

Abstract

[Project Information]

Project Title : Effectiveness of Measures Using ICT and Other Tools for Preventing Household Food Waste

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[Abstract]

This research investigates the effectiveness of interventions to households on the reduction of avoidable food waste. The research consists of three subthemes each looking into the same topic with a different level of granularity.

Subtheme 1 is an analysis of the efficacy of existing policy measures taken by local authorities. This was conducted through several on-line questionnaire surveys to residents in chosen cities. 16 cities were chosen as representing those with administrative measures that are variable charging for general household waste collection, or separate collection for food waste, and those with four different types of awareness campaigns, as well as those without such measures as a control. In total, around 5000 responses from residents were gathered and analysed. Regarding administrative measures, statistically significant differences were not observed in the frequency of food wastage by the residents. On the other hand, a positive effect on food waste reduction behaviour was seen in cities with each awareness raising activity.

Subtheme 2 is an in-depth assessment of interventions involving refrigerator tidying tools, regular snapshots of fridge contents, food management smartphone app, and an originally developed behaviour recording app with a gamification aspect. This was investigated through two sets of panel studies, each involving about 125 individuals. The amount of food waste generated during the investigation period was automatically recorded via "smart bins" at home with a weight sensor connected on-line to the server. All interventions showed positive effects on food waste reduction, and further characteristics of each intervention were identified.

Subtheme 3 is the evaluation of some of the interventions mentioned above in a social experiment

setting. Case studies took place in Maizuru City, Kyoto Prefecture, and in Nagai City, Yamagata Prefecture. In each city, an experiment neighbourhood and a control neighbourhood were determined, with about 200 households each in Maizuru, and 500 each in Nagai. Composition analyses of household waste as well as questionnaire surveys were carried out once before and once during the intervention for both experiment and control neighbourhoods. It turned out that in either cities we could not establish a statistically significant effect of the interventions on the amount of food waste generated. Questionnaire results indicated that the interventions triggered initial awareness and behaviours such as checking the content of the refrigerator, however it is apparent that there are more factors involved in leading to a reduction in food waste that could be observed by sorting analyses.

[References]

- Maki Nonomura, Hajime Yamakawa, Tomoko Okayama, Kohei Watanabe, Yasuko Seta (2025) Impact of Municipal Household Pay-as-you-throw on Consumer Food Waste Behaviors and Attitudes in Japan, *Detritus*, Vol.31, pp.17-28, DOI:10.31025/2611-4135/2025.19496
- Yasuko Seta, Hajime Yamakawa, Tomoko Okayama, Kohei Watanabe, Maki Nonomura(2025) The Effects of Interventions Using Support Tools to Reduce Household Food Waste: A Study Using a Cloud-Based Automatic Weighing System, *Sustainability*, 17(14), 6392, DOI:10.3390/su17146392
- Nonomura, M. , H. Yamakawa, T. Okayama, K. Watanabe, Y. Seta (2023) "Promotion of "Use-Up Day" by local governments in Japan: Influence of waste reduction campaigns on household food waste behavior", *Proceedings SARDINIA 2023 –19th International Symposium on Waste Management and Sustainable Landfilling*, CISA Publisher, ISBN:9788862650335
- Okayama,Tomoko, Hajime Yamakawa, Kohei Watanabe, Maki Nonomura, Yasuko Seta (2023) "Effectiveness of goods and ICT for managing food in refrigerators on the reduction of avoidable food waste", *Proceedings of the 9th 3R International Scientific Conference (3RINCs)*
- Seta,Y., H. Yamakawa, T. Okayama, K. Watanabe, M. Nonomura (2023) "Interventions to Prevent Household Food Waste with Supporting Tools: Effects on Awareness and Food Waste Reduction", *Proceedings SARDINIA 2023 –19th International Symposium on Waste Management and Sustainable Landfilling*, CISA Publisher, ISBN:9788862650335
- Seta,Yasuko, H. Yamakawa, T. Okayama, K. Watanabe, M. Nonomura, (2023) "Interventions to Prevent Household Food Waste with Supporting Tools: Evaluation by Cloud-Based Weighing System", *Proceedings of the 9th 3R International Scientific Conference (3RINCs)*
- Watanabe,K., T. Okayama, H. Yamakawa, M. Nonomura, Y. Seta (2023) "Development and Investigation on an Effective Intervention Method with a "Nudge" Factor for Reducing Avoidable Food Waste from Households", *Proceedings SARDINIA 2023 –19th International Symposium on Waste Management and Sustainable Landfilling*, CISA Publisher, ISBN:9788862650335
- M. Nonomura, H. Yamakawa, T. Okayama, K. Watanabe, Y. Seta (2025) Impact of Food Waste Reduction Initiatives of Japanese Local Government on Household Food Waste Behaviors, *The 6th Symposium of the International Waste Working Group Asian Regional Branch*, B.3.3
- Y.Seta, H. Yamakawa, T. Okayama, K. Watanabe, M. Nonomura (2025) Behavioral change and prevention of household food waste through intervention utilizing support tools, *The 6th Symposium of the International Waste Working Group Asian Regional Branch*, B.3.3
- K. Watanabe, T. Okayama, H. Yamakawa, Y. Seta, M. Nonomura (2025) Evaluation of social experiments on prevention of household food waste -effectiveness of support tools focusing on refrigerators, *The 6th Symposium of the International Waste Working Group Asian Regional Branch*, B.3.1
- K. Watanabe, T. Okayama, H. Yamakawa, M. Nonomura, Y. Seta (2025) Are Best Before Dates the date for disposal? - Date distribution of discarded food in sorting analysis of household waste, *SARDINIA 2025 20th International Symposium on Waste Management and Sustainable Landfilling*

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