**Transforming Waste into Wealth:**

**Sustainable Recycling of Used Tractor Tyres in Kenya’s Jua Kali Industry**

**Abstract**

This study examines the environmental and economic challenges posed by the disposal of used tractor tyres in Kenya and proposes a sustainable recycling framework through the innovative Jua Kali sector. By repurposing discarded tyres into marketable products (e.g., furniture, shoe soles, and construction materials), the initiative aims to reduce pollution, support circular economy principles, and create inclusive job opportunities in the informal sector. Employing a mixed-methods approach—including field surveys, experimental recycling trials, and comprehensive market analysis—the research draws on international case studies from Africa, the European Union, and Switzerland. These comparisons provide insights for policy development, technology adoption, and community engagement. The anticipated outcomes include reduced environmental degradation, enhanced artisan skills, and increased competitiveness in local and global markets, ultimately aligning with Sustainable Development Goals (SDG 12 and SDG 8).

**Chapter One: Introduction**

**1.1 Background**

Waste management is a critical challenge in Kenya, especially in rural communities where bulky, discarded materials like tractor tyres pose persistent environmental risks. Traditional disposal methods—such as burning, illegal dumping, and neglect—release toxic compounds into the atmosphere (World Health Organization [WHO], 2022) and lead to soil and water contamination. These practices not only diminish air quality but also serve as breeding grounds for disease vectors, thereby increasing the prevalence of illnesses such as malaria (Kenya Ministry of Health, 2023).

Conversely, Kenya’s Jua Kali sector, renowned for its ingenuity in resource utilization and repurposing waste, offers a unique opportunity to address this challenge. By integrating tyre recycling into Jua Kali operations, waste can be converted into innovative and marketable products. This transformative approach supports a circular economy and aligns with global initiatives such as Sustainable Development Goal (SDG) 12, which emphasizes responsible consumption and production (United Nations, 2024).

**1.2 Problem Statement**

Despite progress in recycling plastics and metals, Kenya’s management of rubber waste—particularly tractor tyres—remains inadequate. The improper disposal of tyres results in clogged drainage systems and soil contamination while posing direct health risks to communities (National Environment Management Authority [NEMA], 2023). Although the Jua Kali sector has demonstrated the ability to repurpose waste creatively, limitations such as insufficient training, lack of financial backing, and inadequate policy support hinder the scalability of tyre recycling initiatives. These gaps, if not addressed, are likely to perpetuate both ecological and economic challenges.

**1.3 Research Objectives**

**General Objective:**  
To develop and establish a sustainable recycling framework within Kenya’s Jua Kali sector that transforms discarded tractor tyres into marketable products, thereby advancing environmental stewardship and economic empowerment.

**Specific Objectives:**

1. **Collection and Sorting:** Develop an efficient system for the collection, categorization, and sorting of used tractor tyres.
2. **Technical Skill Development:** Provide structured training programs to equip Jua Kali artisans with advanced tyre recycling and repurposing techniques.
3. **Pollution Mitigation:** Reduce environmental pollution through the systematic recycling of tyres.
4. **Economic Empowerment:** Stimulate economic growth by creating job opportunities within the informal sector.
5. **Market Expansion:** Enhance the accessibility of tyre-recycled products in both local and international markets.

**1.4 Research Questions**

1. What are the specific environmental impacts of discarded tractor tyres in Kenya?
2. How can the Jua Kali sector integrate sustainable tyre recycling practices effectively?
3. What training and financial mechanisms are required to scale recycling initiatives?
4. How can international models of tyre recycling inform local policy and technical processes?
5. What market opportunities exist for tyre-recycled products in Kenya and abroad?

**1.5 Justification**

This study addresses the dual imperatives of environmental protection and economic development. By converting waste into valuable products, the project supports circular economy principles and sustainable resource utilization (United Nations Environment Programme [UNEP], 2024). Additionally, embedding recycling initiatives into the Jua Kali sector promotes grassroots innovation, ultimately contributing to SDG 8, which focuses on promoting decent work and sustainable industrialization (UNDP Kenya, 2023). International case studies further provide a roadmap for integrating policy frameworks and technological innovations that have yielded positive results elsewhere, thereby offering a robust model for Kenya.