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TOWARDS SUSTAINABLE P§RACTICES: INSIGHTS FROM A STUDY ON SINGLE-USE PLASTICS IN UAE

Mohammad Aljaradin, Amna Alteneiji, Moetaz El Sergany

Hamdan Bin Mohammed Smart University, School of Health and Environmental Studies, UAE
Corresponding Author Email: m.aljaradin@hbmsu.ac.ae

ABSTRACT

Plastic pollution has emerged as a global environmental challenge, significantly impacting ecosystems and human health. This study investigates the knowledge, attitudes, and practices regarding single-use plastics in Al Dhaid, United Arab Emirates (UAE). The research aimed to assess awareness levels and attitudes towards replacing single-use plastics among residents, employing a mixed-methods approach that included online surveys and interviews. The study revealed moderate to high levels of awareness about the environmental impact of single-use plastics, with 34.8% of respondents indicating moderate knowledge and 10.1% demonstrating high awareness. Concerns about environmental implications were widespread, with 32.9% considering it extremely important to replace single-use plastics with sustainable alternatives. Furthermore, the findings highlighted a significant reliance on single-use plastic bottles, with 69.1% of respondents using them daily. Despite these usage patterns, there is a notable receptiveness to adopting recyclable alternatives, as indicated by 52.2% of respondents supporting their replacement. While there is growing awareness and concern regarding single-use plastics in Al Dhaid, persistent challenges such as convenience and cultural norms hinder widespread behavioral change. The study recommends continued public awareness campaigns, integration of environmental education in school curricula, and policy interventions like the upcoming ban on single-use plastic bags in the UAE to promote sustainable practices and mitigate plastic pollution.

Keywords: Plastic pollution, Single-use plastics, Environmental awareness, Sustainable alternatives, Policy interventions

1. INTRODUCTION

In the latter half of the 20th century, the advent of disposable plastics marked a significant industrial and societal shift, revolutionizing convenience and product flexibility worldwide (Tsoumas, 2020). From everyday utensils to intricate medical devices, plastics have embedded themselves deeply in modern life, offering unparalleled convenience and durability. However, their very attributes that make them indispensable—such as durability and versatility—have also led to an unprecedented environmental challenge. Despite their intended single-use nature, plastics persist in the environment for centuries, accumulating in oceans, littering coastlines, and infiltrating even the remotest corners of the globe (Abdullah et al., 2021).

The proliferation of single-use plastics has reached alarming levels globally, posing multifaceted threats to ecosystems, wildlife, and human health. Marine species ingest or become entangled in plastic debris, ecosystems are disrupted, and microplastics permeate the food chain, potentially endangering human health (Nasser Al Farsi & Mohammad Aljaradin, 2023; Shams et al., 2021). Moreover, the production and disposal of plastics contributes significantly to greenhouse gas emissions, exacerbating the climate crisis. Recognizing these challenges, efforts are underway worldwide to mitigate plastic pollution through initiatives promoting recycling, biodegradable alternatives, and the transition towards a circular economy. In the Gulf region, including the United Arab Emirates (UAE), the impact of single-use plastics is particularly pronounced due to high consumption rates and environmental sensitivity (Nasser Al Farsi & Mohammad Aljaradin, 2023; Van et al., 2021). Coastal areas and marine life in the Gulf are increasingly threatened by plastic waste, necessitating urgent action to curb its proliferation and mitigate ecological damage. The UAE, in alignment with global sustainability goals, has embarked on initiatives to reduce plastic consumption, improve waste management practices, and foster innovation in sustainable materials (Maryam AlShamsi & Mohammad Aljaradin 2023; Norah Alkhateri & Mohammad Aljaradin 2023). This study focuses on Al Dhaid, UAE, aiming to assess the knowledge, attitudes, and practices surrounding single-use plastics. By examining local perceptions and behaviors, this research seeks to contribute insights that can inform targeted interventions and policies aimed at promoting sustainable practices and environmental stewardship in the region.

2. LITERATURE REVIEW

Plastic waste represents a significant global environmental crisis, driven by its durable, moldable, lightweight, and versatile properties, making it indispensable across various industries (Rajput et al., 2022). The production of plastic has surged dramatically over the decades, escalating from 1.5 million tons in the 1950s to approximately 367 million tons by 2020, highlighting its widespread use and subsequent environmental impact.

Plastic pollution is now among the foremost waste challenges worldwide, exacerbated by its extensive use in sectors requiring resilience, affordability, and adaptability (Rajput et al., 2022). Notably, the consumption of plastic bottled drinking water has significantly contributed to environmental degradation. Despite the availability of potable tap water across all emirates of the UAE, bottled water remains immensely popular, with each person consuming around 285 liters annually equivalent to over 450 plastic water bottles per year (Ajaj et al., 2022). This preference for bottled water stems from lifestyle changes in urban settings and a cultural inclination towards convenience, wellness, and perceived health benefits, particularly among women and older adults. The global bottled water industry has surpassed all other non-alcoholic beverage markets in growth, with significant increases noted particularly in Asia and South America (Kim & Lee, 2022). In the Middle East, including the UAE, despite a traditional reliance on desalinated water due to harsh desert climates and limited freshwater sources, there has been a nearly doubling of bottled water consumption (Rajput et al., 2022).

For instance, in Sharjah, a private waste research company reported recovering 3,342 tons of plastics last year, estimating that the actual amount discarded could be six times higher due to inadequate waste sorting practices among residents (Ajaj et al., 2022). The UAE ranks among the highest globally in per capita consumption of bottled water, with figures reaching 259.7 liters per person annually (Beverage Marketing Corporation, 2007).

Despite these high consumption rates, only a fraction of the 450-plastic water bottles each resident uses yearly are recycled (Bee'ah, 2022).

Efforts to address plastic pollution align with the UAE's commitment to sustainable development goals, such as those outlined in Agenda 2030, particularly Goal 13 aimed at reducing greenhouse gas emissions from plastic use (Al-Shihabi & Barghash, 2023). While laws have been amended to ban the import and manufacture of plastic-based shopping bags from January 1, 2024, restrictions on single-use PET water bottles have not been implemented, highlighting ongoing challenges in plastic waste management (Al-Shihabi & Barghash, 2023).

Plastic bags, another significant environmental concern, have been widely discussed globally for their detrimental impact on ecosystems and marine life. In the UAE, local governments have implemented strategies to mitigate plastic bag pollution, which often clogs drainage systems and harms marine habitats (Ajaj et al., 2022; Nasser Al Farsi & Mohammad Aljaradin, 2023). Plastic waste represents a global environmental crisis that demands urgent attention worldwide. Plastic's durability, moldability, cost-effectiveness, lightweight nature, and flexibility have led to its widespread use across various industries, significantly contributing to its production proliferation over the decades (Rajput et al., 2022). From 1.5 million tons in the 1950s, global plastic production skyrocketed to approximately 367 million tons by 2020, underscoring the scale of the issue (Rajput et al., 2022).

In the UAE, despite access to potable tap water across all emirates, the consumption of plastic bottled water remains exceedingly high, with each person using about 285 liters annually, equivalent to over 450 plastic bottles per year (Ajaj et al., 2022). Factors driving this trend include urban lifestyle changes and health and safety concerns, particularly among women and older adults (Ajaj et al., 2022).

The local response to plastic pollution in the UAE includes significant legislative efforts. A resolution by Dubai Municipality, in collaboration with other stakeholders, calls for comprehensive awareness campaigns to promote sustainable practices and reduce the use of single-use plastics (Abu Jadayil et al., 2022). Effective January 1, 2024, the resolution bans the import and trading of plastic bags, with a complete phase-out of non-plastic single-use items by June 1, 2024, and subsequent bans on other plastic items by 2025 and 2026 (Al-Shihabi et al., 2024).

Moreover, recycling programs are crucial in managing post-consumer waste, although challenges remain in optimizing collection and financial returns from recycled materials (Herdiansyah et al., 2022). Recycling initiatives highlight the environmental benefits of using recycled plastics over conventional materials like expanded polystyrene, underscoring the potential for upcycled plastic to reduce environmental impact (Herdiansyah et al., 2022). Internationally, initiatives to combat plastic waste are gaining momentum. The European Union has implemented bans on various single-use plastics, including straws and cutlery, from marine environments since 2021, setting a precedent for global environmental policy (European Commission, 2021). Similarly, Canada is actively engaged in international negotiations aimed at elevating environmental regulations on single-use plastics to treaty status by the end of 2024 (Government of Canada, 2023).

3. MATERIAL AND METHODS

This study was conducted in Al Dhaid, a historical oasis town located in the heart of the Emirate of Sharjah, with a population of approximately 33,000 as of 2022. Al Dhaid encompasses a diverse range of demographic and socioeconomic backgrounds, and a random sample was chosen from these groups. The primary aim was to examine daily plastic usage and its environmental impact among the residents. Data collection involved an online questionnaire and personal interviews with elders. The questionnaire comprised four distinct sections: the initial section gathered essential demographic data, including gender, age, financial status, and educational background; the second section assessed participants' knowledge regarding the impact of single-use plastics on the environment; the third section explored individuals' attitudes and concerns about the environmental effects of single-use plastics; and the final section collected data on participants' practices, providing insights into their daily habits concerning the usage of single-use plastic items and efforts to adopt more sustainable alternatives. Questions covered the types and quantities of single-use plastic products used, recycling practices, and substitutes for plastic. Elders were personally interviewed to gain deeper insights into their perceptions and practices regarding plastic usage. Key questions focused on participants' observations of non-biodegradable plastics' impact on the ecology, their awareness and knowledge of ecological issues, their recycling habits or use of alternatives to plastic, and the quantities of single-use plastic products they consumed.

The study included both male and female participants, with females comprising 68.6% and males 31.4% of the sample. The age distribution was diverse, with 44.3% falling within the 30-39 years age group, 30% being over 60 years old, 15.7% aged 50-59 years, 4.3% aged 40-49 years, another 4.3% aged 20-29 years, and the remaining 1.4% under 19 years. Income levels were distributed as follows: 44.9% earned more than 50,000 AED, 39.1% had incomes between 40,000 and 50,000 AED, and 11.6% earned between 30,000 and 40,000 AED. Educational attainment among participants varied, with 61.4% holding a bachelor’s degree, 24.3% having a high school education or below, 11.4% possessing a Master's degree, and 2.9% holding a Doctorate. Data from the online questionnaires and interviews were analyzed to identify patterns and correlations between demographics (age, gender, education, and income) and plastic usage behaviors. Special attention was given to the differences in awareness and practices between younger and older age groups, as well as between educational levels. This comprehensive methodology ensures a robust understanding of the plastic usage patterns and environmental awareness among the residents of Al Dhaid, providing valuable insights for potential interventions and educational programs aimed at reducing plastic waste and promoting sustainability.

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4. RESULT AND DISCUSSION

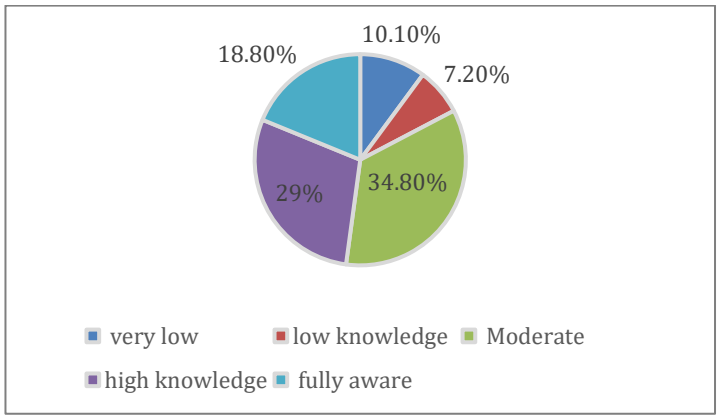

Figure 1. Awareness levels regarding the impact of single-use plastics on the environment

Figure 1 provides valuable insights into respondents' awareness levels regarding the impact of single-use plastics on the environment. The distribution of knowledge ratings is as follows: 34.8% of participants rated their knowledge as moderate, 29% reported low awareness, 18.8% indicated very low awareness, 10.1% acknowledged high knowledge, and 7.2% demonstrated full awareness. This diverse range of awareness levels suggests a varied understanding of environmental issues within the surveyed population.

Notably, the significant portion of respondents with moderate to high knowledge levels indicates a potential receptiveness to environmental issues and the importance of sustainable practices. This finding is encouraging, as it highlights a substantial base of the population that is already somewhat informed and potentially open to further education and initiatives. Understanding these knowledge levels is pivotal for designing targeted educational and awareness campaigns. By addressing specific gaps in understanding, such campaigns can effectively promote sustainable practices and reduce the use of single-use plastics. Collaboration between the government and private sectors is essential to enhance public awareness in Al Dhaid. Additionally, involving families in awareness programs can further reinforce the importance of environmental stewardship and encourage collective action toward sustainability.

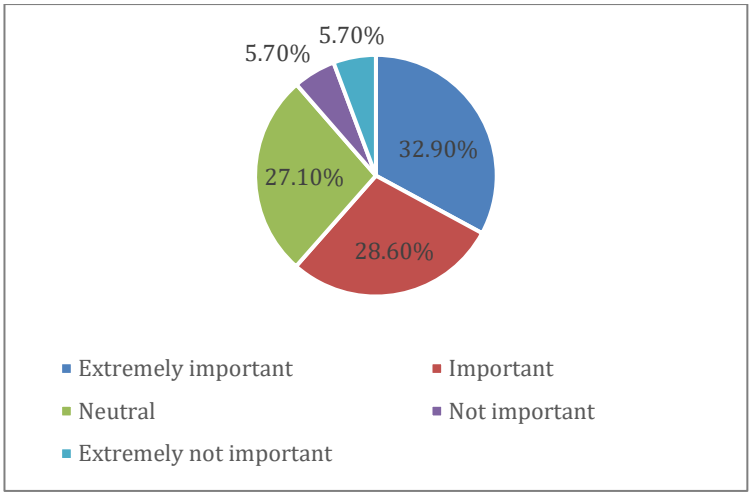

Figure 2. Importance of Replacing Single-Use Plastic

Figure 2 shows that the data gathered reflects individuals' attitudes and concerns regarding the environmental impact of single-use plastics. A significant proportion, 32.9%, expressed that they find the replacement of single-use plastic with sustainable items to be extremely important, while 28.6% deemed it important. Another 27.1% adopted a neutral stance, indicating a diverse range of opinions on the matter. However, it is noteworthy that a combined 11.4% of respondents considered the issue to be either not important (5.7%) or extremely unimportant (5.7%), suggesting a segment of the population with lower levels of concern. This distribution provides valuable insights into public opinion on the necessity of transitioning to sustainable alternatives and highlights the need for targeted educational campaigns to address the varying levels of concern within the community.

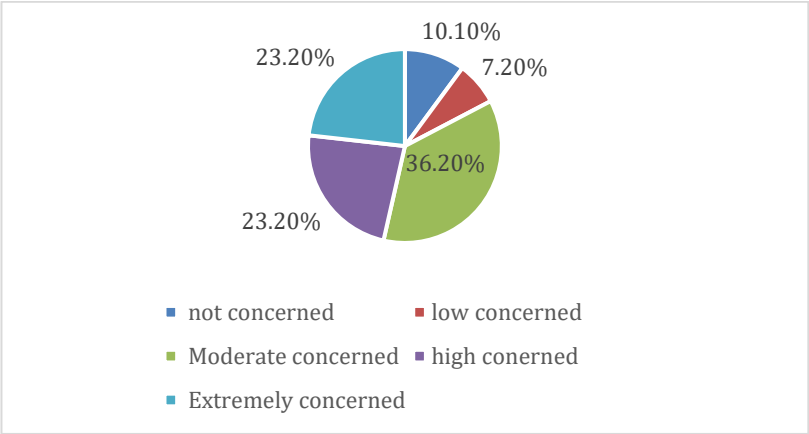

Figure 3. Concerns About the Environmental Impact of Single-Use Plastics

Figure 3 illustrates responders' varying degrees of concern about the environmental impact of single-use plastics. The largest segment, 36.2%, indicates that they are "Extremely concerned." Additionally, 23.2% express "High concern," another 23.2% show "Low concern," 10.1% are "Not concerned," and 7.2% report "Moderate concern." This visual depiction highlights the spectrum of attitudes towards the environmental implications of single-use plastics among respondents in Al Dhaid. Understanding these attitudes is crucial for identifying the level of awareness and concern within the community regarding single-use plastics. It

underscores the importance of tailored educational initiatives and awareness campaigns to address specific concerns and promote sustainable practices. This section of the questionnaire provides valuable insights into Emirati attitudes in Al Dhaid regarding the usage of single-use plastics, informing strategies for fostering greater environmental stewardship and sustainability.

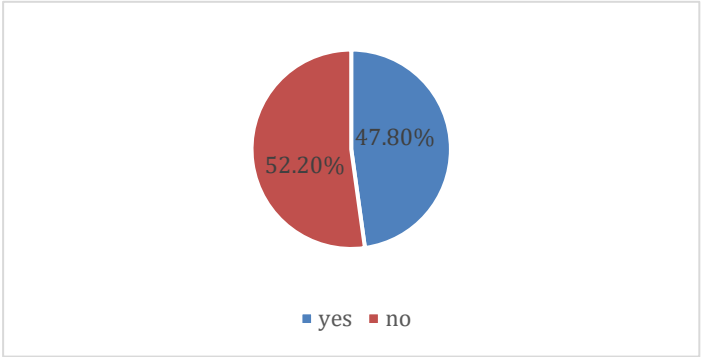

Figure 4: Attitudes Towards Replacing Single-Use Plastic with Recyclable Alternatives

Figure 4 illustrates the percentage of responders who agree or disagree with replacing single-use plastics with recyclable alternatives. Approximately 52.20% of respondents agree with this replacement, while 47.80% do not. This highlights consumer behavior regarding environmental practices and the adoption of eco-friendly materials, linking directly to the broader attitudes and concerns expressed in Figures 2 and 3.

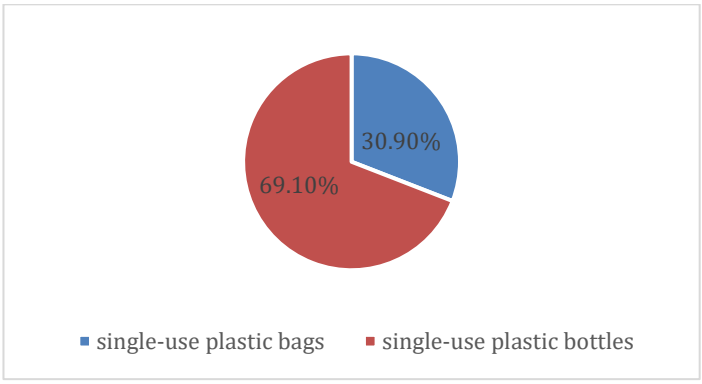

Figure 5: Distribution of Single-Use Plastic Usage

Figure 5 provides insights into respondents' daily habits regarding their usage of single-use plastic items and efforts to adopt more sustainable alternatives. The data reveals that 69.1% of respondents reported using single-use plastic bottles on a daily basis, highlighting a significant reliance on these items in daily routines. In contrast, 30.9% mentioned frequent use of single-use plastic bags.

These findings underscore the widespread use of single-use plastics, particularly bottles, in Al Dhaid. Given the high percentage of daily usage reported, there is a clear need for policies or initiatives aimed at regulating and reducing the use of single-use plastic bottles in the UAE. Such measures could include taxes on single-use plastics, incentives for reusable alternatives, or public awareness campaigns promoting sustainable choices. In making sustainable choices at home and in daily routines, reducing reliance on single-use plastics like bottles and bags is crucial for environmental conservation. Educating the community about the environmental impact of single-use plastics and promoting alternatives such as reusable bottles and bags can contribute significantly to reducing plastic waste and promoting sustainability in Al Dhaid.

5. CONCLUSION AND RECOMMENDATIONS

The findings from this study highlight a moderate level of awareness among respondents regarding the environmental impact of single-use plastics, with a significant proportion emphasizing the importance of replacing them with reusable alternatives. Despite growing awareness, persistent factors such as convenience, cultural norms, and social influences continue to perpetuate the use of single-use plastics in daily life. Addressing this multifaceted issue requires not a singular solution, but a combination of strategies.

Firstly, ongoing public campaigns are essential to reach diverse demographics and raise awareness about the detrimental effects of single-use plastics on ecosystems and human health. These campaigns should prioritize proper waste management practices and promote sustainable alternatives across Al Dhaid. Incorporating environmental education into school curricula and community service projects can foster a culture of environmental stewardship from an early age, contributing to long-term sustainability efforts.

Additionally, community engagement policies should encourage active participation in combating plastic waste. Initiatives such as environmental clean-up drives, and recycling awareness programs can empower residents to take tangible steps towards reducing plastic consumption. Offering incentives, such as rewards or tax benefits, for reducing plastic use can incentivize long-term behavioral changes and foster a greater appreciation for environmental conservation.

Policy measures must also play a pivotal role in ensuring sustainable practices. As seen in the UAE's progressive initiatives, including the upcoming ban on single-use plastic bags and the phased approach to eliminate other plastic products by 2026, legislative actions are crucial for driving systemic change. These measures not only restrict the use of harmful plastics but also encourage the adoption of eco-friendly alternatives, aligning with broader environmental goals to achieve a carbon-neutral future by 2050.

To achieve comprehensive progress, collaboration among community stakeholders, businesses, NGOs, and government authorities is essential. Strategic planning and coordinated efforts can bridge existing gaps in combating plastic pollution, leveraging collective knowledge and resources towards a more circular economy and greener environment.

6. ACKNOWLEDGMENT

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7. Author contribution

Amna Alteneiji collected the data for the study, while Dr. Moetaz El Sergany provided scientific planning and supervision throughout the research process. The article was written, and the data analyzed by Dr. Mohammad Aljaradin.

8. REFERENCES

Aljaradin, M. (2020). Biodegradation of microplastics in drinking water, a review. *Sustainable Resources Management Journal*, 5(1), 1-17.

Abdullah, N. A., Cheang, H., & Harun, M. H. (2021). Single-use plastic: Reduce or ignore. *International Journal of Law, Government and Communication*, *6*(26), 120–126. https://doi.org/10.35631/ijlgc.626010

Al-Shihabi, S., Aydin, R., Araci, Z. C., Dweiri, F., Obeidat, M., & Al Bataineh, M. F. (2024). Abolishing single-use plastic water bottles in Dubai Hotels as a voluntary act—scenarios and environmental impacts. *Sustainability*, *16*(8), 3121. https://doi.org/10.3390/su16083121

Abu Jadayil, W., Qureshi, M. R., Ajaj, R., Aqil, E., Shawahin, G., Anver, H., & Aljeawi, S. (2022). An empirical investigation on plastic waste issues and plastic disposal strategies to protect the environment: A UAE perspective. *Sustainability*, *14*(24), 16719. https://doi.org/10.3390/su142416719

Ajaj, R., Abu Jadayil, W., Anver, H., & Aqil, E. (2022). A revision for the different reuses of polyethylene terephthalate (PET) water bottles. *Sustainability*, *14*(8), 4583. https://doi.org/10.3390/su14084583

Al-Shihabi, S., & Barghash, M. (2023). A system dynamic model for polyethylene terephthalate supply chain in the United Arab Emirates—status, projections, and environmental impacts. *Sustainability*, *15*(17), 13119. https://doi.org/10.3390/su151713119

EAD. (2020) Abu Dhabi Emirate Single Use Plastic Policy. Retrieved February 18, 2023, from https://www.ead.gov.ae//media/Project/EAD/EAD/Documents/KnowledgeHub/LawsandPolicies/en/SINGL EUSEPLASTICPOLICY313.pdf

Herdiansyah, H., Sholihah, S. M., & Frimawaty, E. (2022). Environmental awareness based on community knowledge, attitude, and behavior of the environmental impact of plastic packaging use in urban areas. *IOP Conference Series: Earth and Environmental Science*, *1111*(1), 012030. https://doi.org/10.1088/1755-1315/1111/1/012030

Khoironi, A., Anggoro, S., & Sudarno, S. (2019). Community behavior and single-use plastic bottle consumption. *IOP Conference Series: Earth and Environmental Science*, *293*(1), 012002. https://doi.org/10.1088/1755-1315/293/1/012002

Kim, T., & Lee, S.-D. (2022). Designing for green and grey: Insights from single-use plastic water bottles. *International Journal of Environmental Research and Public Health*, *19*(3), 1423. https://doi.org/10.3390/ijerph19031423

Maryam AlShamsi & Mohammad Aljaradin (2023). Towards Sustainable Food Waste Management in the Hospitality Sector of Ajman, UAE: A Step Towards Achieving SDGs. *Sustainable Resources Management Journal*. 8 (2), 01-13

Rajput, H., Maraqa, M. A., Zraydi, F., Al Khatib, L. A., Ameen, N., Ben ElKaid, R., Al Jaberi, S. S., Alharbi, N. A., Howard, R., & Aly Hassan, A. (2022). A survey on the use of plastic versus biodegradable bottles for drinking water packaging in the United Arab Emirates. *Sustainability*, *14*(5), 2664. https://doi.org/10.3390/su14052664

Norah Alkhateri, & Mohammad Aljaradin (2023). Exploring the Social, Economic, and Environmental Benefits and Challenges of Sanitary Landfill in the Al Jurf Landfill in Ajman. *Sustainable Resources Management Journal*. 8 (1), 1-12.

Nasser Al Farsi & Mohammad Aljaradin. (2023). Advancing SDGs: Assessing the Impact of Abu Dhabi's Single-Use Plastic Policy on Consumer Behaviour and Adoption. Sustainable Resources Management Journal. 8 (2), 14-22 .

Shams, M., Alam, I., & Mahbub, M. S. (2021). Plastic pollution during COVID-19: Plastic waste directives and its long-term impact on the environment. *Environmental Advances*, *5*, 100119. https://doi.org/10.1016/j.envadv.2021.100119

Tsoumas, J. (2019). Designing Single-Use Plastic Products: Far from the Earthly Paradise. *American Scientific Research Journal for Engineering, Technology, and Sciences, 52*, 79-88.

Van, L., Abdul Hamid, N., Ahmad, Md. F., Ahmad, A. N., Ruslan, R., & Muhamad Tamyez, P. F. (2021). Factors of single use plastic reduction behavioral intention. *Emerging Science Journal*, *5*(3), 269–278. https://doi.org/10.28991/esj-2021-01275