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Promoting Environmental Awareness and Culture of Recycling: Towards Sustainable Resource Management and Support for Entrepreneurship

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ABSTRACT:

Over the past decades, Libya has experienced escalating environmental challenges, primarily driven by the accumulation of solid waste and the degradation of natural ecosystems. This study investigates the environmental awareness of university students and preparatory schoolteachers in Misrata, with a particular focus on the significance of recycling as a tool for environmental protection and local economic development. Utilizing a structured questionnaire distributed to 40 participants, the research reveals a generally positive perception among youth and educators regarding the role of recycling in fostering sustainability and generating economic opportunities. However, the findings also highlight persistent obstacles, including inadequate infrastructure and limited public awareness initiatives. The study concludes with recommendations for the formulation of national policies aimed at promoting a recycling culture, establishing waste sorting facilities, and encouraging entrepreneurial investment in the recycling sector

Key words: Libya; Recycle; Environmental; Management; Sustainable

Introduction

Libya has witnessed a growing wave of environmental challenges in recent years, largely driven by the accumulation of solid waste and the unsystematic consumption of natural resources. These issues have been exacerbated by rapid urban expansion and increased economic activity following the discovery of oil, which led to a rise in production, consumption, and living standards. As a result, municipal solid waste has become one of the most visible and pressing environmental concerns, placing a heavy burden on local municipalities and contributing to the pollution of coastal areas, air degradation, and groundwater contamination. Moreover, this waste stream represents a significant loss of materials that could otherwise be reused or recycled.

Recent studies estimate that the average Libyan citizen generates approximately 1 kilogram of solid waste per day (Al-Dheeb, 2024), a figure that highlights the urgent need for comprehensive national policies focused on waste reduction and recycling. Recycling is not merely a technical solution for waste management—it is a strategic approach to sustainable development. It helps reduce environmental pollution, conserve natural resources, minimize reliance on imported raw materials, and stimulate economic growth through job creation and entrepreneurship (Al-Taib *et al.,* 2024).

Community awareness is a critical factor in the success of recycling programs. Public participation in waste sorting and recycling initiatives depend heavily on individuals' understanding of the environmental and economic benefits of such practices. In this context, university students and preparatory school teachers play a pivotal role (Al-Dheeb, 2024). As educators and future leaders, they are instrumental in shaping environmental attitudes and promoting sustainable behaviors within society. Educational institutions, therefore, serve not only as centers of academic learning but also as platforms for cultivating environmental responsibility and sustainability values (Al-Bashir, 2025; Badi, etal., 2021 and Boubaker, *et al.,* 2025).

Given the absence of a comprehensive national waste management system and the lack of infrastructure for sorting and recycling in many Libyan cities, there is a pressing need for field studies that assess environmental awareness among key societal groups. Such studies can help identify barriers to recycling implementation and explore opportunities for fostering innovation and entrepreneurship in the recycling sector. Accordingly, this study aims to evaluate the level of

environmental awareness regarding the importance of recycling among university students and preparatory school teachers in the city of Misrata. It also seeks to identify the main challenges hindering the adoption of recycling practices and to explore potential avenues for promoting entrepreneurial initiatives in this vital sector, contributing to both environmental sustainability and local economic development.

2. Research Methodology

2.1 Study Design

This study employed a descriptive-analytical approach to assess the level of awareness, knowledge, and interest in recycling among two key segments of the educational community: university students and preparatory school teachers. The research was conducted using a structured questionnaire designed to capture participants' perceptions and attitudes toward recycling and its role in environmental sustainability and economic development.

2.2 Population and Sample

The study sample consisted of 40 participants from the municipality of Misrata, Libya. The sample was divided as follows:

- 30 university students from three different faculties, representing diverse academic disciplines (10 students from each faculty).
- 10 preparatory school teachers from various educational institutions within the city.

Participants were categorized by age group, gender, and educational level as shown below:

Table 1. Categories of Participants by Age, Gender, and Educational Level

Age Group	Number	Gender (M/F)	Educational Level
Under 20 years	25	4 / 21	Undergraduate
21–30 years	5	2 / 3	Undergraduate
31–40 years	8	1 / 7	University/ Postgraduate
41–50 years	1	0 / 1	Postgraduate
Over 51 years	1	0 / 1	Intermediate Diploma

This stratified sample allowed for a diverse representation of perspectives across age and educational backgrounds, enhancing the reliability of the findings.

2.3. Data Collection and Analysis:

Data were collected through a questionnaire comprising nine questions that addressed the following key areas:

- Understanding of the concept of recycling
- Sources of knowledge (e.g., school, media, social networks, local initiatives)
- Perceived importance of recycling
- Types of materials suitable for recycling
- Personal willingness to participate in recycling efforts

2.4 Barriers to participation

Suggestions for encouraging community involvement in recycling. All questionnaires were completed in full, with no missing data reported. The responses were analyzed using descriptive statistics to identify trends and patterns in environmental awareness and attitudes toward recycling among the target groups

3. Results and Discussion

3.1. Sources of Environmental Awareness

The findings indicate that social media was the primary source of awareness about the importance of recycling, cited by 21 participants. Schools followed closely with 19 responses, while traditional media such as radio and television were mentioned by 16 participants. Local initiatives were the least cited, with only 5 responses. These results highlight the growing influence of digital platforms in shaping environmental behavior, underscoring the need to leverage online channels for targeted awareness campaigns, especially among younger demographics.

3.2 Perceived Importance of Recycling

A total of 35 participants considered recycling to be "very important," while 5 rated it as "somewhat important." This reflects a high level of awareness among both university students and educators regarding the role of recycling in environmental protection and resource conservation. Such strong consensus suggests a fertile ground for implementing community-based recycling programs, provided that institutional and infrastructural support is in place.

3.3 Prioritized Materials for Recycling

Plastic materials ranked highest in terms of recycling priority, followed by paper and cardboard (15 mentions), metals (9 mentions), and glass (6 mentions). This indicates a clear recognition of the environmental risks posed by plastic waste, particularly in coastal cities like Misrata, where improper disposal can severely impact marine ecosystems and urban cleanliness.

3.4 Willingness to Participate in Recycling Activities

In this research twenty participants expressed full readiness to engage in recycling efforts, while 16 stated they "might participate," and only 4 showed no interest. These results reveal a generally positive social base that can be mobilized to support recycling initiatives, especially if logistical barriers are addressed and incentives are introduced.

3.5 Barriers and Challenges

The main obstacles identified by participants include:

- Lack of designated areas for waste collection and sorting (22 responses)
- Limited public awareness (20 responses)
- Time constraints due to personal commitments (5 responses)
- Logistical difficulties such as transportation (6 responses)

Participants also offered practical suggestions to overcome these challenges, including:

- "Implement awareness programs in schools and allocate spaces for recycling."
- "Educate citizens on the importance of recycling and provide accessible waste collection points."
- "Recycling is a vital step toward protecting the environment and conserving resources."

These insights affirm that while individual awareness is relatively high, structural and institutional gaps remain significant. Addressing these through policy reform, infrastructure development, and community engagement could substantially enhance the effectiveness of recycling programs in Libya.

4 . Results and Discussion

4.1 Sources of Environmental Awareness

The study revealed that social media was the most influential source in raising awareness about recycling, followed by schools, traditional media, and local initiatives.

Table 2: Sources of Recycling Awareness

Source	Number of Responses
Social media	21
Schools	19
Traditional Media	16
Local Initiatives	5

This distribution highlights the growing role of digital platforms in shaping environmental behavior, suggesting that future awareness campaigns should prioritize online engagement.

4.2 Perceived Importance of Recycling

Participants overwhelmingly recognized the importance of recycling:
Very Important: (35)
Somewhat Important: (5)
Not Important: (0)
A total of 35 participants rated recycling as "very important," while 5 considered it "somewhat important." This reflects a strong environmental consciousness among both students and educators.

4.3 Materials Prioritized for Recycling

Participants identified plastic as the top priority for recycling, followed by paper/ cardboard, metals, and glass.

Table 3: Materials Recommended for Recycling

Material	Mentions
Plastic	20
Paper/Cardboard	15
Metals	9
Glass	6

This prioritization reflects awareness of the environmental hazards posed by plastic waste, especially in coastal cities like Misrata.

5. Conclusion

This study explored the level of environmental awareness regarding recycling among university students and preparatory schoolteachers in Misrata, Libya. The findings revealed a generally high level of awareness and positive attitudes toward recycling as a tool for environmental protection and resource conservation. Most participants recognized recycling as a vital practice and expressed a willingness to engage in related activities. Social media and educational institutions emerged as the most influential sources of environmental awareness, highlighting the importance of integrating sustainability concepts into curricula and leveraging digital platforms for outreach. Participants prioritized plastic waste as the most critical material for recycling, reflecting concern over its environmental impact, particularly in coastal urban areas. Despite the positive attitudes, several barriers were identified, including the lack of infrastructure for waste collection and sorting, limited public awareness, and logistical challenges. These obstacles underscore the need for coordinated efforts to create an enabling environment for recycling initiatives.

6. Recommendations

Based on the study's findings, the following recommendations are proposed to enhance recycling practices and promote environmental sustainability in Libya:

1. Develop national recycling policies that include clear legislation, incentives for environmental projects, and collaboration between government entities and civil society.
2. Establish adequate infrastructure for waste sorting and collection in schools, universities, and residential areas.
3. Integrate environmental education into school curricula and train educators to promote sustainable practices in classrooms.
4. Launch digital awareness campaigns through social media platforms targeting youth, using interactive content to foster eco-friendly behavior.
5. Support green entrepreneurship by providing financial and technical assistance to small and medium enterprises working in the recycling sector.

The study concludes that fostering a recycling culture requires more than technical solutions; it demands sustained community engagement, institutional support, and strategic investment in education and innovation

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