Proceedings of the 10th World Congress on Civil, Structural, and Environmental Engineering (CSEE 2025)
Barcelona, Spain - April 13 - 15, 2025
Paper No. ICEPTP 113
DOI: 10.11159/iceptp25.113

Reduction of Plastic Bags as Food Packaging in Djougou, Benin

Rika Hirao[1], Hidenori Harada[1]
[1]Graduate School of Asian and African Area Studies, Kyoto University
Address, 46 Yoshida-shimoadachicho, Sakyo, Kyoto 606-8501, Japan
hirao.rika.46d@st.kyoto-u.ac.jp; hidenori.harada.8v@kyoto-u.ac.jp

Extended Abstract

In Sub-Saharan Africa, where it is estimated that the demand for plastics will increase while waste management is not established [1], mismanaged plastic waste in urban areas have been polluting the soil, blocking the drainage, affecting the public health, and causing domestic animal deaths. Several countries, such as Benin, Burkina Faso, and Mali, take measures banning the import, export, and use of non-biodegradable plastic bags.

Previous studies have investigated the consumer preferences and disposal behavior of biodegradable plastics in the Global North. Environmental terms, including bioplastics and biodegradable plastics, were confusing for consumer (ex. Japan [2] and Ireland [3]), while consumers are favorable for bioplastics. For example, higher willingness to pay was responded for bio-PET than for conventional PET in Italy [4], and 38% and 29% of 127 respondents were 'moderately' or 'very' willing to pay extra for bioplastics in European countries [5]. Similarly, the segregation was inappropriately understood. Waste audit data in a university in the U.S. for 15 months showed 52% of PLA was in correct bins [6]. In Austria and Germany as well, biodegradable plastic bag waste was found in all types of waste stream (packaging waste, biowaste and residual waste) [7]. While these studies in the Global North aimed to contribute to the reduction of CO2 emissions by utilizing or recycling biodegradable plastics, studies aiming to contribute to the reduction of mismanaged plastic waste by reducing plastic bags utilization in Sub-Saharan Africa have been limited.

In Benin, non-biodegradable plastic bags are distributed for free when shopping [8], but they are planned to be controlled more strictly by the government. Based on previous surveys of the authors, in Djougou, a secondary city in Benin, 19.9% and 11.0% of plastic bags with and without handles utilized by households were utilized as primary packaging for cooked food. In fact, people utilized plastic bags as primary packaging for breakfast and snacks purchased at food stalls and eaten at home. Plastic bag waste with and without handles without food residues were reused 47.9% and 8.7%, respectively, while plastic bags with food residues were reused for 0.0%. Besides, residents were widely concerned about the potential health impacts associated with hot cooked food particularly in black plastic bags.

This study aims to examine the conditions for biodegradable plastic bags campaigns to reduce mismanaged plastic waste in Djougou, Benin. In particular, the household preferences of biodegradable plastic bags toward its utilization for food packaging and disposal behavior will be identified. Specifically, a questionnaire survey will be conducted with more than 200 households from December 2024 to January 2025. The questionnaire will be composed of at least five sections which concern the current non-biodegradable plastic bags, fossil resource-based biodegradable plastic bags, bio-based biodegradable plastic bags, bio-based biodegradable plastic bags with additive. Each section will investigate the willingness for food packaging utilization and waste management and the perceptions of potential health and/or environmental impacts by utilization and open dumping.

References

[1] Lebreton, L., & Andrady, A., "Future scenarios of global plastic waste generation and disposal," *Palgrave Communications*, vol. 5, no. 1, pp.1–11, 2019.
[2] Uehara, T., Nakatani, J., Tsuge, T., & Asari, M., "Consumer preferences and understanding of bio-based and biodegradable plastic," *J. Clean. Prod.*, vol. 417(March), pp. 137979, 2023.
[3] Neves, A. C., Moyne, M. M., Eyre, C., & Casey, B. P., "Acceptability and Societal Impact of the Introduction of Bioplastics as Novel Environmentally Friendly Packaging Materials in Ireland," *Clean Technol.*, vol. 2, pp.127–143, 2020.

[4] Marchi, E. De, Pigliafreddo, S., Banterle, A., Parolini, M., & Cavaliere, A., "Plastic packaging goes sustainable: An analysis of consumer preferences for plastic water bottles," *Environ. Sci. Policy*, vol. 114, pp.305–311, 2020.
[5] Leal, W., Lange, A., Bonoli, A., Saari, U. A., Voronova, V., Klõga, M., Suraj, S., Olszewski, K., Müller, D., Quevedo, D., & Barbir, J., "An assessment of attitudes towards plastics and bioplastics in Europe," *Sci. Total Environ*., vol. 755, pp. 142732, 2021.
[6] Morris, M., Stanton, A., Blomberg, T., & Hicks, A., "Human behavior outcomes at point of disposal of a biodegradable plastic cup at a U.S. -based university campus," *Resour. Conserv. Recycl.*, vol. 203, pp. 107412, 2024.
[7] Mhaddolkar, N., Tischberger-aldrian, A., Astrup, T. F., & Vollprecht, D., "Consumers confused "Where to dispose biodegradable plastics?": A study of three waste streams," *Waste Manag. Res.*, vol. 42(9), pp.776–787, 2024.
[8] Megan Valère, S. (2022, November 15). Prolifération des sachets en plastique non biodégradable au Bénin: sur les traces des hors-la-loi [Online]. Available : https://journalsantenvironnement.com/2022/11/15/proliferation-des-sachets-en-plastique-non-biodegradable-au-benin-sur-les-traces-des-hors-la-loi/