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SINTA 2

Food Consumption Management in Urban Households in Indonesia

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ABSTRACT

The most significant contributor to the increase in food waste in Indonesia is household sectors, mainly urban areas. One approach to reducing food waste is Food Consumption Management (FCM). However, the application of FCM at the household level is strongly influenced by various aspects. This study aims to determine the relationship between socio-economic aspects and food consumption management at the urban household level conducted in four major cities in Indonesia during the Covid-19 pandemic. Primary data was collected using a digital questionnaire distributed to households in Medan, Yogyakarta, Surabaya, and Denpasar. A total of 149 household respondents were obtained and analyzed descriptively. Meanwhile, the relationship between socio-economic aspects and the management of food consumption was analyzed using the Pearson correlation method. The results of this study reveal that household income and the number of family members are significant factors closely related to household food consumption management (FCM), especially in terms of providing, storing, and disposing of food waste.

Keywords: Food Consumption Management, Household, Food Waste, Pearson Correlation

INTRODUCTION

Food waste consists of edible or consumable food discarded before or after its expiration date (FAO, 2013; FAO, 2016; Linh, 2018). According to Marthinsen et al. (2016) in Hidayat et al. (2020), food waste is separated into two categories: preventable food waste (kitchen leftovers) and unavoidable food waste (food waste from consumers). The food waste problem has at least three adverse effects: (1) food waste has a negative effect on the economy because water, electricity, seeds, fertilizers, and other inputs used to produce food will be wasted if the food is wasted; (2) food waste contributes to food insecurity due to increased food costs due to waste; and (3) food waste also contributes to climate change due to increased greenhouse gas emissions caused by the decomposition of food waste that is disposed of in landfills that produce methane, which is more effective in trapping heat in the atmosphere than carbon dioxide (Sooklal et al., 2021).

Food waste can occur at the consumption stage in various places and levels, including households, traditional markets, public facilities such as hospitals and schools, and commercial areas such as restaurants and malls. The Food Waste Reduction Alliance (BSR, 2014) states that the most significant sector that produces food waste and contributes significantly is the household sector, with a waste contribution of 47% compared to other sectors. Most types of waste that can be found easily are organic waste which

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reaches 50% of all waste in Indonesia, followed by plastic waste, paper waste, metal, rubber and glass, and other waste (Setiawan, 2020; Sassi et al., 2016; Stenmarck et al., 2016). Hidayat et al. (2020) mention that food waste is an actual problem at the consumption stage in Indonesia and Indonesia is ranked second in the number of food waste in the world after Saudi Arabia. Organic waste produced by households in Indonesia consists of vegetables, fruit, various processed soybeans, foodstuffs in the form of rice, tubers, and corn, various animal proteins in the form of meat, fish, seafood, and eggs, as well as nuts and others (Humaniora, 2020). Nafiroh and Fuad (2019) mention that food waste is most likely to arise in households due to the consumption of food that is not spent, for example, when in a hurry to go to work or school. Therefore, food waste at the household level can increase if household consumption also increases. Therefore, it needs to be watched out for considering the condition of household expenditure which increased by 50% from 2009-2021, according to Susilowati et al. (2012) in Rusdiana and Maesya (2017).

Because households contribute substantially to food waste, addressing this issue must begin at the household level. Food Consumption Management (FCM), implemented at the household level, is one strategy for reducing food waste. According to Van Geffen et al. (2016), FCM is a set of behaviors to manage food supply at home, beginning with the preparation, processing till it is suitable for consumption, and storage as necessary. Even if there is a discrepancy between the amount purchased and consumed, the ideal condition would be for the household to consume all the food purchased. This aspect makes it imperative to implement FCM at the household level as a routine formed within the framework of the home, as opposed to merely making individual decisions.

FCM comprises six stages: planning, supply, preparation, serving and processing, storage, and disposal. Planning needs to be done as one of the basic steps to avoid food wastage and excessive stock, as well as ensuring that the food purchased is the material that will be used (Sucheran & Olanrewaju, 2021). Food supply encompasses all methods of obtaining it into the home, including buying and receiving it from friends, neighbors, and family. The food is then handled to maximize its usefulness throughout the preparation stage, such as by peeling fruit, chopping vegetable bases, and making other adjustments until the food is ready for processing or can be served right away (presentation and processing stage). Food that has not been processed or served can also be kept in storage. Storage, as Petty (2016) noted, is also necessary. Stock storage is essential to ensuring that food ingredients are properly preserved so they can be used for longer while preventing bacterial growth, resulting in food waste. Goods or inventory control may be done throughout the storage process, for instance, by using the FIFO (First in-First out) approach, which uses old stock first to minimize the potential of waste. Food will be thrown away if it can no longer be preserved or used. Food not consumed for numerous reasons, including expiration, leftovers, and others, is discarded in FCM. According to Zafar (2021), there are numerous more practical, effective, and ecological alternatives to direct disposal, such as donating food to the hungry, feeding livestock for industrial purposes, and composting.

Multiple internal and external factors influence the household implementation of FCM. Internal factors include the social and economic circumstances of the household's head and members. Differences in household characteristics will influence levels of awareness and knowledge regarding food waste (Zainal & Hassan, 2019). The Covid-19 pandemic is the exogenous factor impacting household consumption patterns and food consumption management and affecting people's behavior and activities, particularly food intake patterns. There has been a change in food preparation. For instance, households who once purchased in storefronts or marketplaces were

compelled to shop online (Fitriyani et al., 2021). The decline in people's income will also affect their consumption patterns, such as increasing the need for specific types of food and supplements, and medicines (Lidwina, 2020). The introduction of Large-Scale Social Restrictions (PSBB) to combat the spread of Covid-19 alters the pace of population migration, which, concerning FCM, will affect food storage and supply. This study analyzes the association between socio-economic factors and household food consumption management in metropolitan areas of Indonesia during the Covid-19 pandemic.

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METHODS

Socio-economic aspects are strongly linked to household food consumption management in Indonesia (Bogevska et al., 2021). This research was conducted in four major cities in Indonesia in mid-2021, involving 149 households determined through the quota sampling method in four major cities in Indonesia, including Medan, Yogyakarta, Surabaya, and Denpasar. Respondents who filled out the questionnaire were one of the husbands or wives who represented their respective households. The data analyzed is primary data obtained using a digital questionnaire because it adapts to the pandemic situation.

This study uses socio-economic variables, which include the age of the head of the household, the number of household members, household income and expenditures, and the education level of the head of the household (Bogevska et al., 2021) and the wife (Hadiningrat, 2020). Socio-economic aspects are thought to have a close relationship with food consumption management which is a latent variable composed of indicators (Schanes et al., 2018; Fami et al., 2019): planning, supply, storage, preparation, serving, and disposal. Each indicator has a statement item measured through a Likert Scale (1=strongly disagree, 2=disagree, 3=undecided, 4=agree, and 5=strongly agree).

Household socio-economic data were analyzed by the descriptive analysis method. Meanwhile, the relationship between socio-economic aspects with food consumption management was analyzed using the Pearson correlation method.

RESULT AND DISCUSSION

Food Consumption Management (FCM) is the management of routine purchases and consumption practices, reuse of food waste, and food storage to prevent food waste (Soorani & Ahmadvand, 2019). Good FCM can reduce food waste (Karunasena et al., 2021). Therefore, the correlation between FCM and socio-demographic factors will be important because it can encourage good FCM, thereby reducing food waste. FCM is reflected in six indicators: planning, supplying, preparing, serving and processing, storing, and disposal. At the same time, household socio-demographic factors consist of the age of the head of the family, the education of the head of the family, the education of the wife, the number of family members, and household income and expenses. The correlation between FCM and socio-demographic factors of urban households in Indonesia can be seen in Table 1.

Based on Table 1, it is known that planning in FCM does not correlate with the age of the head of the household, the education of the head of the household, the education of the wife, the number of family members, household income, and household expenses. Planning includes making menus, checking the availability of food ingredients in the refrigerator, compiling shopping lists for both types and quantities, and storing food ingredients. In addition, the storage has been done well by urban households with 80% achievement.

Supply in FCM refers to the utilization of stored food and the accessibility to food sales locations, including mobile vegetable sellers, food stalls, conventional markets, minimarkets, supermarkets, and online purchases. There is no correlation between supply and household income. However, the higher the income, the better

it is to provide home food items, mainly because such provision will be more accessible. This research concurs with Bender et al. (2021), who assert that income corresponds with FCM.

Table 1
Correlation between Food Consumption Management (FCM) and Socio-Demographic Factors of Urban Households in Java

Food Consumption Management	Correlation					
	Head of Household Age	Head of Household Education	Education of wife	Number of Household Members	Household Income	Household Expenses
Planning	-0.106	-0.130	-0.068	0.175	-0.097	-0.198
Supply	-0.076	-0.188	0.133	0.006	0.255*	0.081
Preparation	-0.017	-0.124	-0.034	0.026	-0.093	-0.078
Serving and Processing	-0.111	-0.026	-0.056	0.116	-0.036	-0.015
Storing	-0.099	-0.081	-0.056	0.309*	-0.055	-0.054
Disposal of Food Waste	0.097	-0.198	-0.062	0.311*	0.015	-0.011

Source: Primary data analysis, 2021

Preparation in FCM also does not correlate with all socio-demographic factors of urban households. However, urban households are good at using existing materials, adjusting the amount cooked with family members, and choosing consumed fruits and vegetables. As a result, the achievement of the preparation on FCM is 55%.

The correlation test results between the number of family members and food storage (part of food consumption management) show that both are statistically positively correlated, meaning that the larger the number of family members, the higher the food consumption management effort associated with food storage. The larger the household members, the more food needs are needed to meet the household's requirements. Public awareness and knowledge of food safety are indicated by efforts to check expiration dates and provide labels on food ingredients for which no expiration date information exists.

However, a paradox occurs when knowledge of the expiration date also encourages people to store food more often in food storage cabinets (including refrigerators or freezers). Then, when will consume the food, it turns out that it is approaching the consumption period or expiration date, and the tendency is not to consume them because of excessive concerns about the safety of these foods when consumed (Grunert, 2005; Tsiros & Heilman, 2005; and Evans, 2012). Interestingly, people who use multiple methods to identify food safety (with labels, expiry dates, and food aromas) tend to classify food more often as unconsumable and end up as food waste (Parizeau et al., 2015).

The correlation between the number of family members with food disposal and food consumption management is supported by statistical evidence. In general, larger households cook more food for the family daily, increasing the likelihood of food waste. In practice, food management at the disposal stage does not always result in wasted food being discarded. Before it becomes leftovers, it can be fed to livestock, made into compost or natural fertilizer, and distributed to family members, neighbors, and friends. Awareness to manage food at the disposal stage is anticipatory, with responders attempting to limit the likelihood of food waste by transferring it to others (relatives, neighbors, friends).

Many campaigns seek to increase public awareness and motivation to appreciate food. Increasing awareness and morality in society has been studied, including by Barone et al. (2019) and Aydin

& Yildirim (2021), which stated that the practice of wasting food has been recognized by the community as the wrong action and should not be done. Mattar et al. (2018) stated that people in rural areas tend to be more religious and more often find the practice of distributing food to neighbors around their homes. Regarding efforts to convert wasted food into compost, it is in line with the findings of Vargas-Lopez et al. (2021) and Quested et al. (2011) that vegetable and fruit waste dominates the type of food that is wasted in the majority of households. Food waste from fruits and vegetables is readily biodegradable and can be used as a natural fertilizer.

CONCLUSION

Household income and the number of family members are key factors closely correlated to household food consumption management (FCM), especially regarding providing, storing, and disposing of food waste. Households with higher incomes tend to have better food supply than lower-income households. In addition, the more the number of household members, the better the food storage and the more food waste is discarded.

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REFERENCES

Aydin, A. E., & Yildirim, P. (2021). Understanding food waste behavior: The role of morals, habits, and knowledge. *Journal of Cleaner Production*, *280*, 124250. https://doi.org/10.1016/j.jclepro.2020.124250

Barone, A. M., Grappi, S., & Romani, S. (2019). "The road to food waste is paved with good intentions": When consumers' goals inhibit the minimization of household food waste. *Resources, Conservation and Recycling*, *149*(October 2018), 97–105. https://doi.org/10.1016/j.resconrec.2019.05.037

Bender, K. E., Badiger, A., Roe, B. E., Shu, Y., & Qi, D. (2021). Consumer behavior during the COVID-19 pandemic: An analysis of food purchasing and management behaviors in U.S. households through the lens of food system resilience. *Socio-Economic Planning Sciences*, *82(A)*, 101107. https://doi.org/10.1016/j.seps.2021.101107

Bogevska, Z., Berjan, S., Bilali, H. EL, Sadegh Allahyari, M., Radosavac, A., & Davitkovska, M. (2021). Exploring food shopping, consumption and waste habits in North Macedonia during the COVID-19 pandemic. *Socio-Economic Planning Sciences*, *August*, 101150. https://doi.org/10.1016/j.seps.2021.101150

BSR. (2014). Analysis of U.S. Food Waste Among Food Manufacturers, Retailers, and Wholesalers. *The Food Waste Reduction Alliance*, 1–24.

Denny Eka Setiawan. (2020). *Menuju Indonesia Bersih dan Bebas Sampah 2025*. Mitra Bentala. https://mitrabentala.org/menuju-indonesia-bersih-dan-bebas-sampah-2025/

Evans, D. (2012). Beyond the Throwaway Society: Ordinary Domestic Practice and a Sociological Approach to Household Food Waste. *Sociology*, *46*(1), 41–56. https://doi.org/10.1177/0038038511416150

Fami, H. S., Aramyan, L. H., Sijtsema, S. J., & Alambaigi, A. (2019). Determinants of household food waste behavior in Tehran city: A structural model. *Resources, Conservation and Recycling*,

143(December 2018), 154–166. https://doi.org/10.1016/j.resconrec.2018.12.033

FAO. (2013). Food wastage footprint. In *Fao*. www.fao.org/publications

FAO. (2016). Save Food : Global Initiative on Food Loss and Waste Reduction| Key facts on food loss and waste you should know ! Infographics. *Food and Agriculture Organization of the United Nations*, 01–02. http://www.fao.org/save-food/resources/keyfindings/en/

Fitriyani, I., Rachman, R., & Sumbawati, N. (2021). Menyikapi Perubahan Pola Konsumsi Masyarakat Pada Masa Pandemi Covid-19 Responding To Changing Patterns of Community Consumption During the Covid-19 Pandemic. *Jurnal Pengabdian Kepada Masyarakat*, *1*(1), 20–24.

Grunert, K. G. (2005). Food quality and safety: Consumer perception and demand. *European Review of Agricultural Economics*, *32*(3), 369–391. https://doi.org/10.1093/eurrag/jbi011

Hadiningrat, G. (2020). *Women's Role in Food Waste Management in Indonesia (Study Case in Bandung)*. *31*(Ismophs 2019), 31–35. https://doi.org/10.2991/ahsr.k.201203.006

Hidayat, S.I., Ardhany, Y.H. dan Nurhadi,E. 2020. Kajian Food Waste untuk mendukung Ketahanan Pangan. Agriekonomika Voulume 9 Nomor 2 171-182. https://doi.org/10.21107/agriekonomika.v9i2.8787

Humaniora. (2020). *Wow, 1 Orang Indonesia Hasilkan Sampah Makanan 300 Kg Per Tahun*. Media Indonesia. https://mediaindonesia.com/humaniora/282977/wow-1-orang-indonesia-hasilkan-sampah-makanan-300-kg-per-tahun

Karunasena, G. G., Ananda, J., & Pearson, D. (2021). Generational differences in food management skills and their impact on food waste in households. *Resources, Conservation and Recycling*, *175*(September), 105890. https://doi.org/10.1016/j.resconrec.2021.105890

Lidwina, A. (2020). Perubahan Pola Konsumsi Masyarakat Selama Pandemi Covid-19. *Databoks Data Stories*, 2020. https://databoks.katadata.co.id/datapublish/2020/06/29/perubahan-pola-konsumsi-masyarakat-selama-pandemi-covid-19

Louise Petty. (2016). *17 Ways to Reduce Food Waste in Your Restaurant*. High Speed Training. https://hub.highspeedtraining.co.uk/restaurant-food-waste/

Mattar, L., Abiad, M. G., Chalak, A., Diab, M., & Hassan, H. (2018). Attitudes and behaviors shaping household food waste generation: Lessons from Lebanon. *Journal of Cleaner Production*, *198*, 1219–1223. https://doi.org/10.1016/j.jclepro.2018.07.085

Nafiroh, F., & Fuad, I. L. (2019). ESTIMASI FOOD WASTE BERAS RUMAH TANGGA DI PEMUKIMAN INDUSTRI (Studi Kasus di Desa Banjarkemantren Kecamatan Buduran Kabupaten Sidoarjo). *Agromix*, *10*(1), 30–43. https://www.mendeley.com/catalogue/11f518ca-c28c-38d4-970c-1152c8baf013

Nguyen Khanh Linh. (2018). Food waste management in the hospitality industry Case study: Clarion Hotel Helsinki. *Haaga-Helia University of Applied Sciences*, 1–63. https://www.theseus.fi/bitstream/handle/10024/142528/NGUYEN_KHANH LINH.pdf?sequence=1&isAllowed=y

Parizeau, K., von Massow, M., & Martin, R. (2015). Household-level dynamics of food waste production and related beliefs, attitudes, and behaviours in Guelph, Ontario. *Waste Management*, *35*, 207–217. https://doi.org/10.1016/j.wasman.2014.09.019

Quested, T. E., Parry, A. D., Easteal, S., & Swannell, R. (2011). Food and drink

waste from households in the U.K. *Nutrition Bulletin*, *36*(4), 460–467. https://doi.org/10.1111/j.1467-3010.2011.01924.x

Rusdiana, S. dan Maesya, A. 2017. Pertumbuhan Ekonomi dan Kebutuhan Pangan di Indonesia. Agroekonomika Volume 6 Nomor 1 12-25. DOI: http://dx.doi.org/10.21107/agriekonomika.v6i1.1795

Salman Zafar. (2021). *Waste Management in the Food Processing Industry*. BioEnergy Consult. https://www.bioenergyconsult.com/waste-management-in-food-processing-industry/

Sassi, K., Capone, R., Abid, G., Debs, P., El Bilali, H., Bouacha, O. D., Bottalico, F., Driouech, N., & Terras, D. S. (2016). Food Wastage By Tunisian Households. *Agrofor*, *1*(1). https://doi.org/10.7251/agreng1601172s

Schanes, K., Dobernig, K., & Gözet, B. (2018). Food waste matters - A systematic review of household food waste practices and their policy implications. *Journal of Cleaner Production*, *182*, 978–991. https://doi.org/10.1016/j.jclepro.2018.02.030

Sooklal, R., Buthelezi, D., Oelofse, S., Matinise, S., Mohapi, T., Mabatle, K., & Phakoe, K. (2021). Food Waste Prevention & Management: A guideline for South Africa. *Department of Environment, Forestry and Fisheries The Council for Scientific and Industrial Research*, 38.

Soorani, F., & Ahmadvand, M. (2019). Determinants of consumers' food management behavior: Applying and extending the theory of planned behavior. *Waste Management*, *98*, 151–159. https://doi.org/10.1016/j.wasman.2019.08.025

Stenmarck, Å., Jensen, C., Quested, T., Moates, G., Cseh, B., Juul, S., Parry, A., Politano, A., Redlingshofer, B., Scherhaufer, S., Silvennoinen, K., Soethoudt, H., Zübert, C., & Östergren, K. (2016). Estimates of European food waste levels. In *IVL Swedish Environmental Research Institute - EU FUSIONS* (Issue April). https://doi.org/10.13140/RG.2.1.4658.4721

Sucheran, S., & Olanrewaju, O. A. (2021). Food waste management of restaurants in Kwazulu-Natal, South Africa. *Proceedings of the International Conference on Industrial Engineering and Operations Management*, 58–69.

Tsiros, M., & Heilman, C. M. (2005). The Effect of Expiration Dates on the Purchasing Behaviour for Grocery Store Perishable Categories. *Journal of Marketing*, *69*(2), 114–129.

Van Geffen, L., Van Herpen, E., & Van Trijp, H. (2016). Causes & Determinants of Consumers Food Waste. *Eurefresh.Org*, *20*, 26. https://eu-refresh.org/causes-determinants-consumers-food-waste

Vargas-Lopez, A., Cicatiello, C., Principato, L., & Secondi, L. (2021). Consumer expenditure, elasticity and value of food waste: A Quadratic Almost Ideal Demand System for evaluating changes in Mexico during COVID-19. *Socio-Economic Planning Sciences*, *March*, 101065. https://doi.org/10.1016/j.seps.2021.101065

Zainal, D., & Hassan, K. A. (2019). Factors Influencing Household Food Waste Behaviour in Malaysia International Journal of Research in Business, Economics and Management. *International Journal of Research in Business, Economics and Management*, *3*(3), 56–71.