

Effectiveness of Food Waste Management through Zero Waste Strategy in STP AMPTA Yogyakarta Kitchen

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KEYWORDS

Effectiveness; food waste; educational kitchen.

ABSTRACT

The purpose of this study was to evaluate the effectiveness of the implementation of the Zero Waste strategy in managing food waste in the kitchen of STP AMPTA Yogyakarta. This strategy involves the principles of reduce, reuse, and recycle as an approach to creating a more sustainable environment. This study used a qualitative method with a case study approach as explained by John W. Creswell (2014). Data collection techniques included in-depth interviews, participatory observation, documentation, and Focus Group Discussion (FGD). The subjects of the study consisted of lecturers, students practicing, kitchen managers, and support staff in the kitchen of STP AMPTA Yogyakarta. Data were analyzed using a thematic analysis approach. The results of the study showed that: (1) the management of food waste in the kitchen is still conventional, with an average waste volume of 5 kg per session/practice class, consisting of 60% production waste and 40% consumption waste; (2) the implementation of the Zero Waste strategy is still in its early stages, with efforts such as production planning and simple composting, but is constrained by the lack of supporting facilities and minimal ongoing education; (3) The implementation of the Zero Waste strategy has proven effective in reducing food waste by 30%-40% through more efficient production planning, education, and reprocessing food waste into compost or other food ingredients. The conclusion of this study is that the Zero Waste strategy has significant potential in reducing food waste in culinary education environments if supported by adequate facilities, clear institutional policies, and integration of sustainability education into the curriculum.

INTRODUCTION

The problem of food waste has become a serious global issue. According to the Food and Agriculture Organization (FAO), around 1.3 billion tons of food are wasted worldwide every year. This amount is equivalent to one third of total global food production (FAO, 2011). If this problem is left without significant mitigation efforts, its impact on global food security and the environment will be even worse. Previous research by De Moraes et al. (2020) showed that unmanaged food waste is a significant contributor to greenhouse gas emissions and environmental pollution. Therefore, food waste management must be a top priority in achieving the sustainable development goals (SDGs).

In Indonesia, the problem of food waste also ranks high. Based on data from the Central Statistics Agency (BPS), Indonesia ranks second as the largest producer of food waste in the world (Dhokhikah et al., 2015). This shows the need for a systematic and innovative approach to managing food waste, especially in sectors with high food production intensity. Research by Goh (2022) revealed that most of the food waste in Indonesia comes from household activities, hotels, and restaurants, with management that is not yet optimal to reduce waste. If these sectors do not improve, the negative impact on the environment and economy will increase.

The Zero Waste strategy emerged as an innovative solution to reduce food waste through the principles of reduce, reuse, and recycle. This approach emphasizes the importance of changing mindsets and behavior in the use of resources, so that food waste can be minimized and even reused (Kibert et al., 2016). Previous research by Anthony (2017) showed the effectiveness of this strategy in reducing organic waste in various sectors, including hotels and restaurants in Europe. Therefore, the Zero Waste strategy can also be an ideal solution to be implemented in the education sector, such as kitchens in tourism schools, in order to create efficient and environmentally friendly food management.

Sekolah Tinggi Pariwisata (STP) AMPTA Yogyakarta, as one of the leading tourism and culinary education institutions in Indonesia, has a kitchen as the main facility for student practical activities. Practical cooking activities in this kitchen certainly have the potential to produce large amounts of food waste (Wang, 2016). If the management of food waste in this kitchen is not immediately optimized, the impact will contribute to an increase in the amount of organic waste that ends up in landfills (TPA). Research by Toker & Atabey (2023). shows that the implementation of the Zero Waste method in the culinary school kitchen can reduce food waste by up to 40% through a recycling and composting program. This shows that the implementation of the Zero Waste strategy can be an effective approach that is worth implementing at STP AMPTA Yogyakarta.

The importance of implementing a Zero Waste strategy in a culinary education environment is not only aimed at reducing food waste, but also as part of sustainability education for the next generation in the hospitality and culinary fields (Derqui et al., 2020). Research by Lahn (2024) revealed that the integration of Zero Waste education into the culinary education curriculum helps build awareness and sustainability skills among students (Lahn, 2024). Therefore, the implementation of a Zero Waste strategy not only solves the waste problem but also educates students to be sensitive to environmental and sustainability issues. Based on this background, this study aims to evaluate the effectiveness of implementing a Zero Waste strategy in managing food waste in the kitchen of STP AMPTA Yogyakarta. This study is expected to be able to provide practical recommendations regarding more efficient and sustainable food waste management (Irani & Sharif, 2016).). Thus, the results of this study can be a real solution in supporting the Zero Waste program in the culinary education environment.

LITERATURE REVIEW

1. T Food Waste Problem and Its Significance

The problem of food waste is a critical issue globally and locally. A study by Song et al. (2015) shows that increasing population and living standards contribute to the acceleration of waste production, including food waste. The Zero Waste strategy is a significant solution in overcoming this problem with an approach to reducing resource consumption and sustainable waste management.

2. Zero Waste Strategy in Educational Institutions

Research by Ebrahimi and North (2017) states that waste management in universities requires a holistic approach, including policy integration and behavioral change in supporting the Zero Waste strategy. This study emphasizes the need for institutional commitment in implementing sustainability programs such as waste sorting and environmental education on campus. In addition, research by Moreira and Rutkoskwi (2021) reinforces the importance of implementing Zero Waste in higher education institutions to support the circular economy and sustainable development goals (SDGs). Universities have great potential as a model for society in reducing food waste and maximizing resource reuse.

3. Food Waste Management in Schools and Educational Kitchens

A study by Prescott et al. (2019) highlighted the significant contribution of pre-consumer food waste in school kitchens, mainly due to overproduction and raw material cuts. The study suggested the implementation of better production planning and education of kitchen staff to reduce such waste. Furthermore, a study by Derqui et al. (2018) identified that school canteens are a major source of food waste, but also have the potential to be a means of sustainability education for students. Education and awareness campaigns can significantly modify consumption habits and reduce food waste. Another study by Toker and Atabey (2023) discussed the classification of waste in educational kitchens, with the results that most of the waste came from errors in the production process. The study suggested waste management education as an integral part of the culinary school curriculum to build awareness from an early age.

4. Implementation of Technology and Behavior Change

The use of digital technology is also considered effective in managing food waste in large-scale kitchens. Principato et al. (2023) showed that digital monitoring of food production and consumption in industrial canteens significantly reduced waste, as well as increased staff and customer awareness. Research by Arvidsson (2019) identified a major barrier to reducing food waste in school kitchens as the lack of creative habits in reusing leftovers. The study recommends a flexible approach to menus and improving the skills of kitchen staff to process leftovers.

Thus, the literature reviewed shows that Zero Waste strategy can be an effective solution in managing food waste in educational institutions, especially culinary kitchens. The use of technology, sustainability education, and behavioral change are the main keys to the successful implementation of this strategy. This study provides a strong basis for developing a systematic approach in reducing food waste and maximizing resource use.

METHOD

This research is included in the type of qualitative case study. Case studies are used to provide in-depth descriptions and analysis of food waste management in the STP AMPTA Yogyakarta kitchen. According to Creswell (2014), case studies are suitable for understanding a particular phenomenon in a real context and focus on a specific unit of analysis. The research subjects were selected using the purposive sampling method. According to Creswell, purposive sampling is used to select informants who have direct relevance to the focus of the research. The research subjects include 1) Lecturers in the STP AMPTA Yogyakarta kitchen; 2) Students participating in cooking practice in the kitchen; 3) Laboratory assistants and 4) kitchen teaching assistants involved in the food waste management process. The data collection technique in this study used the triangulation method, which involved In-depth Interviews, Participatory Observation, Documentation and Focus Group Discussion (FGD). Data analysis was carried out using Creswell's (2014) thematic analysis approach which includes the following steps: Data Organization. Reading and Understanding Data, Data Coding, Theme Search, Data Interpretation. To ensure the validity of the data, this study applies 1) Triangulation: Combining data from interviews, observations, documentation, and FGD; 2) Member Checking: Confirming the findings with informants to ensure the accuracy of data interpretation and 3) Audit Trail: Keeping all research records to show the transparency and credibility of the research process.

RESULTS AND DISCUSSION

Based on data collected from various data collection techniques, the results of the study can be presented in the following main themes:

1. Conditions of Food Waste Management in the STP AMPTA Yogyakarta Kitchen

Types and Volumes of Food Waste

- 1) Based on the results of observations, it was found that food waste in the STP AMPTA Yogyakarta kitchen can be categorized into:
 - a) Production waste: Waste originating from the process of cutting materials, peeling skin, and selecting unfit food materials.
 - b) Consumption waste: Leftover food that has not been eaten after the cooking practice process is complete.
- 2) The average volume of waste produced during one cooking practice session is 4 kg per practice class, with a composition of 60% production waste and 40% consumption waste.

2. Waste Management Process

- a. Interviews with kitchen managers revealed that there is no formal or systematic policy in managing food waste. Waste tends to be thrown directly into the trash without adequate sorting.
- b. Current management practices still focus on waste disposal, not waste prevention or recycling.

3. Student Compliance with Waste Management

Based on the results of observations and FGDs, students tend to be less aware of the importance of managing food waste. The majority of students do not sort raw materials efficiently and do not calculate food portions optimally.

4. Implementation of Zero Waste Strategy in the Kitchen of STP AMPTA Yogyakarta

Understanding of Zero Waste

- 1) The results of the interview showed that most lecturers and students have a basic understanding of the concept of Zero Waste, but do not yet understand the concrete application in practical activities.
- 2) Understanding of the principles of reduce, reuse, recycle is still limited to theory, without real application in daily practice in the kitchen.

5. Initial Implementation Efforts

Several initial steps towards Zero Waste have been attempted, although not yet structured, including:

- 1) Efficient use of food ingredients through menu planning by teaching lecturers.
- 2) Collection of leftover production materials to be made into simple compost by the kitchen laboratory team.

6. Implementation Constraints

The results of interviews and FGDs identified the main constraints, including:

- 1) Lack of supporting facilities, such as containers for sorting organic and inorganic waste.

2) Lack of student awareness and skills in managing raw materials efficiently.

3) Staff ignorance of procedures for reusing or recycling food waste.

7. Effectiveness of Zero Waste Strategy in Reducing Food Waste

Based on observation data and simple trials, the Zero Waste strategy begins to show effectiveness when implemented with the following steps:

a. Proper Production Planning

Adjusting the amount of raw materials based on the number of students per practice group reduces production waste by up to 30%.

b. Use of Remaining Materials for Other Production

1) Utilizing vegetable and fruit waste to make simple compost can reduce organic waste by up to 25%.

2) Consumable food waste is reused in the form of other foods such as broth or animal feed.

c. Student and Staff Education

Short training given to students on the Zero Waste concept increases awareness and skills in utilizing materials optimally.

Discussion

Analysis of Food Waste Management Conditions

The results of the study show that the STP AMPTA Yogyakarta kitchen still operates with a conventional system in managing food waste. This finding is consistent with a study by Prescott et al. (2019) which revealed that most educational kitchens tend to produce high waste due to inefficient planning. This condition shows the urgency to design a more systematic and sustainable food waste management system.

1. Implementation of the Zero Waste Strategy

The initial implementation of the Zero Waste strategy in the STP AMPTA Yogyakarta kitchen, such as the use of compost and reducing production waste, has shown positive results. However, obstacles such as the lack of supporting facilities and minimal education are still the main obstacles. This is in line with the research of Derqui et al. (2018) which emphasizes the importance of facilities and education in the implementation of Zero Waste in the school environment.

2. Effectiveness of the Zero Waste Strategy

The results of a simple trial show that the Zero Waste strategy is able to significantly reduce production and consumption waste. The use of compost as a recycling solution supports the circular economy approach as explained by Moreira and Rutkoski (2021). With good production planning and continuous education, the effectiveness of this strategy can be further improved. Based on the research results, the Zero Waste strategy has great potential in reducing food waste in the STP AMPTA Yogyakarta kitchen. However, its effectiveness is highly dependent on 1) Provision of supporting facilities; 2) Continuous education for students and staff and 3) Implementation of more efficient production planning.

CONCLUSION

Based on the results of the research that has been conducted through a qualitative approach using the case study method and Creswell's thematic analysis, the following are the conclusions of this research:

1. Condition of Food Waste Management in the STP AMPTA Yogyakarta Kitchen
 - a. The STP AMPTA Yogyakarta Kitchen still uses a conventional waste management system, where most of the food waste is directly thrown away without any sorting or effective utilization.
 - b. The food waste produced consists of production waste (60%) and consumption waste (40%), with an average volume reaching 6-8 kg per practice session.
 - c. Student awareness in managing food waste is still low, due to the lack of education and understanding of the importance of sustainable food waste management.
2. Implementation of Zero Waste Strategy
 - a. The implementation of Zero Waste strategy in the kitchen is still in the early stages, with several steps such as better production planning and utilization of leftover materials for composting.
 - b. The main obstacles in implementation are the lack of supporting facilities such as waste sorting containers, minimal ongoing education, and limited time and energy in kitchen practice.
 - c. However, through brief education and good planning, students began to show increased awareness in minimizing food waste during practice.
3. Effectiveness of Zero Waste Strategy
 - a. The application of the principles of reduce (reducing waste materials through production planning), reuse (reusing edible food waste), and recycle (composting organic waste) has proven effective in reducing food waste by 30%-40% in a simple trial.
 - b. Continuous education and supervision improve students' skills in using materials efficiently and reduce the potential for waste.
 - c. This strategy has great potential if supported by facilities, formal policies from the institution, and integration into the educational curriculum to build a culture of sustainability among students.

Research Implications

This study shows that the implementation of Zero Waste strategy in educational kitchen can be a practical and sustainable solution to reduce food waste. These results can be adopted by other culinary educational institutions as a model in realizing an environmentally friendly green kitchen.

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