National University of Comahue

Research Report

SUSTAINABLE UNIVERSITIES: FROM AWARENESS TO ACTION AGAINST SINGLE-USE PLASTIC

Lucila Mailén Ledesma

National University of Comahue, Argentina (lucilaledesmaa@gmail.com)

Carla Nahir Tallarico

National University of Comahue, Argentina (carlanahirtallarico@gmail.com)

Saul Socompi

National University of Comahue, Argentina, Argentina (ssocompi.saul@gmail.com)

Abstract

This research addresses the issue of single-use plastic consumption within the university environment and proposes an integrated model that combines economic, institutional, and behavioral approaches to reduce it. The study adopts a quantitative approach based on surveys administered to students, faculty, and administrative staff at the National University of Comahue, particularly within the Faculty of Economics and Administration. Its aim is to identify consumption habits, levels of environmental awareness, and willingness to change. The results reveal a high level of concern about the environmental impact of plastics and a positive attitude toward adopting sustainable practices, although structural barriers—such as the lack of adequate infrastructure and the persistence of ingrained habits—remain. It is concluded that effectively reducing single-use plastics requires coordination among environmental education, institutional policies, and material resources that facilitate everyday sustainable actions. This research contributes to the development of strategies applicable in university contexts seeking to advance toward an environmentally responsible culture and more sustainable resource management.

Keywords: responsible consumption; university sustainability; plastic reduction.

1. INTRODUCTION

The massive use of plastic has become one of the main environmental challenges of the 21st century. In just seven decades, global production of this material has increased exponentially, leading to a growing accumulation of waste that affects both terrestrial and marine ecosystems (Truelove et al., 2023). As these plastics degrade, they release microplastics that contaminate water, soil, and air, impacting biodiversity and human health (Willis & Fytianos, 2022). In response to this global issue, strategies to reduce the impact of plastics range from public policies and technological solutions to educational programs and awareness campaigns. Universities, due to their educational role and their capacity to promote cultural change, represent key spaces to foster sustainable habits and reduce the use of single-use plastics.

Despite numerous efforts to address this issue, research often focuses on only one aspect of the problem. Techno-economic studies, such as that by Larrain et al. (2021), show that recycling faces major economic limitations and depends heavily on oil prices, which compromises its profitability and sustainability. On the other hand, institutional research, such as that by Willis and Fytianos (2022), demonstrates a high willingness among university communities to reduce plastic consumption but emphasizes that any measure must be accompanied by environmental education and awareness initiatives.

Finally, from a psychological perspective, Truelove et al. (2023) showed that small behavioral interventions—such as public commitments or “pledges”—can generate significant changes in individual behavior. However, these three approaches remain disconnected: economic studies rarely consider the role of human behavior, institutional studies seldom test concrete interventions, and psychological experiments often overlook economic feasibility and institutional implementation. This fragmentation limits the effectiveness of strategies aimed at reducing single-use plastic consumption in real contexts such as universities.

To address this gap, the present research proposes the development of an integrated model to reduce single-use plastic consumption within the university setting, combining three key dimensions: economic feasibility,

social and institutional acceptance, and individual behavioral change. The project seeks to design and implement a multifaceted intervention based on the Theory of Planned Behavior (TPB), adapted to the university context and supported by the engagement of the academic community. The model will integrate educational and participatory strategies that strengthen environmental awareness and promote reduction and reuse behaviors, prioritizing waste prevention over low-profit recycling solutions.

With this proposal, the study aims to contribute both to the theoretical understanding of the problem—by linking approaches from circular economy, environmental psychology, and institutional management—and to practice, by offering a framework applicable to other universities seeking to move toward more sustainable institutions.

2. METHODOLOGY

The research adopted a **quantitative approach**, as it sought to measure and analyze the consumption habits and perceptions of the university community regarding plastic use. To achieve this, an anonymous and structured survey was designed and implemented to identify trends, behaviors, and levels of environmental awareness within the university.

Sampling, Data Collection, and Limitations

The participants in this study were members of the university community, including students from various academic programs, faculty, and administrative staff. All of them share the characteristic of being active participants in academic and institutional life, which positions them as strategic actors in the implementation of sustainable practices aimed at reducing plastic bottle consumption within the university environment.

The sample was selected using **convenience sampling**, a non-probabilistic method in which participants are chosen based on their availability and ease of access. Participants were drawn from the Faculty of Economics and Administration, the University Library, and classrooms in Building 40. The survey was distributed digitally through **Google Forms**, allowing participation from those who had access to the form and were interested in taking part. This procedure made it possible to collect a total of **78 responses**, which were analyzed to assess plastic consumption habits within the university and to obtain a representative overview of the institutional

reality.

In general terms, the sample was heterogeneous in terms of age, gender, and institutional role, enabling the collection of diverse perspectives on single-use plastic consumption. Most respondents were students, reflecting the demographic composition of the university; however, faculty and administrative staff were also included to provide a broader view. All participants shared the common feature of being active members of the university, ensuring the relevance and reliability of the collected information.

The main data collection instrument was an **anonymous structured questionnaire**, created using the Google Forms platform and consisting of **10 questions**. The anonymity of the survey encouraged more honest responses than might be expected in face-to-face interviews. This tool was chosen for its wide reach, adaptability, and cost-effectiveness, allowing quick and direct access to the target audience.

Moreover, the digital format ensured that all participants answered the same set of questions, facilitating comparison and analysis of the results. The questionnaire combined **closed-ended questions**—which provided quantitative data such as frequencies and percentages—with **one open-ended question**, in which respondents could share opinions and suggestions, thereby enriching the analysis. This combination offered a more comprehensive understanding of the issue by integrating statistical information with individual perceptions.

Following the proposed **SMART objective**, the research included specific actions such as distributing the digital questionnaire mainly through **WhatsApp**, via a direct link shared across various student and faculty group chats. Additionally, **in-person visits** were carried out at the Faculty of Economics and Administration building, where both teaching and administrative staff were reached and invited to participate by scanning a **QR code** linked to the survey.

The use of the **Google Forms** platform enabled agile and efficient data collection from a representative number of students, faculty, and administrative staff. This approach proved to be the most suitable, as it provided clear and comparable numerical data essential for quantitative analysis.

The stages of the procedure were as follows:

1. **Definition of objectives:** The main goal was to understand the consumption habits of the university

community and its willingness to adopt more responsible alternatives. A **SMART objective** was defined: *"to reduce plastic bottle consumption within the university by 30%."*

2. **Questionnaire design:** A structured survey consisting of **10 questions** (both closed- and open-ended) was developed to obtain quantitative and qualitative information.

3. **Survey implementation:** The digital questionnaire was distributed among groups of students, faculty, and administrative staff, ensuring anonymity and voluntary participation.

4. **Response collection:** The questionnaire remained open from **September 24 to October 15, 2025**, during which time diverse participation was achieved.

5. **Systematization and analysis:** The responses were downloaded and organized into a database, facilitating statistical processing and interpretation of the results.

Data analysis was conducted using **descriptive quantitative techniques**, which aim to show how variables behave within the studied group without making inferences or predictions. The closed-ended responses were summarized in **percentages and bar charts**, allowing the identification of patterns, frequencies, and trends related to plastic consumption.

Additionally, a **Likert scale** was applied to measure participants' attitudes, perceptions, and levels of agreement regarding the issue under study. This enabled the comparison and classification of responses, aiding in the development of relevant indicators.

Moreover, the open-ended responses provided **complementary qualitative information**, which helped contextualize and enrich the interpretation of numerical results by identifying improvement proposals and new ideas suggested by respondents.

3. RESULTS

This section presents the main findings of our project on the production and responsible use of plastic within the university.

Based on the analysis of the data collected through surveys, we sought to understand how plastic is used, managed, and perceived within the university community. The results provide insight into the extent to which the daily practices of students, faculty, and administrative staff align with the principles of sustainability and circular economy promoted by the **Sustainable Development Goals (SDGs)**. Likewise, the findings offer a foundation for assessing existing institutional actions and proposing strategies aimed at reducing the environmental impact associated with the use of single-use plastics in the academic environment.

Figure 1 below shows that the distribution reflects a broad representation of the student body, which is particularly relevant since this group constitutes the main actor in consumption dynamics within the university campus.

Figura 1

Regarding the frequency of consumption habits, most respondents indicated that they consume plastic bottles infrequently, rather than as a regular habit.

Figure 2

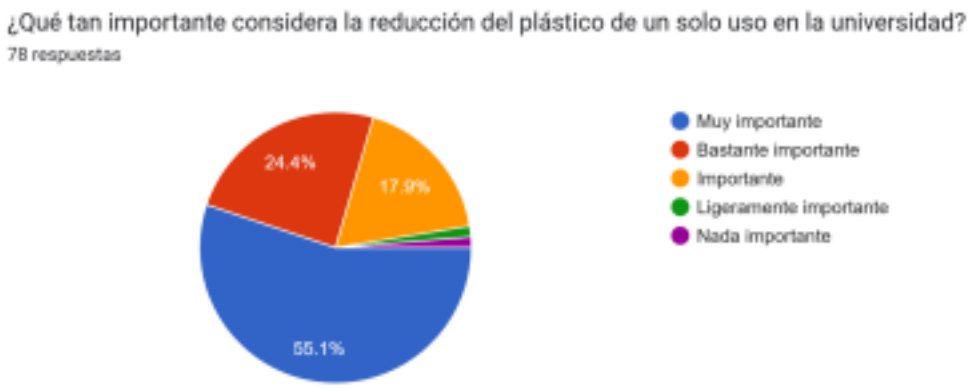


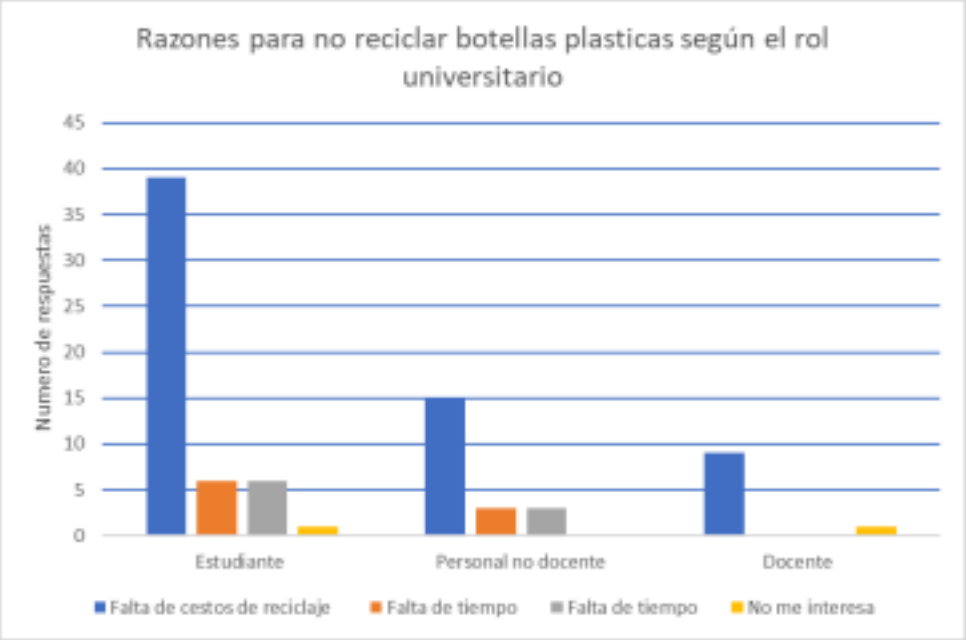
Figure 2 illustrates how participants assess the need to reduce single-use plastics within the institution. A **positive correlation** was observed between the level of awareness and the perceived importance of the issue. It can be stated that all three groups—students, faculty, and administrative staff—agree that reducing single-use plastics at the university is **very important**.

Both **faculty members and administrative staff** demonstrated a high level of understanding regarding the environmental impact of plastics, with most respondents selecting answers such as *"Yes, very much"* when asked about the importance of reduction efforts. **Students** also showed strong environmental awareness, although some admitted to having only partial knowledge about recycling processes or about the **potability of water from campus dispensers**.

Within the framework of this study on environmental habits and perceptions among the university community, respondents were also asked about the **main obstacles** to adopting sustainable practices such as recycling or reducing plastic consumption.

The **most frequently cited reasons** for not recycling or fully reducing plastic use were consistent across all three groups. As shown in the bar chart, the **lack of recycling bins** on campus was identified as the primary barrier.

Figure 3



A **positive correlation** was found across all three groups, reflecting a **proactive and collaborative attitude** toward institutional measures. The vast majority of respondents answered *"Yes, I would help promote change,"* while a small number responded *"Maybe,"* without expressing opposition to the initiatives.

This indicates a **collective willingness to participate**, as long as the university provides **adequate resources, awareness campaigns, and visible improvements** to support these efforts.

Cuadro comparativo general – Percepción sobre el uso del plástico en la universidad

Aspecto	Estudiantes	Personal No Docente	Docentes	Coincidencias generales
Conciencia ambiental	Alta preocupación por el impacto del plástico. Consideran el tema muy importante	Alta conciencia ambiental, consideran prioritaria la reducción del plástico	Alta conciencia y compromiso ambiental, con mirada institucional.	Los tres grupos muestran alta sensibilidad ambiental y reconocen la importancia del tema.

Frecuencia de consumo	La mayoría "rara vez" o "nunca" usa botellas descartables.	Mayoría "rara vez", algunos "nunca".	Predomina "rara vez", pocos casos de uso frecuente.	En general, el consumo de botellas descartables es bajo.
Problemas detectados	Falta de cestos y dispensers, poca oferta sostenible, barreras por costumbre	Falta de cestos, pocos dispensers, escasez de opciones reutilizables	Falta de cestos y dispensers, falta de alternativas sostenibles.	Todos identifican falta de infraestructura y alternativas sostenibles.
Barreras principales	Costumbre, comodidad, falta de información o alternativas.	Comodidad, precio y falta de opciones.	Costumbres arraigadas y falta de tiempo o espacios.	Las costumbres y la comodidad son los mayores obstáculos comunes.
Propuestas frecuentes	Más dispensers, puntos verdes, campañas e incentivos	Más dispensers, puntos verdes, campañas, prohibición de botellas plásticas	Más dispensers, puntos verdes, campañas, incorporación de envases retornables	Los tres proponen mejorar infraestructura, educación ambiental e incentivos
Predisposición al cambio	Mayoría "sí, ayudaría al cambio"	Casi todos "sí, ayudaría".	Mayoría "sí, ayudaría", pocos "tal vez"	Fuerte predisposición positiva al cambio en todos los grupos.

4. DISCUSSION – CONCLUSION

The results of this study suggest that, although the university community demonstrates a high level of environmental awareness, there are still obstacles that hinder the effective reduction of single-use plastic consumption. This situation can be explained by the persistence of everyday habits associated with convenience and by the limited availability of accessible alternatives. Consequently, the gap between awareness and action does not indicate a lack of interest, but rather the presence of structural and

institutional limitations, such as the lack of recycling bins, the absence of water dispensers, and the shortage of incentives—such as informational talks, infographics, discussion spaces, and, above all, initiatives that promote a culture of recycling.

It is recognized that environmental education and the provision of adequate infrastructure are determining factors in modifying consumption patterns. The different participant groups agreed on the importance of reducing plastic use and expressed their willingness to collaborate through concrete measures. However, this high level of willingness could be partially influenced by the desire to provide socially desirable responses.

A key issue derived from these findings is understanding why, despite widespread environmental awareness, the use of disposable bottles has not decreased significantly. As noted, the lack of adequate material conditions prevents the practical adoption of sustainable behaviors. Therefore, any effective strategy must operate integratively across three levels: individual, institutional, and economic.

Study Limitations

It is acknowledged that the use of convenience sampling and the small sample size (78 participants) limit the generalizability of the results. Additionally, the data obtained may be influenced by subjective perceptions or by the tendency to respond favorably, despite the survey's anonymity. Nonetheless, the observed trends are consistent with previous research on responsible consumption in academic contexts, which strengthens the study's validity.

Recommendations

- Strengthen sustainable infrastructure through the installation of water dispensers, segregated recycling bins, and clearly visible green points.
- Implement ongoing environmental education campaigns that promote consumption reduction and the use of reusable bottles.
- Design institutional incentives that recognize and reward sustainable practices among students and staff.

- Expand the research to include other faculties and universities, using mixed methodologies to deepen the analysis of behavioral change.
- Conduct periodic environmental awareness studies to monitor progress and guide policy adjustments.

Conclusión

This research demonstrates that the reduction of single-use plastic consumption within universities depends not only on individual environmental awareness, but also on the effective coordination of policies, education, and resources. Advancing toward more sustainable universities requires a collective and sustained commitment over time, supported by concrete actions that enable lasting behavioral and institutional change.

REFERENCES

Larrain, M., & Passel, S. (2021). Techno-economic assessment of mechanical recycling of challenging post-consumer plastic packaging waste. ELSEVIER, 170, 2. https://doi.org/10.1016/j.resconrec.2021.105607

Truelove, H. B. (2023). Reducing single-use plastic on college campuses. Reducing single-use plastic on college campuses. https://doi.org/10.1016/j.cresp.2023.100098

Willis, B., & Georgios Fytiano, G. (2022). Towards Microplastic Reduction Within Institutions. Towards Microplastic Reduction Within Institutions. https://doi.org/10.1007/s11270-022-05790-8