD. karanja@sabs.jkuat.ac.ke

SDG 3: Good Health and Well-being/**A-2063 G3:** Healthy and well-nourished citizens.

SDG 3 Theme: Health and Population/**A-2063 G Theme:** Health and Nutrition.

Sub-theme: Therapeutic Landscapes.

BIOGRAPHY:

Hillary Waweru is a graduate of Landscape Architecture from Jomo Kenyatta University of Agriculture and Technology. In his academic tenure, he has acquired valuable skills and experience at Third Dimension Concepts. Now serving as a landscape architect assistant and a member of the Architectural Association of Kenya, Waweru focuses his research on user-cantered design in therapeutic landscapes, particularly healing gardens within healthcare settings. His contributions include the publication of a journal article, *"demonstrating his commitment to advancing knowledge in landscape architecture"*. With a dedication to integrating nature into healing environments, Waweru strives to make impactful contributions to the field.

ABSTRACT:

The idea that spending time in natural spaces, particularly gardens, can enhance overall health and well-being, has gained popularity. Studies show that healing gardens are now considered crucial in healthcare settings. However, Thika level five hospital faces a significant issue . Its outdoor spaces are neglected and underused, mainly due to the absence of clear guidelines for designing them with users in mind. Scholars emphasise the importance of incorporating scientific knowledge into the design of healing gardens for effectiveness. Using a descriptive research approach through questionnaires, interviews, and observations, the study identifies user spatial needs at the Thika level five hospital. It assesses the open space status and recommends strategies for mainstreaming user spatial needs in therapeutic landscapes. One key finding of the study is that users prefer being in nature . They also value privacy. Further, the study reveals that the outdoor spaces of hospitals generally do not have qualities for a therapeutic landscape, particularly in terms of diverse sensory stimuli. A healing space should provide various sensory experiences, such as different textures, pleasant scents, and visually appealing elements, creating a relaxing environment. The guiding principle for the development of these gardens is biophilic design. Such design concepts and analogies viewing the healing garden as a vital part of the hospital's healing approach, where nature enhances the well-being of patients, visitors, and staff. Design elements include harnessing nature's therapeutic power, engaging the senses, offering a respite from the clinical environment, and immersing people in nature. Through these intentional changes, the healing garden transforms into a space where natural principles actively contribute to improving health and overall well-being.

KEYWORDS: **Therapeutic Landscapes, Well-being, Spatial Needs.**

RELATIONSHIP BETWEEN PHYSICAL ENVIRONMENT AND HEALING.

Researcher: Nasibi Morris Ochonya B.Arch. Hons.,2024, JKUAT.mauricenasibi@gmail.com

Supervisor: Dr. Paul Aloyo B.Arch. (JKUAT) MEPM (KU) PhD.(KU).aloyopaul@gmail.com

SDG 3: Good Health and Well-being/**A-2063 G3:** Healthy and well-nourished citizens.

SDG 3 Theme: Health and Population/**A-2063 G Theme:** Health and Nutrition.

Sub-theme: Therapeutic Landscapes.

BIOGRAPHY:

Nasibi Morris Ochonya is a graduate Landscape Architect from the Jomo Kenyatta University of Agriculture and Technology. He is also a member of the Architectural Association of Kenya, Landscape Architecture chapter. From companies such as Urban Green and Ecoarch Solutions ,he has gained skills in sustainable garden design and innovative solutions from intensive research. Nasibi has an interest in the design of healing landscapes, crafting design philosophies that appeal to aesthetics and the mind. He has also trained under renowned Landscape Architects in the country learning ethical professional conduct and communication in the workplace.

ABSTRACT:

In an era marked by unprecedented advancements in medical technology and treatment modalities, the significance of holistic approaches to healthcare has regained prominence. One that has garnered increasing attention is the concept of healing landscapes. Studies show that a healthy landscape leads to healthy people. However, there is a general lack of deliberate design of physical factors in the environment which have an influence on healing. This study therefore investigated the relationship between the physical environment and healing. The research investigated the application of the theory of sustainable garden design and the theory of the healing landscapes at the Kenyatta University Teaching Referral and Teaching Hospital (KUTRRH). Field visits relied on observation checklists that were used to identify physical factors, their design, and the lack thereof. Purposive sampling was used to interview key informants likely to have information relevant to the objectives of the study. Information was obtained through one-on-one interviews with these individuals, who included visitors and staff members. The findings were represented through tables, pie charts, histograms, and bar graphs. The study established that in order to create a functioning and well utilised healing landscape, emphasis on the deliberate design of the physical factors in the landscape was important. Such design should aim to increase engagement of users with nature, giving a sense of freedom and enhancing aesthetics for the purpose of providing healing to the users.

KEYWORDS: **Prospect, refuge, sustainable garden design,.**

Sustainable Development Goal 04

Quality Education

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Theme:

Inclusive Education

Agenda 2063 Goal 01

Well-educated citizens and skills revolution underpinned by science, technology, and innovation.

Theme:

Education and science, technology, and innovation (STI) driven skills revolution.

ENHANCING THE USER EXPERIENCE OF CHILDREN WITH AUTISM IN EDUCATIONAL SETTINGS.

Researcher: Isaac Maina Njoroge, B.Arch. Hons., 2024, JKUAT, isaac.maina2017@students.jkuat.ac.ke

Supervisor: Arch., Wycliff Nyaigoti Nyachwaya, M.U.D., B.Arch. Hons, JKUAT M.A.A.K (A) wnyachwaya@jkuat.ac.ke

SDG 4: Quality Education/**A-2063 G2:** Well-educated citizens and skills revolution underpinned by science, technology, and innovation.

SDG 4 Theme: Inclusive Education/**A-2063 G2 Theme:** Education and science, technology, and innovation (STI) driven skills revolution.

Sub-theme: Appropriate Building Materials and Technologies.

BIOGRAPHY:

Isaac Maina, a graduate architect with a bachelor's degree from Jomo Kenyatta University of Agriculture and Technology, has furthered his education with a diploma in building from Eldoret National Polytechnic. Gaining practical experience as a Junior Architect and Intern in Nairobi City County, he focused on urban renewal, housing, and project management. Committed to community welfare, he actively participated in ASA JKUAT World Architecture Day talks, addressing the design for health and well-being, particularly for children with autism. His ongoing contributions to transformative projects underscore his dedication to excellence in the field.

ABSTRACT:

Learning institutions play a crucial societal role by accommodating a diverse range of users, considering various physical and mental abilities (Smith et al., 2009). Focused on primary school grades 1–9 in Kenya, this study addresses the specific needs of children with autism spectrum disorder (ASD). The research aims to identify deficiencies in existing facilities, propose desirable building design attributes, explore material technology's impact on ASD user experience, and investigate construction solutions. Employing a comparative environmental behaviour research approach, the study utilizes case studies, literature inferences, and diverse data collection methods such as questionnaires, observation, photographs, sketches, and interviews to comprehend the user experience. Findings underscore the vital importance of integrating user experience considerations from the outset of design (Smith et al., 2009). The study recommends holistic building design for ASD children, addressing sensory, emotional, and functional aspects. Thorough pre-planning, including spatial arrangement, furnishings, lighting, colour schemes, and technology, is essential to create a harmonious environment. Mitigating stressors like sensory overload supports therapy and aids ASD children in navigating their surroundings. Sensory-responsive spaces contribute to their well-being and development. Emphasizing sensitivity to ASD children's emotional safety and identity needs, the study suggests that integrating building design and materials technology thoughtfully leads to inclusive, comforting, and positive environments, ultimately enhancing lower learning institutions for the well-being and development of children with ASD. In summary, the research highlights the significance of cohesive design and material integration, ensuring the specific requirements of ASD children are met within learning environments (Smith et al., 2009).

KEYWORDS: **Technology, User experience, autism spectrum disorder.**

ADAPTABLE DESIGN FOR COLLABORATIVE LEARNING IN PRIMARY SCHOOLS.

Researcher: Teddy Tavan Juma., B.Arch. Hons, 2024, JKUAT, Juma.teddy@students.jkuat.ac.ke

Supervisor: Dr. Ng'eno Chelang'at Faith. B.Arch. (Hons), MSc. SAS. UoS (UK), PhD Arch. UoS (UK), archfaithngeno@gmail.com

SDG 4: Quality Education/**A-2063 G2:** Well-educated citizens and skills revolution underpinned by science, technology, and innovation.

SDG 4 Theme: Inclusive Education/**A-2063 G2 Theme:** Education and science, technology, and innovation (STI) driven skills revolution.

Sub-theme: Life-long Education.

BIOGRAPHY:

Teddy Tavan is a graduate architect with interests in innovative contextualized design and humanitarian visual art; his conceptual photography has achieved awards from organizations such as the amnesty NGO, Adobe creative, 500px and Canva Pexel Group. His mentions in architecture include the PAUSTI competition, 2022 as well as his passion for detail designing and innovation, he has practiced furniture design for 3 years and aspires to solve humane problems through architectural installations and product design.

ABSTRACT:

This research studied the influence of flexible design in collaborative primary schools within the context of Nairobi's metropolitan area. It was inspired by the change in pedagogy at the dawn of Competency Based Curriculum (CBC), an adjustment towards technology (Amutabi, 2019). CBC prioritizes collaborative learning prompting adaptable classrooms to promote diverse teaching methods, as noted by Oblinger, 2006 and Bassing, 2022.The study assesses Kronenburg's (2007) and Schmidt's (2016) parameters, such as convertibility, transformability, divisibility, and versatility. These are then analysed against the elements of collaboration based on Cook & Friend (1991); Welch & Sheridan (1995). Case studies were qualitatively analysed based on Crotty (1998), including interviews, questionnaires, and observations. Comparative analysis, space syntax, charts, and tables were used to present the findings. It concluded that schools need more adaptable space options for a better balance between collaborative work and private reflection. Spaces failed to accommodate diverse groups during collaboration and lacked spatial adaptability, thus failing to achieve adjustability. Notably, traditional classroom layouts with single access points and permanent partitions had limitations that hindered functionality. Mobile furniture did not warrant efficient convertibility. Adaptable design benefits collaboration in schools by allowing the environment to adapt to the needs of diverse learners. The study underscored the importance of transformability in enabling multi-use and expansion of space to accommodate collaborative learning. The case studies supported the idea that a flexible environment improved collaboration by enabling diverse needs of students through inclusivity and facilitating future adaptability and versatility to changing requirements, therefore promoting collaborative learning.

KEYWORDS: Flexible design, competency learning, functional separation.

SENSORY DESIGN FOR PLACEMAKING: A CASE OF AUTISTIC VOCATIONAL TRAINING CENTRES.

Researcher: Grace Wanjiku Kabiro, B.Arch. Hons., 2024, JKUAT, wanjikugrace194@gmail.com

Supervisor: Arch., Eric Plal, M.U.D., B.Arch. Hons, M.A.A.K, JKUAT, eric.plal@jkuat.ac.ke

SDG 4: Quality Education/**A-2063 G2:** Well-educated citizens and skills revolution underpinned by science, technology, and innovation.

SDG 4 Theme: Inclusive Education/**A-2063 G2 Theme:** Education and science, technology, and innovation (STI) driven skills revolution.

Sub-theme: Promotion of psychological wellness.

BIOGRAPHY:

Grace Wanjiku Kabiro is a graduate of Architecture from the Jomo Kenyatta University of Agriculture and Technology. At the Space Form Studio, she has developed a keen eye for design and a heart for those with special needs, to ensure that everyone thrives in their environment. Here she seeks contribute to the creation of environments that empower those lives with unique spatial requirements Grace displays a good understanding of architectural principles, that incline towards strong social responsibility. In design she prioritizes functionality and aesthetics, ensuring spaces cater to the diverse needs of individuals.

ABSTRACT:

The research proposal aimed to identify specific design criteria for customizing spaces to cater to the sensory needs of individuals or groups with autism spectrum disorders (ASD). This is through focusing on aspects like sensory zoning, transition spaces, escape areas, and visual cues for wayfinding, the study was prompted by the rising prevalence of autism cases and the challenges faced by individuals with ASD in securing and maintaining employment. The literature review concentrated on vocational training interventions for adolescents and adults with ASD due to the stark reality of high unemployment rates and associated service costs. The primary objective was to identify spatial design elements conducive to create a conducive learning environment in vocational institutes for autistic adults aged 18-25. The research also analysed the impact of sensory design on autistic behaviour within the vocational institute environment and assessed the resultant impact on behavioural temperament. To achieve this, Fairmile School, City Primary, and Mathare Special Training Centre were studied in Nairobi, employing mixed methods for data collection, including observation checklists, structured interviews, and closed questionnaires. Inferences were drawn from critical literature demystifying autism and triangulating perceptions of autistic learners with sensory aspects of building designs, such as ASPECTSSTM by Mostafa (2008). The study concluded that creating a comfortable learning environment for autistic individuals requires the integration of educational activities with sensory design approaches. This collaborative approach aims to facilitate knowledge acquisition and skill generalization while addressing the stress points in the built environment, including air quality, noise, lighting, and spatial organization.

KEYWORDS: Sensory Design, Place Making, autism spectrum disorder.

ROLE OF SPATIAL DESIGN IN ENHANCING USER EXPERIENCE IN CHILDCARE CENTRES.

Researcher: Joseph Kiarie Wainaina, B.Arch. Hons., 2024, JKUAT, k.joewainaina@gmail.com

Supervisor: Arch. Jerusha Ngungui, MSc. Nottingham, B. Arch (Hons), MAAK (A), Reg. Arch., JKUAT, email address. jerusha.ngungui@jkuat.ac.ke

SDG 4: Quality Education/**A-2063 G2:** Well-educated citizens and skills revolution underpinned by science, technology, and innovation.

SDG 4 Theme: Inclusive Education - Early Childhood Development/**A-2063 G2 Theme:** Education and science, technology, and innovation (STI) driven skills revolution.

Sub-theme: Enhancing Learning Environments for Holistic Development

BIOGRAPHY:

Joseph Kiarie, a graduate architect from Jomo Kenyatta University of Agriculture and Technology (JKUAT), brings a meticulous eye for detail and innovative design solutions, enriched by extensive experience at Mutiso Menezes International (MMI). Fuelled by a profound passion for human-centred design, he specializes in crafting purposeful environments prioritizing positive user experiences. Committed to merging creativity with functionality, Kiarie ensures spaces captivate aesthetically while enhancing inhabitants' well-being. His current mission involves shaping the architectural landscape through research, leaving a lasting imprint with a thoughtful and user-centric approach to design.

ABSTRACT:

In Kenya, over 35% of children under the age of five are enrolled in childcare centres, spending approximately 35 hours per week in these facilities. The physical environment of childcare centres plays a crucial role in fostering optimal growth and development, making it essential to consider it in their creation. Unfortunately, childcare centre environments have often been characterized by poorly designed spaces that overlook the psychological and physical needs of users. These centres have typically focused on providing basic learning spaces, akin to traditional schools, without considering the environments' impact on the children's psychological well-being and cognitive development. Such neglect may lead to negative experiences and hinder the holistic development of children. The following three specific objectives guided the research: identifying spatial attributes, determining perception influences, and investigating user perceptions in Nairobi's childcare centres. To carry out the research, case study method was utilized, focusing on childcare centres in Nairobi County, which has a significant number of children enrolled in such centres. The data collection methods included observational analysis of spatial attributes for user experience and attributes of perception in the selected case studies. Additionally, surveys comprising interviews and questionnaires were used to investigate the user's perception of the built environment in the selected centres. The findings assess the utilization of spatial design for enhancing user experience by comparing literature review insights with case study data. The study's outcomes will contribute recommendations for improving childcare centres' user experiences and offer guidelines for future childcare centre development.

KEY WORDS: Cognitive development, Psychological wellbeing, User experience

SENSORY DESIGN FOR EFFICIENT EARLY CHILDHOOD LEARNING SPACES FOR AUTISTIC CHILDREN IN NAIROBI

Researcher: Oscar Cheruiyot, B. Arch, Hons., 2024, JKUAT, oscheruiyot@gmail.com

Supervisor: Arch. Josephine Mwangi, B. Arch., Hons., M.A.A.K., JKUAT, Josephine.mwangi@jkuat.ac.ke

SDG 4: Quality Education/**A-2063 G2:** Well-educated citizens and skills revolution underpinned by science, technology, and innovation.

SDG 4 Theme: Inclusive Education - Learner Diversity and Identities /**A-2063 G2 Theme:** Education and science, technology, and innovation (STI) driven skills revolution.

Sub-Theme: Enhancing Special Needs Education.

BIOGRAPHY:

Oscar Cheruiyot earned his stripes as a graduate of Jomo Kenyatta University of Agriculture and Technology (JKUAT). With a curiosity for the intersection of design and human experience, he focuses on creating spaces that cater to diverse needs. His academic knowledge and experience working with Design City infuse his projects with a blend of artistic flair and functional empathy. His portfolio reflects his technical prowess and showcases his dedication to creating spaces that resonate with the occupants on a sensory level. His research advocates for designs that go beyond aesthetics, aiming to enhance the lives of those who inhabit them.

ABSTRACT:

Despite the vast research on sensory design, little is known about its role in enhancing efficiency in early childhood learning spaces for autistic children in Nairobi County. The existing designs of early childhood learning spaces for autistic individuals in Nairobi City County overlook the specific sensory needs and challenges of this population. Regardless of this gap in the autism-learning environment, there are yet to develop architectural design guidelines catering specifically to the scope of autistic needs. This has posed a significant barrier to effective learning and optimal outcomes for autistic children. Applying sensory design theory, Humphrey`s theory, perceptual theory, and behavioural theory as guides, this study intends to correct this exclusion by answering the question: How do autistic children behave while in their learning environment? How do children with autism spectrum disorder perceive built environments in Autism schools in Nairobi? Using a case study research approach, this study recovered some of the teachers' and therapists' perspectives on the autism-learning environment through the use of methods such as observations, questionnaires, and structured interviews. From the findings of the research, i.e., sensory-friendly environments, sensory breaks visual supports, and tactile sensory considerations, it was noted that sensory design attributes affect the perception of autistic learners, and their behaviour, in their learning environment. The research concluded that sensory design is a powerful tool in enhancing early childhood education efficiency for autistic children; by creating environments that cater to the sensory needs of young learners, educators can foster engagement, curiosity, and holistic development.

KEYWORDS: **Sensory Design, Efficient, Autism spectrum Disorder**

IN LEARNING SPACES TO ENHANCE LEARNING EXPERIENCE: a case of Upper Primary Schools in Kiambu County.

Researcher: Juliet Kariuki, B.Arch., 2024, JKUAT, kariukijuliet16@gmail.com

Supervisor: Arch. James Shikuku, B.Arch. Hons., M.Sc., JKUAT, shikukujames25@gmail.com

SDG 4: Quality Education/**A-2063 G2:** Well-educated citizens and skills revolution underpinned by science, technology, and innovation.

SDG 4 Theme: Inclusive Education - Universal Primary Education/**A-2063 G2 Theme:** Education and science, technology, and innovation (STI) driven skills revolution.

Sub-theme: Effective Learning Environments.

BIOGRAPHY:

Juliet Kariuki, a graduate architect from Jomo Kenyatta University of Agriculture and Technology, has combined skills learned from her academic journey with practical experiences gained from Megastructures Limited and Vine Design to sharpen her architectural expertise. Her passion finds expression in human and user centered design in architecture, convinced that designing spaces that are functional and tailored to the end user enriches the overall experience of the occupants. Driven to contribute to the field, she engages in research with an aim of understanding the relationship between people and buildings so as to optimize functionality of spaces and user experience.

ABSTRACT:

According to the Pedagogy-Space-Technology (PST) Framework by Professor Radcliffe, the learning environment is composed of learning spaces, technology, learning and teaching methods(pedagogy) with a change in one factor influencing the other two. The shift to Competency Based Curriculum (CBC) in Kenya requires incorporation of adaptability to accommodate the change in pedagogies and technology while factoring in different learners' abilities and preferences as the learners in upper primary are expected to explore the broad-based curriculum to discover their talents. From the study, the concepts of adaptability relevant to learning spaces were identified as flexibility, convertibility, and scalability with spatial, structural, and service strategies for design incorporation into the six building layers derived from the Shearing Layers theory. The study also identified different aspects of learner needs and learning preferences that influence learning experience. The research used archival study to determine the spatial needs for competency based learning and different learner preferences, undisguised observation of case studies selected through non-probability sampling in Kiambu county to evaluate existing learning spaces and surveys specifically questionnaires and focus groups to find out the perceptions and preferences of learners and their teachers. Through thematic, comparative, and descriptive analysis, the study revealed that there was limited incorporation of adaptability in existing learning facilities hindering maximized use of spaces to offer variety and choice to learners, enable access and mobility while fostering collaboration and social interaction. Therefore, it was concluded that adaptability needs to be incorporated from conception of design to optimize functionality consequently enhancing learning experience.

KEY WORDS: Adaptability, flexibility, convertibility, scalability, learner experience.

Sustainable Development Goal (SDG) 11

Sustainable Cities and Communities

Theme:

Inclusive, safe, resilient, and sustainable cities and human settlements.

Agenda 2063 Goal 01

A high standard of living, quality of life and well-being of all citizens.

Theme:

Modern, affordable, and liveable habitats and quality basic services

PROFILE OF THE THREAT OF SPATIAL TRANSFORMATION TO BUILT HERITAGE - A Case of Coastal Heritage Sites.

Researcher: Nzioka Kelvin Kithome, B.Arch. Hons., 2024, JKUAT, kelvinkithome001@gmail.com

Supervisor: Arch.Wallace Njiiri [B. Arch. (Hons), M.U.D, M.A.A.K, JKUAT, njiirikihiko@gmail.com

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Conservation of heritage and cultural identity in urban regeneration and conservation.

BIOGRAPHY:

Nzioka Kithome, a Graduate Architect, holds a first-class honor in bachelor's degree of Architecture from JKUAT, with commendations including the Chairman's Award of Excellence, 2019/2020, and successive Best Student Awards. His outstanding performance extends to winning the Pausti International Student Accommodation Competition and representing his university at the international trade fair in 2022 besides achieving 1st runners-up at the Luxury Expo in 2023. With a diverse professional background, including roles at Synarc Ltd and Grand Arch Studio, he currently holds a key position at Symbion Africa. Kithome is committed to advancing architectural knowledge, particularly in sustainable architecture and heritage conservation.

ABSTRACT:

Heritage buildings are important constructs of identity and a sense of place (Yazdani Mehr, 2019). The heritage value of Lamu Island and the archipelago, engulfed in drab tenements, has been subjected to considerable pressure from economic and developmental demands. The heritage space has faced descant intrusions that have subjected the built heritage to disruption in its scale, historic colour, and aesthetic quality (Wallace et al., 2020). Due to these recent changes and the underlying tension between urban growth and heritage conservation, urban areas that are hard to identify in a historical context have sprung up (Mutonga, 2022). This inquiry sought to assess spatial transformations in the historic Lamu to understand how they threaten built heritage and as a result, form an approach towards heritage conservation in the changing historic Swahili town. Information on a comprehensive case study of Lamu Island was gathered through observation checklists used to record the observation of spatial attributes such as building geometry, materials use, colour, texture, density, spatial layout, navigation, and access. A sample size of 40 respondents was interviewed to establish their perception of the contested built heritage. The findings were discussed, analysed, and presented through comparative analysis, charts, and graphs. This study found that spatial transformation in Lamu has resulted in a complexity that in effect has altered the built character of Lamu. The study recommends the inclusion of aesthetic controls to limit informality and preserve patrimony. Complementary design is necessary to strengthen coherence, and continuity with change and safeguard cultural values and heritage.

KEYWORDS: Urban spatial transformation, built heritage, conservation.

CONTEXTUAL CULTURAL RELEVANCE OF FORM IMAGEABILITY AND FOOTFALL IN MUSEUMS AND EXHIBITION CENTRES – A case of the City of Nairobi.

Researcher: Kipngetich Edmund, B.Arch. Hons., 2024, JKUAT, edmundchumo@gmail.com

Supervisor: Brenda Amani, B.Arch. Hons., 2024, JKUAT, bren.maiba@gmail.com & Martin Ochieng Mbidhi, B. Arch. (Hons.), MA Planning. PhD. Architecture. M.A.A.K (Architects Chapter). Reg. Architect, BORAQS, mmbidhi@jkuat.ac.ke. mmbidhi@gmail.com

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Conservation of heritage and cultural identity in urban regeneration and conservation.

BIOGRAPHY:

Edmund Kipngetich, hailing from Kapserton, Uasin Gishu County, achieved academic milestones at Kapsabet Highlands School, Nairobi School, and Jomo Kenyatta University of Agriculture and Technology. Graduating with First-Class Honours in Architecture, he honed his skills at prestigious firms like Symbion Kenya Limited, Synarc Systems and Designhouse Studio. A member of the AAK, Edmund aspires to register as an architect, specializing in parametric architecture. His commitment to excellence earned him the Architecture Chairman's Award for 2nd best overall student, 2019/2020, the best overall student in 2020/2021 at JKUAT and mention in the PAUSTI Student Accommodation Competition in 2022.

ABSTRACT:

This thesis explores the relationship between architectural form, imageability, and footfalls within the Nairobi's cultural institutions. Existing museums and exhibition centres in Nairobi often lack resonance with users, as they often lack identity, cultural significance, and fail to evoke strong mental images or sensory experiences (Maringa & Ochieng, 2013). These structures often prioritize functionality and cost over aesthetics and cultural significance, resulting in a lack of distinctiveness and cultural specificity and decreased footfalls (Maringa & Ochieng, 2013). The application of the concept of imageability to architecture is conspicuously lacking in the sense of recognizing a building as a landmark and as an element of imageability (Lynch, 1960). The research aims to determine how architectural form influences imageability and, consequently, footfalls. Employing a mixed-method approach across three case studies, data was gathered through observation, archival study, questionnaires, and interviews and presented using bar graphs, pie charts, and tables. Triangulation of various research methods enabled comparative analysis based on the stated objectives. The findings suggest that architectural form significantly influences a building's imageability, which, in turn, impacts footfall, albeit partially, as it is also dependent on other factors such as capacity, location, and character of a building. To create an imageable and culturally resonant spaces, the research suggests considering the building's surface attributes, form characteristics and elements, context, symbolism, identity, scale, and proportion. By addressing these factors, the research concludes that it is possible to design imageable art museums and exhibition centres that attract higher footfalls.

KEYWORDS: Form, imageability, footfall, context, landmark, identity.

THE ROLE OF CULTURAL IDENTITY IN PLACE-MAKING - A case of Cultural Centres in Kisumu City.

Researcher: Cindy Crawford Ouma, B.Arch. Hons., 2024, JKUAT, cindycrawford033@gmail.com

Supervisor: Martin Ochieng Mbidhi, B. Arch. (Hons.), MA Planning. PhD. Architecture. M.A.A.K (Architects Chapter). Reg. Architect, BORAQS, mmbidhi@jkuat.ac.ke. mmbidhi@gmail.com

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Conservation of heritage and cultural identity in urban regeneration and conservation.

BIOGRAPHY:

Crawford Cindy Ouma holds a Bachelor's degree in Architecture from the Jomo Kenyatta University of Agriculture and Technology. Their academic prowess earned them first class honours. As an esteemed member of the Architectural Association of Kenya, Cindy currently serves as an Architectural Designer at Oaklim Contractors Limited. Their research interests lie in African Architecture preservation and contextualism. Driven by a passion for African cultures and making impacts through architecture, they continue to make strides in advancing knowledge within their field. Her previous leadership roles include being the head of public relations at the Architecture Students' Association in JKUAT.

ABSTRACT:

This study investigates the role of cultural identity in shaping the design of Cultural Centres in Kisumu City amid the global trend of cultural homogenization in public spaces (Wang, 2007). Focused on the Luo ethnic group in Kisumu, the research explores the impact of integrating specific cultural identity elements on creating functional spaces that respect local culture (Chukuwali, 2005). Fieldwork, including observations and questionnaire-based interviews, evaluated three Cultural Centres, uncovering the interplay between cultural identity and place-making. The findings highlight how access, spatial layout, shape, materiality, and colour contribute to reflecting local identity, enhancing user experiences with positive distractions and community engagement. Conclusions stress the pivotal role of cultural identity in Cultural Centres, suggesting a redesign that integrates identity elements. The study contributes to existing knowledge by identifying distinctive cultural features in Kisumu City, advocating for hierarchical spatial organization, circular motifs, a blend of modern and traditional materials, earthy colour palettes, and cultural artifacts within Centres. The infusion of specific cultural components aims to make these spaces representative and meaningful to the local community. Recommendations include adopting specific design approaches, layouts, forms, scales, material choices, colours, and positive distractions. Future research should explore Cultural Centres in diverse contexts with unique communities, broadening the understanding of cultural integration in design.

KEYWORDS: Cultural homogenization, cultural identity, place-making.

EXPLORING CRITICAL REGIONALISM, A CASE OF MARKETS IN MOMBASA.

Researcher: Lawrence Nderitu Mureithi, B.Arch. Hons., 2024, JKUAT, lawrencenderitu254@gmail.com

Supervisor: Arch., Wycliffe Waburiri, M.U.D., B.Arch. Hons, M.A.A.K, JKUAT, wycliffe.waburiri@jkuat.ac.ke

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Conservation of heritage and cultural identity in urban regeneration and conservation through critical regionalism.

BIOGRAPHY:

Nderitu Mureithi, a graduate architect from the Jomo Kenyatta University of Agriculture and Technology with a demonstrable commitment to academic excellence. He has acquired valuable experiences at renowned firms such as Form craft and Megastructures, meticulously refining his technical skills and advancing his architectural expertise. His current role at Form craft Creative Ltd places him in a unique position to specialize in computer aided design and architectural visualization, complete with passionate for 3D modelling. Nderitu actively contributes to the architectural landscape through extensive research in blending innovation with cultural resonance to make substantial and meaningful impacts in the field.

ABSTRACT:

This research thesis sought to explore critical regionalism and its pivotal role in shaping market designs in Mombasa, with a particular emphasis on the seamless integration of contextual socio-cultural norms, environmental, and architectural dimensions. Current designs lack conscientious incorporation of critical regionalism, resulting in disconnected and unsustainable structures that do not align with the specific regional needs and the distinctive characteristics. Addressing this gap is crucial for creating harmonious, culturally sensitive, and environmentally sustainable market spaces. The study analyses the intricate relationship between culture, environment, and architectural design in Mombasa's markets. It employs a mixed-methods research approach, combining qualitative and qualitative approaches that are anchored on the sample surveys and that data collection tools of interviews and observations and subsequent descriptive and inferential analysis of data. The findings reveal a positive correlation between cultural integration and user satisfaction, emphasizing the importance of considering the local environment for sustainability. Spatial optimization based on cultural and environmental considerations enhances market functionality. Contextually relevant designs stimulate economic growth. Critical regionalism is seen to have a positive impact on user satisfaction, cultural identity, and environmental sustainability. There is therefore a need to prioritize critical regionalism in the design of markets, in order to attain full economic and cultural benefits. Additionally, it is necessary to develop pertinent guidelines, foster collaboration, and invest in research in order to improve market design. The study provides a comprehensive, contextually sensitive roadmap addressing socio-cultural, environmental, and economic aspects of markets.

KEYWORDS: **Critical Regionalism, Conservation, Built Heritage.**

INTERACTIVE ARCHITECTURE FOR VISITOR EXPERIENCE IN MUSEUM EXHIBITION SPACES.

Researcher: Nicholus Muchiri Rugendo, B.Arch. Hons., 2024, JKUAT, nicholusmchr@gmail.com

Supervisor: Arch. Evans Makan, B.Arch. Hons., JKUAT, makanevans@gmail.com.

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Sub-theme: Conservation of heritage and cultural identity in meaning & structure of public exhibition spaces.

BIOGRAPHY:

Nicholus Muchiri is a graduate architect from Jomo the Kenyatta University of Agriculture and Technology. His attributes of hard work, creativity and rational thinking guided him to achieve a second-place runner-up position at the PAUSTI Affordable Student Housing competition, 2022. He views architecture as a tool to create impact on a global stage. His other passions within the field include CGI/3D visualization. A fusion of honed academic and physical experience at Synarc Systems where he has been working and Heritage Associates, enables him focus on advancing his technological expertise to influence spaces, culture, and heritage.

ABSTRACT:

Museum architecture in the contemporary world preserves and exhibits the social, economic, and heritage values of a people. Museums have long been regarded as repositories of culture and knowledge. Studies indicate that the museum in the contemporary age not only tells a fixed story to visitors through curatorial design but is also a story co-maker in collaboration with a visitors experience. Museum exhibition spaces thus cannot avoid adapting interactive elements within their spaces. This study investigated the impact of interactivity on visitor engagement and satisfaction, exploring spatial elements like spatial sequencing, degree of enclosure, shape, scale, and lighting, alongside technological components such as digital displays and immersive technologies. The activity theory and its related complements were reviewed. The study employed a blended methods approach to investigate museums in Nairobi. It embraced case studies, observation of behaviour, and user feedback surveys. The findings revealed that interactivity transforms the conventional museum experience into a participatory encounter, enabling active engagement with exhibits, spaces, and fellow visitors. This synthesis contributes to the evolution of museum architecture, shaping spatial narratives that enhance cultural exploration. This study identified an articulate design framework that fostered dynamic, immersive encounters with museum exhibits. It recommended minimizing object fatigue of visitors by providing spaces for intermittent social rest, and through the use of varied types of exhibition spaces such as the digital, print, and virtual forms. The study revealed insights into the efficacy of interactive elements in the Kenyan context, influencing the ongoing evolution of museum design and visitor experience.

KEYWORDS: **Interactivity, spatial sequencing, enclosure, immersive technologies.**

EVOLVING HOMES IN AN EVOLVING WORLD - A case of Medium Density Work Homes in the City Nairobi.

Researcher: Kimberly Nyanchama Mong'are, B.Arch. Hons., 2024, JKUAT, kimberly.mongare@gmail.com

Supervisor: Dr. Ng'eno Chelang'at Faith. B.Arch. (Hons), MSc. SAS. UoS (UK), PhD Arch. UoS (UK), archfaithngeno@gmail.com

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SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Adaptable home-work housing.

BIOGRAPHY:

Kimberly Mong'are, a Graduate Architect, is dedicated to aligning built environments with societal needs. Holding a First-Class Honours Bachelor of Architectural Studies from Jomo Kenyatta University, she excels academically winning the Best Kenyan Student Project award from the East Africa Institute of Architects, 2022 and achieved Second Runners Up at the Pan African University Institute for Basic Sciences, Technology, and Innovation, 2023. Currently serving as an Advisor to the East Region Student's Committee for the Africa Union of Architects, her leadership roles previously included the President and Finance Secretary positions in the Architecture Student's Association at JKUAT.

ABSTRACT:

The rise of remote work exposes the disconnect between traditional home environments and the evolving demands of dynamic work processes, leading to varying user expectations (Turner, 1979). The Covid-19 pandemic unveiled global spatial inequalities in home-based work (Mason, Carter, & Tagg, 2011), with inflexible home workspaces challenging work-life balance. Existing housing often falls short in meeting work requirements, resulting in unsuitable spaces (Holliss, 2015), and blurred lines between home and work necessitating changes to home configurations. Remote work also raises concerns about isolation due to the absence of traditional office interactions (Dolan, 2012), potentially leading to feelings of confinement (Stewart Pollack & Menconi, 2005). Poorly designed work-home spaces exacerbate these issues (Holliss, 2015). This research aims to develop a spatial framework for harmonious living and working in medium-density settings. Using a mixed-method approach, the study employs single instrumental and collective case studies. Observational data from 15 work homes evaluates live-work spatial needs, while interviews with 112 work home users, using open and closed-ended questionnaires, corroborate observed data and identify perceptions and workspace requirements. Findings confirm that current work-home arrangements inadequately cater to both living and working needs, struggling to establish distinct boundaries between work and living areas. The study emphasizes the incorporation of spatial design elements to create efficient work homes, advocating for diverse workspaces, distinct user access, and thoughtful use of natural light and colours. Recommendations focus on policy adjustments in urban planning and building codes to facilitate the growth of work home designs.

KEY WORDS: work-home spaces, live-work dynamic.

ADAPTIVE RE-USE FOR UPGRADING OF ABANDONED INDUSTRIAL BUILDINGS IN NAIROBI KENYA.

Researcher: Jerome Kariuki Kimani, B.Arch. Hons, 2024, JKUAT, jerome.kimani@students.jkuat.ac.ke

Supervisor: Arch. Dr. Susan Kibue, B.Arch. (UoN), M.A. (Newcastle-Upon-Tyne), PhD (Sheffield). FAAK (A), skibue@jkuat.ac.ke:

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Sub-theme: Urban Regeneration of Industrial Heritage for Housing.

BIOGRAPHY:

Jerome Kimani was the President of the Architectural Students Association (ASA) JKUAT in the year 2021-22. He is passionate about communication, and began his architectural writing journey with a student article in the AAK Buildpress Magazine Issue 01, March 2020. He attained the Competent Communicator Award in Public Speaking from Toastmasters International in 2023. He is a winner of the 2023 International UC Berkeley Prize Essay Competition. He holds a Diploma in Business Information Technology from Strathmore University, and in 2023 became a Certified Professional Coach under the International Coach Federation to join a growing family coaching business.

ABSTRACT:

Public records show that there are industrial buildings in various locations in Kenya, which as a result of political and economic change have been abandoned. This has led to disuse and misuse of these buildings that have important industrial heritage value. This study investigates adaptive reuse as an alternative to demolition of these buildings, to mitigate loss of industrial heritage and to retain evidence of technologies, the flows of materials and people and work processes. A case study methodology is employed to study three industrial buildings in Nairobi that have been converted to new functions. These buildings were assessed with respect to three spatial attributes: form, function, and material choice. Relevant theory identifies these attributes as: the building parts which can be varied and which have a historical–artistic value, how the space can be transformed in the light of the new requirements, and which construction systems are compatible with the territory and the building). It was found that as regards form, prioritisation of top lighting strategies, use of colour and a building's history are used to create imageability. Where function is concerned, consideration of privacy, zoning and circulation as well as a pragmatic approach in the design of mechanical services is prudent. As regards choice of materials, façades are found to have both functional and aesthetic value; maintained by honesty of material. Additionally, the use of modular construction and low embodied-energy materials is advised.

KEYWORDS: **Adaptive reuse, abandoned industrial buildings**

SPATIAL DESIGN FOR ACCESSIBILITY, A CASE OF SPORTS TRAINING CENTRES FOR PARAPLEGIC TRACK ATHLETES.

Researcher: Stephanie Bosibori Onyambu, B.Arch.(Hons), 2024, JKUAT, onyambu.stephanie@students.jkuat.ac.ke

Supervisor: Arch. Oino Evans Juma ,B.Arch. (Hons) JKUAT, M. Eng. (Arch. Env. Design) Kyoto University Japan, FAAK , Architect , joino@jkuat.ac.ke

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Sub-theme: Accessible and Inclusive Urban Infrastructure.

BIOGRAPHY:

Stephanie Onyambu earned her bachelor's degree in Architecture from Jomo Kenyatta University of Agriculture and Technology. She currently serves as an architectural designer at Maestro Architects Limited where her design skills, ability to research, and leadership abilities have given her a rise in rank. Beyond her professional role, Stephanie is committed to advancing universal accessibility. Her passion for inclusive design has led her to contribute significantly to ongoing research at the Centre for Inclusive Design and Innovation. Her dedication to creating spaces that prioritize accessibility and usability reflects her commitment to making the built environment inclusive and accommodating for all.

ABSTRACT:

This research examined the impact of integrating spatial design considerations in sports training centres dedicated to track athletes, with a focus on enhancing accessibility for paraplegic participants and improving their overall performance. It aimed to address the widening performance gap between able-bodied and paraplegic track athletes, particularly those representing Kenya in global competitions. While existing literature has briefly discussed general accessibility concerns, this research sought to provide a nuanced exploration of the influence of spatial design on improving accessibility for paraplegic track athletes within Kenyan sports training centres. Utilizing a mixed methods approach, the research incorporated fieldwork, including the observation of two athletics training centres to evaluate the integration of spatial design elements enhancing accessibility. Findings were validated through questionnaire-based interviews with 100 trainees within these centres, and the collected data underwent analysis and was presented using comparative methods, charts, and graphs. The study revealed the detrimental impact of inaccessibility on the attitudes of paraplegic track athletes, resulting in poor performance at competitions due to challenges such as long travel distances, difficulty in finding accessible entryways, wasted effort on training grounds trying to prevent skidding, and reliance on assistance for access to training facilities. Conclusions emphasize the pivotal role of spatial design in enhancing accessibility within sports training centres, advocating for a redesign to incorporate essential spatial elements for accessibility. The research contributes to existing knowledge by identifying wheelchair ergonomics, spatial efficiency, perceptible environments, and surface articulation as spatial factors for enhancing accessibility in sports training centres for paraplegic athletes.

KEYWORDS: **Spatial Design, Accessibility, Paraplegic Track Athletes.**

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SPATIAL DESIGN FOR AN EFFICIENT PUBLIC MARKET: A CASE OF GIKOMBA MARKET.

Researcher: Jessicah Nyambura Gichuki, B.Arch. (Hons), 2024, JKUAT, jessicahnyambura@gmail.com

Supervisor: Arch. Oino Evans Juma ,B.Arch. (Hons) JKUAT, M. Eng. (Arch. Env. Design) Kyoto University Japan, FAAK, Architect, joino@jkuat.ac.ke

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Sub-theme: Urban regeneration.

BIOGRAPHY:

Jessicah Gichuki, a Graduate architect, believes design mirrors society's evolving needs. With a First-Class Honours Bachelor of Architectural Studies from Jomo Kenyatta University, her team secured Second Runners Up at the Pan African University Institute for Basic Sciences, Technology, and Innovation in 2023. Holding a certificate in graphic design from Computer Pride, she served as the creative director at Hufan Clothline, a sustainable fashion brand, 2021. In 2022/23, she led as the Head of Public Relations for the Architectural Student Association (ASA) council and pioneered the ASA-JKUAT mentorship program, currently serving as its coordinator.

ABSTRACT:

The study sought to establish how spatial design enhances efficiency in public markets, focusing on Gikomba market, a retail and wholesale market located in Kenya's capital. Researchers have observed that public markets in Kenya are not used effectively despite renovation efforts and Gikomba market has ailments such as congestion and insecurity. It is renowned for its second-hand clothing business and is undergoing renovations in line with Kenya's Vision 2030 objective of being a global competitor. For the research objectives, the study evaluated architectural elements like spatial organisation, scale, degree of enclosure, navigation, and lighting in public markets to improve space efficiency. Previous research on spatial and functional efficiency guided the analysis. The study adopted a qualitative approach focusing on phenomenological research to understand users' experiences within their market setting. Data collection methods included guided observations using pre-coded checklists, interviews and focus groups to gain comprehensive insights into user behaviour and practices. The collected data was analysed and presented through descriptive texts and illustrated images. Efficiency parameters such as spatial clustering, spatial depth, physical barriers, appropriate axes of movement, flexibility, space utilisation and suitability were evaluated. In Gikomba market, partial efficiency was observed in certain sections, while other areas disregarded the concept of efficiency. The findings revealed that spatial design can elevate public markets' efficiency by establishing each market's specific spatial requirements. Notably, 85% of the 80 respondents emphasized the need to replan and rezone the market to enhance user efficiency.

KEYWORDS: **Space efficiency, public market, spatial clustering.**

GREEN ARCHITECTURE FOR ENHANCED FUNCTIONALITY IN BUS TERMINALS.

Researcher: Emmanuel Wekesa, B. Arch (Hons), JKUAT, emmanuelwekesa.arch@gmail.com**Supervisor:** Arch. Raphael Mirera, B. Arch (Hons), JKUAT, raphael.mirera@jkuat.ac.ke

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Sub-theme: Green transportation Infrastructure

BIOGRAPHY:

Wekesa Emmanuel, a graduate architect from Jomo Kenyatta University of Agriculture and Technology, is passionate about contextual sustainable architecture especially in Kenya and the continent of Africa at large. He was the class president for the architecture class from 2019-2023 and involved in various student leadership while in undergraduate including ASA Student. He is intent on mentorship and building a cohesive environment in team leadership. Having been involved in the Nairobi GTC construction and as a proud member of the Architecture Association of Kenya since 2021, he aspires to be a revolutionary architect in Kenya and world at large.

ABSTRACT:

This study examines the role of green architecture in enhancing functionality of bus terminals in Nairobi, Kenya. Studies show that with the rising concerns of global warming and climate change, green buildings not only play a role of mitigating the impacts of climate change, but also safeguard the health of its occupants through aspects of natural ventilation. The Nairobi Metropolitan Area Transport Agency's (NaMATA's) Strategic Plan 2023 confirms that intention to create a sustainable urban transportation system in line with the Kenya vision 2030 agenda. Bus transport terminals have many infrastructural and planning challenges that inhibit their functionality. This study aims to provide specific guidance to the planning and design of the infrastructure such terminals. The research relied on observations to evaluate the state of the terminals and the complexities of functionality within them. Comparative case study analysis and interviews with key stakeholders in green building and green transportation were done to enhance the validity and accuracy of the data collected. The study confirmed that bus terminals within Nairobi lack proper infrastructure to enhance their functionality, there has been minimal or no green architecture interventions in the design and constructions of bus terminals. It affirms that green architecture can be used to enhance the functionality of these terminals. The study also provides the possible guidelines to functionality of bus terminals located in Cities. It goes ahead to illustrate how the principles of green architecture can be incorporated in their design, to enhance their functionality and achieve a Sustainable Transport System.

KEY WORDS: Green Architecture, Functionality, Sustainable urban transport

INFLUENCE OF THE THIRD-PLACE CONCEPT ON THE DESIGN OF PUBLIC LIBRARIES IN NAIROBI FOR IMPROVED USER EXPERIENCE

Researcher: Omondi Harriet Awino, B.Arch. Hons., 2024, JKUAT, harrieta1997@gmail.com

Supervisor: Martin Ochieng Mbidhi, B. Arch. (Hons.), MA Planning. PhD. Architecture. M.A.A.K (Architects Chapter). Reg. Architect, BORAQS, mmbidhi@jkuat.ac.ke. mmbidhi@gmail.com

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Sub-Theme: Universal access to safe, inclusive, and accessible, green, and public spaces.

BIOGRAPHY:

Harriet Awino, a graduate architecture student from JKUAT, has demonstrated a strong commitment to achieving excellence in her academic journey. Throughout her education, she has gained valuable experiences at both the Nairobi Metropolitan Services and Lins Consult firm, where she has refined her technical skills and architectural expertise. Harriet's passion lies in the realm of AI architecture, human-centered design, seamless integration of technology, captivating design aesthetics, and sustainable architectural practices. She devotes herself to the field with active engagement in extensive research. Currently, she continues to make significant contributions to the architectural landscape, blending innovation with a human-centric approach.

ABSTRACT:

In a world dominated by digital advancements, public libraries face challenges in maintaining their relevance. This study explored the transformative potential of the third-place concept in reshaping the design of public libraries, to enhance user experiences. Recognizing the vital role of public libraries in community engagement, education, and personal development, it advocated that embracing the third-place concept could enable libraries to adapt and thrive in the face of evolving information landscapes. It also investigated the place-making theory to evaluate its potential impact on the design of public libraries as third places. Through an exploration of the existing public libraries in Nairobi city in and a thorough review of third-place theory and literature on library design, the research identified specific design elements and strategies that could elevate the third-place experience within library settings. Moreover, it incorporated user feedback collected through questionnaires and observation checklists to gain valuable insights into the perceptions, needs, and preferences of library users. Its' findings offer useful perspectives on the efficient integration of the third-place concept in the design process, potentially leading to the creation of public libraries that cater to the diverse needs of communities. The conclusions drawn from the study confirmed that certain public libraries in Nairobi had implemented the third-place concept, thereby witnessing enhanced user satisfaction. This underscored the importance of robust design integration. Emphasis on the significance of flexible spaces, varying of privacy, and incorporating diverse typologies in ensuring positive user experiences was recommended as providing good guidance for the designs of libraries.

KEY WORDS: Third-Place Concept, Place-Making, Community Engagement.

THE INFLUENCE OF PHYSICAL CHARACTERISTICS ON CRIME MANAGEMENT IN RESIDENTIAL NEIGHBOURHOODS: A CASE OF JERICHO ESTATE, NAIROBI.

Researcher: Simon Peter Gitonga Mureithi, B. L. ARCH 2024, JKUAT, simongitongap11@gmail.com

Supervisor: Dr. Arch. Micah Makworo, MEPD, PHD, JKUAT, micahmakworo@sabs.jkuat.ac.ke

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Sub-theme: Universal access to safe, inclusive, and accessible, green, and public spaces. in residential neighbourhoods.

BIOGRAPHY:

Simon Peter Gitonga holds a Bachelor of Landscape Architecture degree from JKUAT. He presented an Agritech Park proposal at the 2023 JKUAT Open Day, highlighting the role landscape architecture in promoting climate smart agriculture for economic growth, which was the theme of the Agricultural Society of Kenya. He was a member of the Landscape Architecture Students' Association. Gitonga specializes in public spaces, and therefore advocates for inclusive, economically, and environmentally sustainable spaces. His capstone thesis focused on the influence of physical characteristics on crime management in Jericho estate, Nairobi. He is committed to enhancing community well-being through thoughtful design.

ABSTRACT:

The prevalent crime in urban environments and fear of it remains a top concern worldwide. Criminal activity harms individuals and damages essential infrastructure in residential neighbourhoods. Jericho estate in Nairobi has been beset by recurring crime incidents, turning it into a crime hotspot. Considering this, the study sought to establish the influence of physical characteristics on crime management in Jericho Estate. The study explored the theories of defensible spaces, eyes on the street, and broken windows, all resonating with the link of the physical environment to crime occurrence. The study sampled neighbourhood clusters in order to generalize the findings. Data on the physical characteristics was collected through observation. The study interviewed 30 respondents to establish the status of crime in the neighbourhood as well as to propose crime management strategies. Data was then subjected to descriptive statistical and thematic analysis and presented through charts, tables, and texts. The study found that the predominant typologies of crime in the neighbourhood were mugging, theft and burglary. The occurrence of crime in the neighbourhood was related to the physical characteristics. Solid waste pollution, bushes and unkept vegetation, neglected spaces, absence of street activities, physical deterioration and absence of lighting were linked to criminal activities. The study concluded that design solutions such as natural surveillance, neighbourhood cohesion through the neighbourhood clusters approach and efficient lighting could be effective tools for deterring crime. The study recommended the use of environmental design and mixed-use development as strategies of crime prevention and management that would increase neighbourhood vibrancy, cohesion, and natural surveillance.

KEY WORDS: **Crime, physical deterioration, natural surveillance, cohesion.**

RELATIONSHIP BETWEEN LANDSCAPE ELEMENTS AND USERS EXPERIENCE IN URBAN STREETSCAPES, A CASE OF KIAMBU TOWN MAIN STREET.

Researcher: Lagho Emily Mghoi B.L.Arch Hons., 2024, JKUAT. emghoi28@gmail.com

Supervisor: Dr. Stella Kasiva Mbiti, B. Arch. (JKUAT) M.Sc E.M.P, PhD. Land. Arch, mbitistella@sabs.jkuat.ac.ke

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Sub-theme: Universal access to safe, inclusive, and accessible, green, and public spaces.

BIOGRAPHY:

Lagho Emily Mghoi is a member of the Architectural Association of Kenya, Landscape Architecture Chapter. Emily has an interest to provide solutions in design and contribute to the already existing pool of knowledge in the area of landscape elements and users experiences in urban streets. She has benefited from quality professional experience at Align Architects and Karura Forest where she picked up technical skills and hands-on expertise in landscape architecture. She was an active member of the Landscape Architects students' Association at JKUAT and is currently affiliated with the Youth and Urbanism Organization that advocates for sustainable and resilient designs.

ABSTRACT:

Urban centres around the world are constantly evolving, shaped by a myriad of landscape elements that play a pivotal role in enhancing or diminishing the quality of the life for their inhabitants. The interactions between design and user experience in urban environments has garnered significant attention from researchers, architects, and urban planners. Urbanization is an undeniable global phenomenon, with more than half of the world's population now residing in cities. Despite the central role that streets play in facilitating movement, interactions and community life, urban streetscapes remain unresponsive to the user needs. The lack of comprehensive research on the influence of landscape elements such as street layout, lighting, signage, green spaces and accessibility on user perceptions and interactions hinders the development of user- centric urban environment. This study examined the relationship between different landscape elements and the user experiences in the urban streetscape. It used case-study design and collected data using interviews and observation methods to document different existing and non- existing landscape elements, and to assess user perceptions in space. The purposive sampling technique was used to identify the individuals to be interviewed. The study applied the Prospect - Refuge Theory by Jay Appleton to discern why particular landscape environments felt secure, meeting basic user psychological needs. The findings of the research were represented in tables, pie charts and bar graphs. The study established a close link between landscape elements and user experience. To enhance user experience and to create functional, responsive, and vibrant streetscapes, the study recommended the integration of diverse landscape elements in design.

KEYWORDS: **Vibrant functional streets, Sustainable designs, Streetscapes**.

LANDSCAPE DESIGN AND PEDESTRIAN SAFETY OF URBAN STREETS: A CASE OF JOGOO ROAD, NAIROBI.

Researcher: Elsie Anyango Owili, B.L.Arch. Hons., 2024, JKUAT, elsieowili.a@gmail.com.

Supervisor: Sunday Julius Abuje, B. LArch. (Hons.), M.E.P.D, PhD, MAAK (Landscape Chapter), M.EIK, JKUAT, sunabuje@gmail.com, sunabuje@sabs.jkuat.ac.ke

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Sub-theme: Universal access to safe, inclusive, and accessible, green, and public spaces.

BIOGRAPHY:

Elsie Owili holds a bachelor's degree in landscape architecture from Jomo Kenyatta University of Agriculture and Technology. She is also a member and former Vice Chairperson of the Landscape Architecture Students' Association. While in university, she developed her skills, working on industrial attachment with architects, landscape architects and government entities such as the State Department for Public Works and the Kenya Forest Service. Committed to cultivating safe and inclusive public spaces, she is currently involved in the design of a recreational space in Kenya, which demonstrates her passion for unique and impactful landscape design.

ABSTRACT:

This study explores how landscape design impacts pedestrian safety in urban streets. Amidst growing urban populations, urban streets grapple with the task of balancing diverse activities while prioritizing pedestrian safety. Landscape design aims to improve this, but challenges persist due to inadequate pedestrian infrastructure and high vehicular traffic, that results in pedestrian and vehicular conflict. Jogoo Road, in Nairobi, is affected by these issues. It is currently recognized as one of the city's most perilous streets. The objectives of the study involved profiling into the character of Jogoo Road, identifying activities influencing pedestrian safety, establishing the relationship between urban street character and pedestrian safety and lastly formulating design guidelines to promote pedestrian safety along Jogoo Road. The study was guided by the New Urbanism Theory and Systems Approach Theory. It utilized both a descriptive approach and case study design to evaluate the attributes of Jogoo Road. Data collection was carried out through structured observation, interviews, and questionnaires and then taken through statistical and comparative analysis. The study found that inadequate landscape design, encroachment of activities on pedestrian spaces and elevated levels of vehicular traffic created a dangerous environment for pedestrians. The study concluded that there was a need to improve current pedestrian infrastructure. The study recommended enhancing safety through installion of additional lighting, promoting green infrastructure, constructing bus stop shelters, relocating street vendors to designated areas, expanding pedestrian walkways, and providing designated parking spaces to ensure clear and safe pathways for pedestrians through the integration of the concept of connectivity.

KEY WORDS: Safety, green infrastructure, connectivity, street character.

THE IMPACT OF URBAN LAND DEGRADATION ON SAFETY OF USERS IN GLOBE ROUNDABOUT AREA, NAIROBI.

Researcher: Cynthia Vinaywa Ogola, B.L.Arch. Hons. 2024, JKUAT, cynthiavinaywa@gmail.com.

Supervisor: LArch Carolyne Wanza, B.L.Arch. Hons. MUD, JKUAT.

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Sub-theme: Access to safe and inclusive green and public spaces.

BIOGRAPHY:

Cynthia Vinaywa, a dedicated professional, earned her B.L.Arch. Hons. degree from JKUAT in 2024. With a solid foundation in landscape architecture, she is poised to contribute significantly to the field. While she is currently not affiliated with specific professional organizations, Cynthia is enthusiastic about establishing connections within the landscape architecture community. Her focus on continuous learning and exploration drives her passion for research, where she aims to delve into topics related to sustainable urban development and safety. As she begins her career, Cynthia looks forward to contributing fresh perspectives and innovative solutions to the landscape architecture domain.

ABSTRACT:

Urban landscapes, particularly in bustling metropolises like Nairobi, are filled with challenges that impact societal well-being and safety. This research delves into the intricate relationship between urban land degradation and its consequent effects on safety of users in the Globe Roundabout Area of Nairobi's Central Business District. Using a combination of quantitative and qualitative methods, this study identifies specific indicators and extents of land degradation, analyses safety perceptions, and seeks to establish correlations between these elements. The quantitative data was collected through observation and a survey of users of the Globe Roundabout Area. The qualitative data was collected through interviews with key stakeholders. The research found that urban land degradation has a significant impact on safety in the Globe Roundabout Area. The main types of urban land degradation in the area are soil erosion, diminished vegetation cover, pollution accumulation, land compaction, and disruption of natural drainage. The study findings suggest a conspicuous linkage between areas of pronounced urban degradation and heightened safety concerns, highlighting the pressing need for holistic urban planning, development, and maintenance that factors in both environmental and societal well-being. This research recommends a number of measures to address urban land degradation, including planting trees and shrubs to reduce soil erosion, encouraging the use of native plants, waste management, designing a bus terminus and permeable walkways to improve drainage, implementing storm water management practices, protecting, and restoring Nairobi River, improved lighting by installing LED streetlights powered by solar and creating green spaces.

KEYWORDS: **Urban Land Degradation, Safety of Users, Urban landscapes.**

ROLE OF LANDSCAPE PLANNING AND DESIGN IN ENHANCING SAFETY AND SECURITY IN PUBLIC OPEN SPACES: A Case of Kamukunji Historical Park.

Researcher; Maureen Muthoni Mwai, B.L, Arch (2024), JKUAT.muthonimwa01@gmail.com

Supervisor; Arch. Esther Katile, B.Arch., JKUAT, MUD, JKUAT, estherk@sabs.jkuat.ac.ke

SDG 11: Sustainable Cities and Communities/**A-2063 G:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Universal access to safe, inclusive, and accessible, green, and public spaces.

Biography:

Maureen Mwai, holds a bachelor's degree in Landscape Architecture from Jomo Kenyatta University of Agriculture and Technology. Despite being at the beginning of her academic journey, she has displayed exceptional promise and has earned a reputation for expertise in the role of landscape planning and design in enhancing safety and security in public open spaces. Her commitment to advancing knowledge is reflected in her inaugural publication, an insightful exploration of the interplay between safety, security, and landscape design in urban public spaces. Mwai looks forward to further research and contributions as she embarks on her academic and professional career.

ABSTRACT:

Urban public open spaces are integral components of urban landscapes, offering places for recreation, social interaction, and community engagement. However, the successful utilization of these spaces hinges on addressing safety and security concerns. This research project focused on the critical theme of enhancing safety and security in public open spaces through effective landscape design, using Kamukunji Grounds in Nairobi, Kenya, as a case study. The study begun by examining the global perspective on safety and security in urban open spaces, drawing insights from international benchmarks and best practices. It then delved into the unique challenges faced by developing countries, emphasizing the need for context-specific approaches to safety and security in public spaces. The historical significance of Kamukunji Grounds was explored, considering its evolution over time and the contemporary safety challenges it presents. The research aimed to unravel the intricate relationship between landscape design and safety and security, proposing design interventions tailored to the geographical context and socio-economic conditions of Kamukunji Grounds. By employing a multidisciplinary approach that incorporated urban planning, architecture, and criminology, the project sought to provide actionable insights and design recommendations. The anticipated outcomes included a comprehensive understanding of the interplay between landscape design and safety in public spaces, with the ultimate goal of creating safer, more secure, and inclusive environments for urban communities. The findings of this research have the potential to inform future urban planning strategies and contribute to the development of design guidelines that prioritize safety and security in public open spaces.

Keywords: **Urban public open spaces, Safety, security.**

THE ROLE OF ECOLOGICAL URBANISM IN ENHANCING RESILIENCE OF TOWNS, A CASE OF KENOL TOWN.

Researcher: Ivy Nyambura Gitau, B.L. Arch. Hons. 2024, JKUAT, nyatani211@gmail.com

Supervisor: Ms. Janet Ondieki, B.L.Arch, JKUAT, MGIS, JKUAT.

SDG 11: Sustainable Cities and Communities/**A-2063 G:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Enhance inclusive and sustainable urbanization and capacity for participatory, integrated, and sustainable human settlement planning and management.

BIOGRAPHY:

Nyambura is a graduate Landscape Architect, with a passion for interpreting ecology in urban design. She has actively engaged in research focusing on urban ecology with an aim to enhance the resilience of towns through innovative design strategies. As an executive member of the Landscape Architecture Student Association, and head of public relations she has guided the social media content for the International federation of Landscape architects (IFLA Africa). Nyambura has demonstratable leadership and organizational skills, contributing to the enrichment of academic and the professional experience for fellow students. Her commitment to the field and lifelong learning is unequivocal.

ASTRACT:

In an era of increasing urbanization, towns grapple with escalating challenges of maintaining resilience amid swift environmental and societal shifts. Traditional approaches to urban planning and design are often ill-equipped to address these multifaceted challenges. Ecological urbanism proposes a novel approach, placing ecological principles at the forefront of the process. It envisions cities not as separate entities but deeply intertwined with their natural surroundings. Resilient urban design emphasizes the importance of constructing adaptable infrastructure systems that withstand and recover from various shocks and stresses. This study sought to investigate the role of ecological urbanism in enhancing resilience of towns. Specifically, it set out to assess Kenol's vulnerabilities, its physical infrastructure, social fabric, and environmental factors, analyse existing ecosystems within Kenol town and develop a comprehensive resilience framework tailored to Kenol's unique characteristics. Employing a mixed-method approach, the research incorporated quantitative surveys, qualitative interviews, and a review of relevant literature. The research revealed that Kenol town lacked substantial integration of principles of ecological urbanism while exhibiting limited resilience. Key challenges included inadequate infrastructure, resource mismanagement, Environmental degradation, and limited community engagement. Accordingly, the study recommended actions for enhancing ecological urbanism that had the potential to enhance resilience by improving infrastructure design, water management, green spaces, and community involvement. This study contributes to an ongoing discourse on the crucial role of ecological urbanism in fortifying resilience of towns, providing actionable guidance for local authorities and policymakers to better prepare urban areas for an uncertain and rapidly changing future.

Key words: Sustainability, Resilience, Ecological urbanism, Urban infrastructure.

ROLE OF NGONG RIVER CORRIDOR AS AN URBAN OPEN SPACE IN LINDI KIBRA.

RESEARCHER: Wainaina Arnold Gitau, B.L.Arch. Hons, 2024, JKUAT. wainainaland@gmail.com

SUPERVISOR: Dr. Dennis Karanja, (B. Arch. Hons., M.L.A, Ph.D.), 2024, karanjak@sabs.jkuat.ac.ke

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub- theme: Universal access to safe, inclusive, and accessible, green, and public spaces.

BIOGRAPHY:

Arnold Gitau is a graduate Landscape Architect from Jomo Kenyatta University of Agriculture and Technology. He is a member of the American Society of Landscape Architects (ASLA) and the Landscape Architecture chapter of the Architectural Association of Kenya. Arnold is currently working on Landscape residential development projects in Kenya. He has a special interest in financial education and entrepreneurship. He is passionate about sustainable finance with a research focus on environmental, social, and governance models. Arnold has received certified training in Six Sigma, green economy, scrum master, and risk awareness and averting.

ABSTRACT:

Urban open spaces play a great role as green infrastructure in revitalizing a community. In the informal settlements, open spaces have not been prioritized as recreational spaces. Residents in informal settlements are deprived of open green and recreational spaces, hence impacting their physical and mental wellbeing. The UN SDG 11 on Sustainable Cities and Communities, advocates for safe access and inclusive green and public spaces. In light of this, the study focuses on establishing urban open spaces along the Ngong River corridor in Lindi- Kibra. A descriptive research approach was employed to understand the relationship between the river corridor as an urban open space in the natural setting in Lindi Kibra. A sample of 20 Lindi residents were interviewed on their user experience of the Ngong River corridor and their perception of the establishment of urban open spaces along the river corridor. Data on the uses of the Ngong River corridor and existing open spaces was collected through observation methods. The results indicated that the Ngong River corridor had great potential as an urban open space and catered for both the physical and mental well-being of the residents. The study recommended the rehabilitation of the Ngong River corridor as a blue-green infrastructure in Kibra for urban climate resilience, recreation and environmental rehabilitation, and for social connection of the Lindi residents and Mugumoini Langata residents. The expected outcomes from the design interventions included a linear park, provision for urban agriculture, a children's play area, a public market, and an urban garden.

Keywords : Urban open space, river corridor, biodiversity, green spaces, recreation.

THE IMPACT OF INFORMAL SETTLEMENTS ON THE SUSTAINABLE USE OF RIPARIAN ZONES; A CASE OF NGONG RIVER.

Researcher: Sharon Cherotich Mitei, B.L.Arch. Hons.2024, miteishah24@gmail.com

Supervisor: Dr. Stella Mbiti, L. Arch, MSc E.M.P, PhD, mbitistalla@sabs.jkuat.ac.ke

SDG 11: Sustainable Cities and Communities/**A-2063 G1:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Inclusive and sustainable urbanization and capacity for participatory, integrated, and sustainable human settlement planning and management.

BIOGRAPHY:

Sharon Cherotich Mitei holds a Bachelor's degree in Landscape Architecture from Jomo Kenyatta University of Agriculture and Technology [JKUAT]. She has a keen interest in sustainable urban development and the integration of natural elements into the built environment. A member of the Architectural Association of Kenya and the Landscape Architecture Student's Association, she has sharpened her skills in landscape design and urban planning. She is currently affiliated with the Children and Youth Major Group ,advocating for inclusive and resilient urban spaces. Her final year research project focused on the impact of informal settlements on the sustainable land use of riparian zones.

ABSTRACT:

Riparian zones connect social activities with varied effects on river ecosystem structure and functions. This may result into overexploitation of the riparian zones and decrease in their capacity to meet different social, economic, and environmental demands. Informal settlements are characterized by rapid urbanization with inadequate infrastructure, posing challenges to riparian zones. This study explored the impact of informal settlements on the sustainable use of riparian zones. The study objectives included assessing the ecological characteristics of the Ngong river riparian zone in Kibra; investigating the nature of land uses along the Ngong river-riparian zone in Kibra; determining the relationship between the ecological status and land uses along the Ngong river riparian zone in Kibra; and developing strategies for sustainable land-use to mitigate along the Ngong riparian zone. The study employed a case-study design. Data was collected using interviews, focused-group discussions, and observation methods. Data was subjected to descriptive statistics and qualitative analysis and presented using graphs, pie charts and photographs. The study revealed a direct correlation between the proximity of informal settlements and environmental quality along the Ngong River riparian zone. The study concluded that proximity of informal settlements to the Ngong River coupled with lack of sanitation/ infrastructural facilities and poor waste management were key contributors to the environmental degradation of Ngong river riparian zones. The study recommended sustainable urban planning, nature-based solutions, and policy interventions that balanced demands of urbanization with environmental conservation to mitigate the negative impacts of informal settlements on riparian zones.

KEY WORDS: **Sustainable land use, riparian zones, informal settlements.**

THE INFLUENCE OF URBAN GROWTH ON URBAN RIVERFRONTS - A case of Ndarugu river in Nakuru.

Researcher: Christine N. Mwangi, B.L.Arch Hons., 2024, JKUAT, n.mwangi@students.jkuat.ac.ke

Supervisor; Arch. F.K Ngunjiri, B. Arch Hons., 1990, UON, M.A Development Studies, 2004, fred@sabs.jkuat.ac.ke

SDG 11: Sustainable Cities and Communities/**A-2063 G:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub Theme: Environmental impact of cities on riverfronts, air quality, and municipal and other waste management.

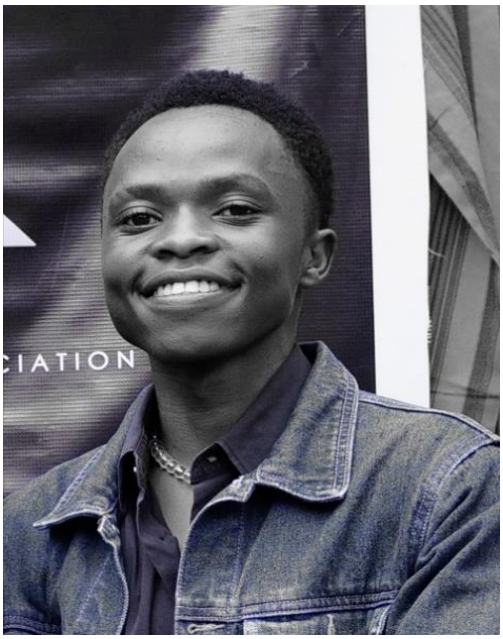
BIOGRAPHY:

Christine Nyokabi Mwangi is a graduate Landscape Architect from Jomo Kenyatta University of Agriculture and Technology. She is a member of the Architectural Association of Kenya and is committed to continuous learning and professional growth. She enhanced observational data collection, analysis, and presentation skills in her research thesis. She also developed interpersonal communication skills and gained a deeper understanding of the challenges of sustainability. Her research interests lie in ecosystem restoration, reflecting a passion for sustainable, environmentally conscious design. With a solid academic foundation and a commitment to excellence, Christine is poised to contribute significantly to practice of landscape architecture.

ABSTRACT:

Urban riverfronts enhance the quality of urban areas as they contribute to improved aesthetics, biodiversity conservation and recreational opportunities. The study aimed to assess the impact of urban growth on riverfront ecology and society. Studies indicate that rapid urbanization increases impervious surfaces causing heightened riverfront flooding and erosion. Ndarugu riverfront has been subjected to disturbances that arise from rapid urban growth such as encroachment by development. This has contributed to the destruction of riparian environments and their vegetation. It has also occasioned increased pollution in the form of urban run-off, solid waste dumping, untreated sewage, and agricultural chemical discharge. The inquiry aimed to also assess the current ecological impact and extent of degradation resulting from urban growth and as a result to form an approach toward restoration of the riverfront. Data was collected using observation, photographs, sketches, and interviews of local residents. It was thereafter analyzed and presented in from of pie charts and tables. The study found out that ecological impacts affected the health of residents and aquatic life alike on account of the lack of clean water, increased flooding, and destruction of riparian land. It further confirmed that ecological disturbance was attributed to natural area conversion into developments indicated by expansion of residential and agricultural zones close to the river. There was an intricate relationship between urban growth and the riverfronts. The harmonious co-existence of the two, that nurtured the health and vitality of the riverfront was therefore essential. The study therefore recommended incorporation of green infrastructure for stormwater management, riparian buffer zone, waste management techniques and also riverbank stabilization measures.

KEYWORDS: Urban riverfront, Urban growth, Disturbances, Restoration



THE ROLE OF GREEN INFRASTRUCTURE ON URBAN FLOOD MANAGEMENT: A CASE OF IMARA DAIMA ESTATE, NAIROBI.

Researcher: Kenedy Mutwiri Mwobobia, B. L. Arch 2024, JKUAT. mwobobiakenedy@gmail.com

Supervisor: Dr. Arch. Micah Makworo, B..ARCH, MEPD, PHD, JKUAT, micahmakworo@sabs.jkuat.ac.ke

SDG 11: Sustainable Cities and Communities/**A-2063 G:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Reduce water-related disasters, with a focus on protecting the poor and people in vulnerable situations.

BIOGRAPHY:

Kenedy holds a bachelor's degree in landscape architecture from Jomo Kenyatta University of Agriculture and Technology, with an excellent academic record attracting an award as the Best IFLA 2023 student charrette digital storytelling. He is an affiliate of the Architectural Association of Kenya and, the International Federation of Landscape Architects, IFLA Africa social media team and a Graphic Designer. He has gained professional experience at Urban Green Landscapes, EcoArch Solutions, and Karura Forest where he refined his technical skills and landscape architectural expertise. Kenedy's passion lies in sustainability, climate change, and ESG. He currently pursues ventures on climate adaptation and resilience.

ABSTRACT:

Floods as classified by the United Nations International Strategy for Disaster Reduction are among the most common natural disasters worldwide,. Imara Daima Estate in Nairobi has been experiencing recurring flooding problems resulting in losses and distress to the residents. This study sought to find out the role of green infrastructure in flood management in Imara Daima Estate. To achieve this, the study had four objectives: to establish the current state of green infrastructure; to find out the existing flood management strategies; to establish the relationship between green infrastructure and flood management; and to recommend design measures for sustainable flood management in Imara Daima Estate. Data on the existing state of green infrastructure was collected through observation. The study sampled the most affected clusters in order to generalize the findings. Twenty-five respondents were interviewed to establish the flood situation in the estate. Data was then subjected to descriptive statistical and thematic analysis and presented through charts, tables, and texts. The findings disclosed that Imara Daima Estate suffered from inadequate drainage infrastructure compounded by poor management practices and excess storm water from the expressway and Mombasa Road. This caused a significant threat to the welfare of residents. The study recommended for the adoption of sustainable solutions to flooding through the integration of green infrastructure elements such as rain gardens, swales, parks, ponds, and artificial wetlands. Such interventions would seek to enhance flood management while also improving air quality, biodiversity, water resource protection, and rainwater purification in the estate.

KEY WORDS: Green infrastructure, sponge city, flood management.

THE ROLE OF GREEN INFRASTRUCTURE IN URBAN STORM WATER MANAGEMENT.

Researcher: Shadrack Mwendwa Mutinda, B.L.Arch., 2024, JKUAT. mutindashadrack02@gmail.com.

Supervisor: Arch., Gathogo Githatu, B.ARCH, M. Arch., ggathogo@gmail.com, www.arch-link.co.ke

SDG 11: Sustainable Cities and Communities/**A-2063 G:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Reduce water-related disasters, with a focus on protecting the poor and people in vulnerable situations.

BIOGRAPHY:

Shadrack Mutinda is a graduate landscape architect from Jomo Kenyatta University of Agriculture and Technology. Through volunteer roles as a creative director and assistant membership director in several student organizations, he developed strong teamwork and communication abilities. His degree industrial attachment experience in seedling management, site installation, inspection and maintenance, and outdoor landscape design built in him career defining practical landscaping skills. Shadrack aims to begin his career by leveraging his creative passions and training in landscape architecture to create local and global impact through transformation of public spaces alongside communities into social, economic, and environmentally sustainable spaces.

ABSTRACT:

Urban stormwater management is a major challenge in developing countries, where flooding causes destruction of properties, economic losses, loss of life, and disruption of transportation systems and business. Green Infrastructure (GI) is an emerging concept that utilizes natural or semi-natural systems to reduce, store, infiltrate and treat stormwater runoff through sustainable means. The study assessed the role and benefits of GI in managing excessive urban stormwater in Kenya's Stony Athi river, a tributary of the great Athi river. This river breaks its banks and floods the Nairobi-Mombasa Road bridge, nearby densely populated residential areas and farms during heavy rains. This occurs on account of uncontrolled upstream flows and rapid urbanization leading to increased runoff. The study is guided by the ecosystem services theory and urban resilience frameworks to understand the concepts of GI in stormwater management. Mixed methods are used to collect resident survey data. It emerged that residents are adversely affected by the damaging floods, have very limited knowledge of GI stormwater management benefits, and lack awareness of sustainable stormwater management options. The study advocates for the introduction of GI as essential for managing stormwater from the source point. It is also advisable to educate the public on the benefits of GI in order to potentially increase its adoption in the community. It was also ideal to design an educational waterfront park to restore upstream wetlands that would control flooding, provide public green spaces for recreation, roll out GI awareness activities as well as promote tourism. Overall, GI's potential emerged as an environmentally sustainable long-term urban storm water management strategy suitable for fast developing countries like Kenya.

KEY WORDS: Green Infrastructure, Urban Stormwater management, Flooding.

IMPACT OF URBAN DEVELOPMENT ON THE DETERIORATION OF WETLANDS - A CASE OF NAIROBI DAM, NAIROBI.

Researcher: Kimanthi Gardner Abraham, B.L. Arch 2024, JKUAT, kimanthigardner@gmail.com

Supervisor: Mathias Mutisya, B.L. Arch; MEPD, JKUAT mmutisya@jkuat.ac.ke

SDG 11: Sustainable Cities and Communities/**A-2063 G:** A high standard of living, quality of life and well- being for all citizens.

SDG11 Theme: Inclusive, safe, resilient, and sustainable cities and human settlements/**A-2063 G1 Theme:** Modern, affordable, and liveable habitats and quality basic services.

Sub-theme: Environmental impact of cities on water fronts (wetlands), air quality, and municipal and other waste management.

BIOGRAPHY:

Gardner Abraham is a graduate landscape architect from Jomo Kenyatta University of Agriculture and Technology. He grew his professional skills at Greener Solutions Landscape Limited and Align Architects as a trainee. Beyond his career, he's committed to community service, life improvement, wellbeing through enhancement of spaces, automotive engineering, culinary arts, and travel. Trust, belief, and faith guide his life with emphasis on making a positive impact in the community. Gardner ascribes to the theme of hope, resilience, and collective action, as the source of transformative power to building a better world together.

ABSTRACT:

Wetlands, cover about 6% of the Earth's surface and produce essential economic, environmental, and socio-cultural impacts that altogether, include replenishing groundwater, support to biodiversity and food sustenance. Wetlands continue to be one of the most endangered ecosystems, with losses being accounted for mainly by pollution, climate change and urbanization. Urbanization often results in habitat loss, altered hydrological patterns, and increased pollution, all of which contribute to the deterioration of wetlands. This study seeks to bridge the knowledge gaps on the complex relationship between urban development and wetland deterioration, by exploring the pathways through which human activities in urban landscapes impact on these fragile ecosystems. The research area was the Nairobi dam and its neighborhood. Unobtrusive observations were used to examine use of the surrounding environment of the dam and interact with it. The study found that urban development around the Nairobi Dam area has shrunk its ecological services capacity through majorly wetland encroachment, solid waste pollution, water pollution, agricultural activity. It was observed that there was T inadequate waste disposal system within the settlements and inadequate legal policy on urban development within wetlands. The findings contribute essential information for policymakers, urban planners, and conservationists to formulate effective strategies for sustainable urban development that mitigate the adverse effects on wetlands. Recommendations drawn here included a need for strategic waste collection and recycling points within the settlements. It was necessary to restore the dam to its original function as a wetland park to prevent further encroachment. Such an action would enhance of the livelihoods and wellbeing of the surrounding community.

KEYWORDS: Urban landscapes, ecosystems, ecological services.

Sustainable Development Goal 13 Climate Action

Climate Action

Take urgent action to combat climate change and its impacts.

Theme:

Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

Agenda 2063 Goal 07

Environmentally sustainable and climate resilient economies and communities

Theme:

Climate resilience and natural disasters preparedness

THE INFLUENCE OF CLIMATE CHANGE ON STORM WATER MANAGEMENT IN URBAN RESIDENTIAL AREAS. – A CASE OF GITHURAI ESTATE, NAIROBI.

Researcher: Wekulo Jacquelyne Okutoyi, B.L.A, Hons., 2024, JKUAT, jokutoyi3@gmail.com.

Supervisor: Sunday Julius Abuje, B. LArch. (Hons.), M.E.P.D, PhD, MAAK (Landscape Chapter), M.EIK, JKUAT, sunabuje@gmail.com, sunabuje@sabs.jkuat.ac.ke

SDG 13: Take urgent action to combat climate change and its impacts**:/A-2063 G7:** Environmentally sustainable and climate resilient economies and communities.

SDG13 Theme: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries/**A-2063 G7 Theme:** Climate resilience and natural disasters preparedness.

Sub-theme: Reduce water-related disasters, with a focus on protecting the poor and people in vulnerable situations.

BIOGRAPHY:

A skilled and dedicated landscape architect, Jacquelyne Okutoyi has an interest on the complexities of urban resilience in the face of climate change, and specifically the intricate interplay between climate change and stormwater management in urban residential areas. She has competence in environmental analysis, sustainable design, urban planning, project management and innovative stormwater management solutions. Jacquelyne is passionate about fostering resilient communities, in the broader context of urban planning. She combines academic rigour with a commitment to creating vibrant, environmentally conscious spaces that withstand the challenges posed by our changing climate, thereby contributing greatly to sustainable urban development.

ABSTRACT:

Climate change is a profound global challenge already manifesting severe effects which are expected to intensify. It is predicted to impact nearly every aspect of the hydrological cycle, complicating efforts of governments and non-governmental entities to manage storm water and its impacts. The research interest was provoked by observing how urban areas worldwide grapple with a storm water problem that is exacerbated by the effects of climate change. This study focused on urban residential areas, examining the influence climate change has had on their capacity to effectively manage stormwater. The theoretical framework drew from the Split Flow Theory on the understanding of urban hydrology and stormwater management practices in urban areas. The theory proposes to split runoff into three volumes, evaporate, infiltrate and discharge; and manage them in ways that emulate natural hydrological processes. This thereby creates more ecologically based stormwater management systems. Employing both quantitative and qualitative approaches, the research aimed to explain the experiences of respondents in Githurai regarding stormwater management. It examined parameters related to both climate change and stormwater. Data collection involved observation with checklists and photographs, questionnaires, and interviews. The findings aligned with existing literature, highlighting the need to adapt and invest in sustainable and green storm water management infrastructure. It was evident that adapting stormwater management practices that mimic the natural water cycle by integrating green infrastructure into urban planning was vital to mitigating the effects of climate change.

KEYWORDS: Climate change, storm water management, urban residential areas.

THE ROLE OF RESILIENT DESIGN IN FLOOD MITIGATION IN BUNYALA-SOUTH, BUSIA COUNTY.

Researcher: Jacinta Margaret, B.L.Arch. Hons., 2024, JKUAT, jacintamargaret22@gmail.com

Supervisor: Sunday Julius Abuje, B. LArch. (Hons.), M.E.P.D, PhD, MAAK (Landscape Chapter), M.EIK, JKUAT, sunabuje@gmail.com, sunabuje@sabs.jkuat.ac.ke

SDG 13: Take urgent action to combat climate change and its impacts**:/A-2063 G7:** Environmentally sustainable and climate resilient economies and communities.

SDG13 Theme: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries/**A-2063 G7 Theme:** Climate resilience and natural disasters preparedness.

Sub-theme: Reduce water-related disasters, with a focus on protecting the poor and people in vulnerable situations.

BIOGRAPHY:

Jacinta Margaret, a graduate of the Bachelor of Landscape Architecture programme at JKUAT, has additional academic qualifications in Mandarin from Mahainam College. She is an articulate, charismatic, and eloquent leader. She is affiliated with Zawadi Girls Organization, Pacemaker International, Ex-Share programme, Wandia Consultancy, and Prime Homes and Gardens. She is currently an intern. Her research interests encompass sustainable design, green spaces, and urban planning. Driven by her passion for creating functional, resilient, and sustainable environments, she explored innovative solutions to mitigate perennial flooding in Bunyala South in her undergraduate research project.

ABSTRACT:

This study examined the impact of flooding in Bunyala South Ward, attributing the occurrence to excess rainfall and water overflow in areas with a high-water table. The primary goal was to evaluate the efficacy of resilient design as a sustainable solution for flood mitigation, with a focus on enhancing the community's resilience to recurrent flooding. The study examined the current state of flooding, the effectiveness of existing mitigation measures, and the complex relationship between flood mitigation and resilient design within human settlements. Data collection involved first-hand information through observation, photography, and interviews, complemented by archival methods for secondary data. The findings highlighted Bunyala South Ward's role as a habitat for diverse ecosystems, emphasizing the importance of flood mitigation. Notably, the region had suffered severe impacts on infrastructure, households, and the social fabric due to flooding, revealing limitations in current mitigation elements such as dykes. Two key frameworks, multi-layered defences, and social resilience formed the foundation of resilient design in flood mitigation. This approach ensured a holistic and adaptive strategy by empowering and involving residents in the design process. Community sensitization about floods and engagement in planning, response, and recovery efforts contributed to fostering a more resilient society in the face of floods. The research underscored the pivotal role of resilient design in mitigating flood-related challenges and recommended the integration of resilient design principles in future flood mitigation strategies for Bunyala South Ward to promote sustainable and effective solutions.

KEYWORDS: **Resilient design, flood mitigation, multi-layered defences.**

Sustainable Development Goal 15

Life on Land

Protect, restore, and promote sustainable use of the terrestrial ecosystem

Theme:

Sustainably manage forests, combat desertification, reverse land degradation, halt biodiversity loss

Agenda 2063 Goal 07

Environmentally sustainable and climate resilient economies and communities

Theme:

Biodiversity, conservation, and sustainable natural resource management

ECOLOGICAL RESTORATION OF URBAN RIPARIAN LANDSCAPES: A CASE OF NGONG RIVER, NAIROBI KENYA.

Researcher: Bunde A Beldine, B.L.Arch. Hons., 2024, JKUAT, beldinebunde8@gmail.com

Supervisor: Arch. Caleb Toroitich, B. Arch, M.L.A, Cape Town, ctoroitich@sabs.jkuat.ac.ke

SDG 15: Life on land - Protect, restore, and promote sustainable use of the terrestrial ecosystem/**-2063 G7:** Environmentally sustainable and climate resilient economies and communities.

SDG15 Theme: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss/**A-2063 G7 Theme:** Biodiversity, conservation, and Sustainable natural resource management.

Sub-theme: Urban Ecosystem Restoration.

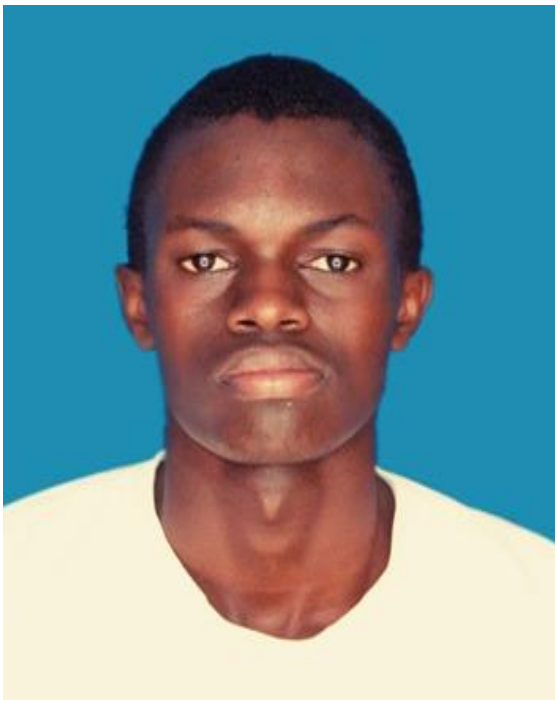
BIOGRAPHY:

Beldine Bunde is a graduate landscape architect and with a passion in transforming outdoor spaces. She holds a bachelor's degree in Landscape Architecture from the Jomo Kenyatta University of Agriculture and Technology. Her academic journey is marked by a keen interest in sustainable practices and blending artistry with ecological consciousness. She actively engages in community projects including the design and planning of an outdoor landscape laboratory in the JKUAT premises. She has acquired diverse skills through education, internships, and community projects such as site planning, planting design, urban planning, landscape design and site surveying.

ABSTRACT:

Over the past few decades, human activities have markedly eroded urban ecosystems, causing detrimental effects on both aquatic and terrestrial habitats. The study sought to address the deterioration of essential riparian ecosystems pivotal for biodiversity, water quality, and flood regulation. It pursued this through a comprehensive examination of a specific riparian landscape along Ngong river in order to gauge the degree of degradation and pinpoint primary contributing factors. The theoretical framework underpinning this study comprised of the theories of ecological restoration and the urban ecology. The study was conducted systematically using both qualitative and quantitative research methods. The research approach applied was descriptive approach to ensure objectivity and accuracy. Primary data was collected through field study and use of questionnaires, interviews, and observation checklists, while collection of secondary data implied the application of literature review. Study findings based on factors such as the state of the riparian habitats, utility of the river corridor and causes of degradation of the riparian landscapes led to the development of a comprehensive restoration plan. This plan incorporated initiatives such as reforestation using native species, stabilization of eroding riverbanks, zero waste management practices, sustainable land use practices and the establishment of buffer zones to prevent further disturbances caused by human activities. Subsequent monitoring post-restoration revealed positive changes, including enhanced water quality, an increase in biodiversity, and improved provision of ecosystem services. The research findings make significant contributions to the broader discourse on sustainable ecosystem management, providing practical insights into mitigating the impacts of human-induced degradation on vital riparian landscapes.

KEYWORDS: Ecological restoration, ecosystem services, biodiversity conservation.



IMPACT OF SOLID WASTE ON URBAN RIVER RIPARIAN VEGETATION, A CASE OF NGONG RIVER IN KIBERA.

Researcher: Oduor Kenneth Otieno, B. L .Arch. Hons. JKUAT 2024 lutwakenneth@gmail.com

Supervisor: Arch. Josephine Muchogu; B.Arch. Hons. MSc. JKUAT josephinemuchogu@sabs.jkuat.ac.ke

SDG 15: Life on land - Protect, restore, and promote sustainable use of the terrestrial ecosystem/**-2063 G7:** Environmentally sustainable and climate resilient economies and communities.

SDG15 Theme: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss/**A-2063 G7 Theme:** Biodiversity, conservation, and Sustainable natural resource management.

Sub-theme: Rehabilitation Conservation of riparian zones.

BIOGRAPHY:

Kenneth is a graduate of landscape architecture at the Jomo Kenyatta University of Agriculture and Technology and a member of AAK landscape architect's chapter. He is passionate about creating sustainable outdoor environments and developing innovative solutions to modern-day challenges in the built and natural environments. He hopes to achieve this using knowledge acquired in science technology engineering and mathematics (STEM) whilst undertaking his undergraduate degree. He is interested in research on ecological ecosystems and related modern-day world problems. Aside from his studies he has a deep interest in leadership and theological teachings and is a great admirer of woodworking skills.

ABSTRACT:

Rivers are a key feature in the urban fabric. They offer both tangible and intangible services to the urban dweller. Disposing of waste along rivers negatively affects the physical, chemical, and biological characteristics of river ecosystem. Previous studies indicate humans are the drivers of these nugatory changes in riparian vegetation, channel form, fauna, water quality and water flow levels. This study sought to establish impacts that solid wastes have on the immediate riparian vegetation and communities living in the Lindi and Silanga areas of Kibera along the Ngong river riparian zone where degradation is apparent. The study adopted a descriptive approach and case study design with observation, questionnaires and interview methods being used to establish the physical characteristics of the riparian zone, condition of the vegetation cover and occurrence of solid wastes on the riparian zone. Qualitative data was subjected to thematic analysis generating thematic maps, graphs, photographs, and charts. The study confirmed that chemicals from batteries and metals in the river water were causing harm to riparian vegetation, changing soil nutrient composition and fertility. This undermined the soils ability to host plant. Solid wastes were noted to smother plants, block sunlight, and interfere with root systems, leading to reduced plant growth and bad health. It was necessary therefore to establish solid waste dump zones]away from the riparian area. The study recommends the enforcement of existing solid waste management regulations and supporting community awareness campaigns to curb the solid waste scourge.

KEYWORDS: river rehabilitation, riparian vegetation conservation, revitalization

IMPACT OF FARMING PRACTICES ON AGRICULTURAL LANDSCAPES IN SEMI-ARID AREAS. A CASE OF NDOVONI VILLAGE, MAKUENI COUNTY.

Researcher: Irene Waeni Ndolo, B.L. Arch 2024, JKUAT, irenendolo@icloud.com

Supervisor: Mr. Mathias Mutisya, B.L. Arch; MEPD, JKUAT, mmutisya@jkuat.ac.ke

SDG 15: Life on land - Protect, restore, and promote sustainable use of the terrestrial ecosystem/**-2063 G7:** Environmentally sustainable and climate resilient economies and communities.

SDG15 Theme: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss/**A-2063 G7 Theme:** Biodiversity, conservation, and Sustainable natural resource management.

Sub-theme: Land Conservation and Regeneration.

BIOGRAPHY:

Irene Ndolo has a bachelor's degree in landscape architecture from the Jomo Kenyatta University of Agriculture and Technology. She has worked in the following establishments while on industrial attachment, The Really Useful Landscape Company, The State Department for Public Works, and Karura Forest Service. She has also worked as a landscape architecture assistant at Lariak Landscapes. Her interests revolve around ecological and environmental issues while promoting coexistence between people and wildlife within agricultural, residential, and communal landscapes. She also has an interest in the product design of landscape furniture through woodwork.

ABSTRACT:

Agricultural landscapes act as a source of livelihood for the people in semi-arid regions through the provision of natural resources. This fragile ecosystem is susceptible to land degradation with agriculture as the main cause as in the case of Ndovoini village. This research aimed to manage land degradation and restore and preserve the ecosystem by establishing its causes and impacts as governed by landscape ecological principles. Five farms were sampled from the village and data was collected through observation, interviews, and archival methods using data collection tools such as observation checklists, interview schedules and photography. Thematic and statistical analysis were used in interpreting the data, which was presented through maps, reports, and images. From the case studies, farming practices improper land use, and climate change were found to be the causes of land degradation with reduced soil productivity and biodiversity loss as its impacts. Climate change, undesignated paths for people and animals, and improper household waste disposal exacerbating the degradation. These farms were characterized as landscapes with, scarce forest patches, low plant diversity, scattered vegetation, invasive plant species, hindered movement, declining land productivity, landcover change, human and wildlife conflict, eroded soils, bare land, poor plant health, and thermal discomfort which rendered lowered their aesthetic value. Landscape interventions of land grading, crop planting schedule, indigenous grass reseeding, ecological revitalization, carbon sequestration, agroforestry, and land use planning were recommended for adoption here.

KEYWORDS: Degradation, Agriculture, Biodiversity Loss, Ecological Revitalization

IMPACT OF URBAN DEVELOPMENT ON BIRD HABITATS IN NAIROBI NATIONAL PARK

Researcher: Odemba Esther Lukania, B.L.Arch 2024, JKUAT, luklukania@gmail.com

Supervisor: Ms. Janet Ondieki, B.L.Arch, JKUAT, MGIS, JKUAT, janet.ondieki@sabss.jkuat.ac.ke.

SDG 15: Life on land - Protect, restore, and promote sustainable use of the terrestrial ecosystem/**-2063 G7:** Environmentally sustainable and climate resilient economies and communities.

SDG15 Theme: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss/**A-2063 G7 Theme:** Biodiversity, conservation, and Sustainable natural resource management.

Sub-theme: halt biodiversity loss and restoration of degraded habitats.

BIOGRAPHY:

Odemba Lukania holds a bachelor's degree in Landscape Architecture from Jomo Kenyatta University of Agriculture and Technology. She is passionate about environmental conservation and creation of functional spaces for human interaction with nature. Her special interest towards birds led her to be part of the African Bird Atlas Project. She is a firm believer in creating inclusive spaces for everybody especially women and is part of the World Pulse that gives her a platform to learn the application of spatial planning and design tools to accommodate the needs of women of all ages.

ABSTRACT:

Birds are essential as they occur in various ecosystems and habitats, either in wild areas or human settlements. At the core of urbanization comes rapid growth in human settlements as well as the growth and emergence of cities. Urbanization has significant impacts on habitats, majorly habitat loss through fragmentation, destruction, and degradation. With the rapid growth of the Kenyan population, the city of Nairobi has grown dramatically impacting on its environs such as the Nairobi National Park. This study sought to assess the effects of urban development within the park, specifically on bird habitats contained within it. An accessible part of the park was mapped out along with surrounding urban activities. Literature on urban birds, bird choice in habitats and the influence of urban activities on bird habitats were analyzed. The landscape ecology theory was relied upon to explain the value of landscape matrix in the interaction of humans and birds. Data collection was made through observation, photography, and sketching areas of interest. Study findings indicated that increase in vegetation structure, composition, and diversity, resulted into increased likelihood of bird choice for a habitat. There was also a decrease in habitat quality in areas of intense development. Quality of flora increased with diverse vegetation and creation of habitat niches. The study recommended for the creation of buffer zones in areas of conflict between wildlife and humans in order to reduce habitat loss. It advocated for proper planning of cities with special focus on waste management and transport systems to conserve, diversify and protect habitats from destruction.

KEY WORDS: Habitat loss, diversity, quality, urbanization

School of Architecture & Building Sciences (SABS).
College of Engineering & Technology (COETEC).
Jomo Kenyatta University of Agriculture & Technology (JKUAT).

DOCTORATE, MASTER'S, & BACHELOR'S DEGREES RESEARCH SYNOPSES.

SABS BOOK OF RESEARCH ABSTRACTS VOL. I, 2023/24

EDITOR-IN-CHIEF: PROF. PAUL MWANGI MARINGA (PHD), CBS, FAAK, MKIP.

Jomo Kenyatta University of Agriculture & Technology has maintained its position as premier institution of training, research, & innovation, according to the January 2024 Webometrics ratings. JKUAT was ranked the second-best university in Kenya, in the latest standings.

The Faculty of Architecture & Building Sciences (SABS) is part of the academic units at Jomo Kenyatta University of Agriculture & Technology (JKUAT), that is involved in education, research, & community services in the field of built environment. This is the second oldest school of architecture in Kenya & was established first as a department of architecture in 1990 & as a school in 2000. The School brings together disciplines related to the built environment with the aim of training, conducting research & innovation. The faculty focusses its contribution on the provision of qualified human resources & science in the development of this field.

Staff members are actively engaged in research either in a supervisory capacity at undergraduate & postgraduate levels or as research partners in sponsored research projects funded through National Research Fund (NRF), international bodies or industries. Additionally, staff are actively involved in consultancy assignments undertaken for individuals, institutions, county, & national government. Some members also serve as assessors for Commission for University Education (CUE) & professional bodies like Board of Registration of Architects & Quantity Surveyors (BORAQS), Institute of Engineers of Kenya, (IEK), Institute of Quantity Surveyors of Kenya (IQSK), among others. The school has vibrant postgraduate programmes, & all departments offer both Masters & Doctoral programmes. Our Centre for Urban Studies, now integrated into the Department of L&scape Architecture is at the forefront of Training, Research, & Innovation with its knowledge being developed in close cooperation between practitioners & researchers, both in the University & at the UN-Habitat. We have qualified & experienced academic & non-academic staff in all areas of our specializations, who are committed to develop a robust alumnus suited to the dem&s of the country & the region at large. The faculty & staff are dedicated & supportive to address research within the University & create a research environment that links the spheres of science, technology, & innovation to the built environment. Our graduates are very well received by the industry which by itself motivates faculty.

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All programmes mounted through the faculty have been accredited. Locally, all programmes are accredited by CUE. At international level, Architecture is accredited by Commonwealth Association of Architects (CAA) & Landscape Architecture by International Federation of Landscape Architects (IFLA). SABS welcomes you to engage with us in any of our diverse disciplines & in seminars, workshops & conferences & share with us our commitment to service as outlined in the University service charter