HOW DOES PLASTIC POLLUTION IN AKTOBE INFLUENCE ECOSYSTEM?

Abilova Inkar

Student of Nazarbayev Intellectual School of the Physics and Mathematics in Aktobe, Kazakhstan, Aktobe

Utegenova Ayazhan

научный руководитель, Adviser, Teacher of Nazarbayev Intellectual School of the Physics and Mathematics in Aktobe, Kazakhstan, Aktobe

Abstract. This research addresses the problem of plastic pollution, emphasizing local and global settings, including Kazakhstan and more especially Aktobe. Only a small portion of plastic garbage gets recycled in Kazakhstan, which exacerbates pollution concerns in areas like Aktobe where burning plastic is a prevalent practice and results in poor air quality and health problems for locals.

Introduction

A whopping 2 million plastic bags are used every minute worldwide, while over 400 millions tons of plastic produces per year, which is equal to 67 Egyptian pyramids. The issue of plastic pollution is relevant not only abroad, but also in Kazakhstan. Kazakhstan recycles less than 132,000 tons of plastic waste in 2021, constituting just 21.9 percent of the total annual plastic waste generated in the country. This indicates that the country produces 602,740 tons of plastic waste each year. Furthermore, this problem is very relevant problem in Aktobe. For instance: during the summer the smell of burned plastic outspreads throughout the whole town. Residents always complain according this issue, as it becomes extremely hard to breath. Moreover, one of the major outcomes of issue is increased level of alergics, which had a certain effect on my health.

Aims

The aim of this research is to comprehensively investigate the impact of plastic pollution in Aktobe, focusing on its influence on ecosystem health and air quality. To identify the specific ecosystems affected by plastic pollution, the pathway of toxins, to analyze exactly how plastics affect the air quality, to gather valuable information to understand and address factors contributing to plastic pollution in Aktobe.

Literature review

Plastic pollution resulting from solid waste landfills has emerged as a critical environmental concern, prompting research endeavors to assess its impact on ecosystems. According to a comprehensive overview of existing studies, with a specific focus on the environmental assessment conducted in the Akmola Region of North Kazakhstan by Salikova in 2023 the work delves into plastic waste disposal sites, municipal solid waste management, and the characterization of plastic content. Noteworthy findings include the air route is one method that plastic might go from landfills to the environment. Land-locked plastics are transported to nearby regions mostly by wind and precipitation (Kuandyk, 2023). Furthermore, many contaminants, such as organic and heavy metal pollutants, may be found in leachate from landfills. Therefore, during leachate discharge, plastics potentially transported by the leachate might worsen detrimental environmental consequences by serving as vectors for additional pollutants (Askarova, 2023), emphasizing the

need for tailored interventions to address plastic pollution in the Akmola Region. Therefore,toxic pollutants capable of inflicting considerable harm on the environment through water, then widespread throughout underground water to all components of ecosystem(Obebe & Adamu, 2020).

Results

The survey is aimed to gather the information from residents about how plastic pollution in Aktobe influences ecosystem and air quality and find factors that influence the pollution. Participants were asked to answer the same 14 questions -2 evaluation questions, 1 open question and 11 multiple choice questions-to determine how aware people of the problem of plastic pollution, how often clean-up days are held and the general state of the environment in the city of Aktobe. Overall, 110 participants willingly took part in the survey.

I would like to highlight that the survey was conducted regardless of gender, age, and employment. The first question is “how often do you use plastic?”, and the answers are divided into 4 possible options: very often; often; rarely; don't use. Approximately 60% people answers very often, while 1.8% answered don’t use, which means that plastic products are used frequently by residents. The second question is related to the impact of plastic pollution to the ecosystem, as observable changes immediately catch the eye. 81,1% chose “yes”, which is 5 times more than “no”. Therefore local ecosystem suffers due to pollution. The 4^{th} and 5^{th} questions are according to what is done with plastic after it is used, which also determines the level of awareness of people. To the 4^{th} question about where usually people dispose the plastic waste, the large proportion made up 63% (litter), the second place is 16.5% (reuse), the third place 11% (pass for recycle), and the last place take 10% (storing). The results indicate a significant portion of respondents in Aktobe city are not witnessing efforts or initiatives to reduce plastic usage, with 73% responding negatively. This suggests that there may be a lack of visible action or awareness campaigns in the city aimed at tackling plastic pollution. Approximately 78% of residents confirmed that on summer days there is often smog, which indicates that plastics are burned, and the atmosphere suffers from this. 87% of respondents reported unpleasant smell on summer days, which indicates that the problem at this time of year is widespread, and most residents are aware of them. At the same time, only 12% of respondents stated that they do not notice such odors, which means that it is not observable for everyone.

Conclusion

Identification which part is mostly affected by plastic pollution: Through comprehensive investigation, air is specifically affected by plastic pollution, as the results demonstrates that during summer days it is usually frog outside and unpleasant smell through the city. Community Awareness and Engagement: By gathering information from residents about their experience in participation in voluntary work and how are the alternative products instead of plastic is available, provide more works, empower residents to take action according to this issue. Results gained in this research could be significant to government to make a general trend and give more opportunity, financial aid to start projects to reduce plastic.

Reference:

1. International Journal of Engineering Applied Sciences and Technology. (2020). Fellman, J. D., Bjelland, M. D., Montello, D. R., Gettis, A., & Gettis, J. (2013). Human Geography: Landscapes of Human Activities.

2. Salikova, N. S., Rodrigo-Ilarri, J., Rodrigo-Clavero, M.-E., Urazbayeva, S. E., Askarova, A. Z., & Magzhanov, K. M. (2023). Environmental Assessment of Microplastic Pollution Induced by Solid Waste Landfills in the Akmola Region.

3. Obebe, S. B., & Adamu, A. A. (2020). Plastic Pollution: Causes, Effects and Preventions.

4. Jambeck, J. R., Geyer, R., Wilcox, C., Siegler, T. R., Perryman, M., Andrady, A., Narayan, R., & Law, K. L. (2015). Plastic waste inputs from land into the ocean.