

App-Assisted Meal Planning Solutions for Food Waste Reduction and Cost Savings among Filipino Families

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ABSTRACT

This quantitative study examines the impact of app-assisted meal planning on food waste reduction and cost savings among Filipino families using secondary data from UNEP's Food Waste Index and DOST-FIES (2023). Employing descriptive, economic, comparative, and projection analyses, the study estimates potential household benefits of adopting meal planning applications. Results reveal that Filipino households generate approximately 2.95 million tons of food waste annually, leading to substantial economic losses. The analysis suggests that mobile meal planning apps could reduce household food waste by 15-25%, translating to average annual savings of around Php 2,000 per family. The study recommends future research using primary data to validate these findings and determine the most effective implementation strategies for app-based food waste reduction.

INTRODUCTION

Food waste is a key global challenge that has serious economic, environmental, and social consequences. The United Nations Environment Programme (UNEP) estimates that one-third of all food produced globally is wasted, which is clearly contributing to greenhouse gas emissions as well as depletion, while millions of people face food insecurity all over the world (UNEP, 2024).

In the Philippines, household food waste remains an increasingly pressing concern despite the recent progress. Nationally, it is 2.95 million tons, or 26 kilograms per household a year, 65.35% lower than the 9.33 million tons/year in 2021 (UNEP Food Waste Index, 2024). Although the advancements of figures still count for huge economic losses and damage in a country where 11.8 percent of all Filipino families, or approximately three million households, during the fourth quarter of the year 2022 have experienced hunger (Social Weather Stations, 2023).

In Filipino households, there are identified primary types of food waste that are considered well-documented, such as leftovers and uneaten foods, vegetable peelings, and trimmings. Among the top three most wasted foods are rice, meat, and vegetables, with larger household meal sizes, more people in the home, or higher wealth contributing to waste. (DOST, 2023). This means that the larger the family size, the more family members, and the ones who have money will prepare more food. These waste patterns tell us that there must be better meal planning control within households since it could significantly reduce food waste.

Despite people's knowledge of how much food is wasted in Filipino households and the growing availability of mobile meal planning applications that can help people plan their meals, a crucial gap in research examining the potential impact of app-assisted meal planning solutions specifically for Filipino families still exists. Many international studies have shown the effectiveness of digital meal planning tools in reducing food waste and costs; however, in the Filipino context, it remains unexplored quantitatively. Researches today mainly focuses on how much food is wasted and what kind of food is usually thrown away but does not explore enough on how technology like mobile meal planning applications can be a tool to solve or reduce waste. Furthermore, there's not enough information about how Filipino families might be able to reduce expenses and save money by using these meal planning applications to help organize their meals and avoid wasting food.

This gap is particularly important given that more Filipinos today are using mobile phones and there is a clear need to solve problems such as food waste and tight household budgets; research has not explored how meal planning apps might help. If people have a full understanding of the potential impact of app-assisted meal planning, it could inform policymakers to create better plans and inspire developers to build more useful applications. This study investigates the possible effects of app-assisted meal planning solutions on lowering food waste and creating cost savings among Filipino households using mainly secondary data. It aims to ascertain the cost savings

possible through digital meal planning interventions, identify typical types of abandoned food and prevalent disposal habits, and assess the present level of food waste in Filipino households and its economic ramifications. Additionally, it assesses the usefulness of such solutions in real-world situations and pinpoints crucial elements for their effective application in the Philippine setting. The results, however, might not accurately reflect the distinctive cultural customs and economic circumstances of the Philippines because the study mostly draws from foreign research rather than direct data collected from Filipino homes.

This study addresses the intersection of three critical areas; Filipino household economic, food waste management and technology adoption. Analyzing secondary data specific to Filipino contexts and the integration of international proofs on digital application effectiveness will provide an evidence-based framework towards greater understanding how app-assisted meal planning could be tailored and applied in the Filipino contexts. This contribution is crucial given the widespread use of cellphones penetration in the Philippines and the needs to address both food waste and household budget constraints through technology-driven solutions. Moreover, this study will be one of the first researches in the Philippines to project the positive impact of these mobile planning applications towards food waste problem and Filipino households' economic status.

Research Objectives

The primary objective of this research is to explore the potential impact of app-assisted meal planning solutions towards food waste reduction and cost savings among Filipino families through analyzing secondary data. The following below are the specific objectives of the study;

1. To examine the current extent of Filipino food waste and its economic impact in Filipino households.
2. To evaluate the types of food and patterns of food disposal that are usually observe in Filipino families.
3. To determine the potential cost savings that can be achieve by Filipino families through app-assisted meal planning interventions.
4. To assess the practical and potential benefits of implementing digital meal planning solutions towards Filipino families.
5. To explore the important factors for successful implementation of meal planning apps in the Filipino context

LITERATURE REVIEW

Food waste has been one of the global issues that affect food security, environmental sustainability, and household economics. In recent years technology has improved a lot. The use of it, particularly mobile applications, has been explored as a way of addressing the issue. In the Philippines, where food insecurity coexists with a high level of household waste, the importance of understanding how app-assisted tools can reduce food and cost savings is crucial. While much research has examined mobile food planning apps in developed countries, there is limited study on their effectiveness in the context

of Filipino households. This review will explore existing literature on app-assisted meal planning, managing food waste, and strategies for cost-saving to provide a basis for the present study.

Food waste in the Philippines has been one of the issues that have been extensively documented by different research institutions. Using data from 20,151 households in the Philippines, the DOST-FNRI conducted a study and found that Filipino households' waste has an average of 49.6 grams of rice, with a standard deviation of 4.7 grams. For protein foods like meat, fish, and poultry, the average intake was around 7.5 grams with a variation of 0.5, and vegetables were significant amounts daily (DOST-FNRI, 2022). The recognized wasted food not only represents problems for the environment but also substantial economic losses.

Certain factors were recognized that contributed to this waste: larger meal portion sizes for a bigger household and larger meal preparation for a greater number of household members and families who are in higher societal status. (DOST, 2023). Moreover, G. Angchua et al. (2019), noted that food waste generated by customers themselves was also one of the factors. Their awareness of portion sizes and the menu can all be related to how much food was excessively ordered.

Additionally, drivers of food waste include the change of dietary plans in which some people choose those products with a short life, such as dairy and eggs, with fewer meat and wheat products, and the consumption of these products led to a greater rate of wasted food. (Vermeulen SJ et al., 2020). On the other hand, cultural norms and social practices are deeply rooted within us and permeate nearly everything we do on a daily basis, which influences the way we buy groceries, prepare food, share food, and, unfortunately, just waste it. (Su & Hynie, 2011, underscored; Paatlan et al., 2024).

It is supposed that 33.33% of food waste was produced in the world every year but never made it on our dinner plates, causing serious food waste. In fact, the Philippine Institute for Development Studies (PIDS) discovered that there are around 2.175 tons of daily food waste produced in the Philippines, which becomes a contributor to waste management problems and environmental sustainability. The figure also represents a substantial economic loss because the resources of food supply are also wasted. (Barrion et al., 2023).

According to the Sustainability Solutions Exchange (2023), the Philippines experienced hunger; however, food waste is still present, and more than 60% of that waste comes from households. The value of rice waste could have fed at least 3.281 million Filipinos, highlighting the scale of the problem. (DOST-FNRI, 2022) Creating weekly or daily menus to avoid buying too much, proper food storage of supplies, usage strategies to minimize food spoilage, promoting food preservation of fruits and vegetables, and reduction of serving sizes are great recommendations for avoiding food waste (Barrion et al., 2023).

Moreover, M.A. Van Rooijen et al. (2024) mentioned that careful meal planning is an effective way to reduce household food waste. For Reynolds et al. (2019), they found out nutritional guidelines at schools and informational campaigns are good ways for waste reduction.

Meal planning applications in the global market have grown significantly. Various studies have shown good results on how meal planning applications demonstrate their effectiveness towards the reduction of waste and costs. Digital applications are likely helpful to parents in planning their meals and preparing healthy foods for their families as well as in addressing various challenges faced by families who are busy (National Center for Biotechnology Information, 2021). Cane & Parra (2020) found out that digital platforms are important in fighting food waste. They help people avoid specific products from being considered unimportant for human consumption. These platforms not only increase ease of use for individuals managing their diets but also empower nutritionists to better support their clients and physicians with managing personalized health protocols (Albetino et al., 2024).

Additionally, technological use such as cellphones and the Internet of Things shows a potential solution in tackling food waste, which has been introduced in some urban areas. Particularly, a user's personal smartphone or device shows potential as a bridge to act as an intervention in making decisions such as with food shopping and planning. (Castro et al., 2023). For Future Market Insights (2025), market applications for food waste are growing fast with a variety of applications that can assist the various needs and interests of every individual. Some applications will support users in reducing food waste at home since their applications will provide guidelines towards effective meal planning, food storage, and how to effectively use leftovers.

In the study conducted by Garvin TM et al. (2019) about some mobile applications as a meal planning and preparation tool for low-income families, the result showed that preparation behaviors are an inherent practice that is driven by habit. Moreover, it is something that is influenced by family preference and food costs. Integrating meal planning applications into users' routines would create new ways of preparing easy and less costly but healthy meals, which would also be beneficial for them.

With the mobile interface, people who are users can create weekly meal plans, which include recipes, and come up with corresponding shopping lists. (Hong, J. et al., 2024). AI-driven solutions would also enhance the management of household food consumption. It provides ideas on how to consume foods properly. It would also offer expiration reminders and support practices for food sustainability (Clark QM, et al., 2024). Moreover, it effectively produced healthy and personalized meal plans that ensured the individual's health and nutrition values (Amiri et al. 2023).

With respect to mobile technologies, Hanson et al. al. (2021) concluded that digital applications might support households with technology, time, and financial means to prevent or to reduce waste, but highlighting the mobile applications themselves can place a burden of food waste. Applications may help raise awareness about food waste at both producer and consumer levels, but a large-scale study of the possible changes that applications can bring towards food waste, healthy dietary habits, and financial expenses will need more time and resources (Mathisen TF, Johansen R, 2022).

Research on meal planning apps shows their utility in streamlining food preparation processes. Studies indicate that users of meal planning apps can reduce food waste by 15-25% through better planning and portion control (CNN Underscored, 2025; The Spruce Eats, 2024). Commercial meal planning applications like Plan to Eat (2025) and Mealime (2024) have demonstrated practical solutions for families seeking to optimize their meal preparation and reduce waste.

In summary, the reviewed literature highlights the growing concern about food waste and its significant economic and environmental impacts. Many studies emphasized the potential of mobile applications as effective tools in improving meal planning, promoting food efficiency, and reducing household food waste. While many existing international studies focus on developed countries, there is a notable gap in localized studies within the Philippine context. Moreover, the integration of mobile technology into daily food practices appears to be a potential solution in influencing the behavior of the consumers at the household level. These findings determined the need for further research focused on the applicability and effectiveness of app-assisted meal planning in Filipino households, particularly in addressing food waste and enhancing cost-saving efforts.

This study operates an integrated framework combining the principles of Technology Acceptance Model (TAM) by Davis with behavioral change theory (Theory of Planned Behavior (TPB) by Aizen and Albert Bandura's Social Cognitive Theory) and household management concepts (Resource- Based Theory proposed by Barney).

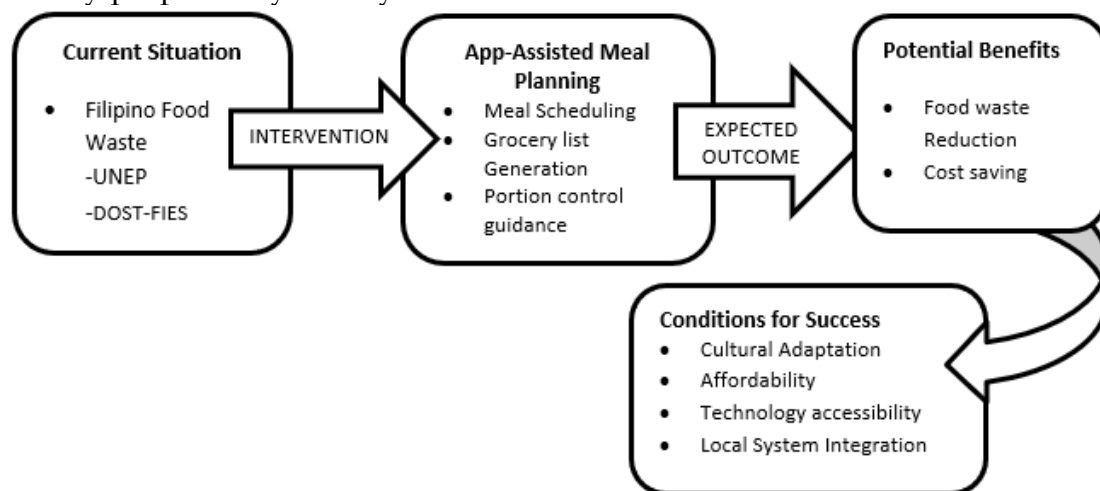


Figure 1. Schematic Diagram of the Conceptual framework for App-Assisted Meal Planning for Food Waste Reduction among Filipino Families

The conceptual framework for this study shows the logical relationship between the current food waste situations in Filipino households, the proposed app-assisted meal planning intervention, and the expected outcomes in terms of waste reduction and cost savings. The conceptual framework begins with the present condition of wasted food among the household of Filipino families. This serves as the baseline condition that highlights the needs for intervention. Secondary data reputable national and international sources such as UNEP Food

waste Index Report and DOST-FNRI will be analyzed to determine the present condition of food waste. This component of the framework acts as the basis on determining the possible improvement as well as to highlights measurable issues that calls for technological solutions.

The core element of this conceptual framework is the app-assisted meal planning which is the intervention which is also recognize as the comprehensive digital solution in addressing the main reasons why food is being wasted. The intervention includes three components; meal-planning recipes, grocery lists creation, and providing portion control recommendations. These functions' goal is to resolve the drivers of food waste cited in existing studies namely ineffective meal planning, too much buying, and inappropriate proportioning. The app-assisted meal planning which is the study's intervention serves as the independent variable of the study, assessed through its projected potential impact rather than through actual implementation. International researches about app-assisted meal planning will be analyzed. The framework will operate the conclusion that the potential effective rates of app-assisted meal planning can be adjusted to suit the Filipino setting, taking into account relevant cultural and economic factors.

The conceptual framework concludes with the anticipated positive outcomes which serve as the dependent variable of the study; food waste and cost savings. Based on international data on the effectiveness of applications, it will estimate how much that app-assisted meal planning could lessen food waste in Filipino families' households. These estimates will reflect a range from conservative to optimistic situations, grounded in documents results from similar interventions elsewhere.

The framework's outcome components also recognizes that actual results may differ due to unique Filipino factors such as cultural eating habits, financial limitations, as well as with the patterns of how Filipinos use technology. Nonetheless, these projections offer measurable basis for evaluating the potential benefits of adopting such digital solutions within the Philippine settings.

METHODOLOGY

This study employed a quantitative research design using secondary data analysis to examine the potential impact of app-assisted meal planning on food waste reduction and cost savings among Filipino families. The population of this research consists of Filipino households, with the analysis unit being individual households. Secondary data were sourced from the United Nations Environment Programme (2024) Food Waste Index Report for global and Philippine waste comparisons, the Department of Science and Technology-Food and Nutrition Research Institute (2022) study for detailed patterns and cultural influences on food disposal, the Philippine Statistics Authority Family Income and Expenditure Survey for economic context and spending trends, and international studies on meal planning app effectiveness for benchmarking. To address the research objectives, the research used different analytical method to comprehensively examine the food waste patterns and the potential benefits of app-assisted meal planning among Filipino households. Using descriptive and

correlational approaches, it explored relationships between meal planning practices and waste reduction outcomes, adopting a cross-sectional design to establish baseline conditions from 2022–2024 Data analysis involved descriptive analysis to identify food waste trends, economic impact assessment to estimate potential savings, comparative analysis with international findings, and projection modeling to forecast long-term financial and environmental benefits of adopting app-assisted meal planning in the Philippine context.

RESEARCH RESULT AND DISCUSSION

This section presents the key findings of the study focusing on the relationship between meal planning practices and waste reduction in the Philippine context. Using descriptive and correlational analyses of secondary data from 2022 to 2024, the results reveal current waste patterns, economic impacts, and the anticipated positive effects of app-assisted meal planning. In relation to the study’s objectives, implications of these findings are discussed in each subsection, and connections were drawn between observed trends and existing literature. Variations in data are examined in light of cultural, economic, and technological factors relevant to Filipino households.

Filipino Food Waste and its Economic Impact in Filipino Households.

The first research objective is to measure the current extent of Filipino food waste and its economic impact on Filipino households. Table1 presents the data and results to answer the first objective.

Table 1. The Current Extent of Filipino Food Waste and Its Economic Impact in Filipino Households

Metric	Value	Source
Total Annual Food Waste	2.9 million tons (nationally)	UNEP 2024 Food Index Report
Per Capita Food Waste	26 kg. (annually)	UNEP 2024 Food Index Report
Previous Food Waste Level	9.33 million tons	Climate Change Commission, 2024
Improvement Rate	68% reduction (2021-2024)	Calculated from the reports
Daily Rice Waste per Household	49.6 g	DOST-FNRI, 2022
Daily meat/ fish/ Poultry waste per Household	7.5 g	DOST-FNRI, 2022
Estimated Daily Vegetable Waste Per Household	30 g	Estimation of the Author

Table 1 depicts the current situation of household food waste in the Philippines, which reveals both challenges and opportunities for intervention. In the table, data shows a remarkable 68% food waste reduction from 9.33 million tons in 2021 to 2.95 million tons in 2024. The figures show an improvement, but despite it, the Filipino households still generate 26 kilograms (kg) of food waste

per capita yearly, which indicates significant room for further food waste reduction. The access to detailed daily waste measurements (49.6 grams of rice, 7.5 grams of meat, and 30 grams of vegetables per household) establishes a basis for focused interventions.

The validation from multiple sources (UNEP, DOST, Climate Change Commission) made the findings reliable. They enhance the credibility of the results. The precise classification of food waste categories facilitates the creation of the targeted intervention strategies. Nonetheless, the swift change could suggest either exceptionally effective intervention or possible discrepancies in measurement technique over different time frames.

The decrease from 9.33 million tons to 2.95 million tons represents a significant transformation, one thing that would usually depend on major policy changes or major changes in behavior. This notable reduction reflects a growing awareness among Filipino families' households, suggesting that they are open to making efforts for food waste reduction, making them more likely to adopt solutions that are technology-driven.

The reduction in food waste in Filipino families is consistent with previous research showing that the three most wasted foods in Filipino households are meat, vegetables, and rice. The average daily plate waste per household is roughly 49.6 g of rice, 7.5 g of meat, and 30 g of vegetables, according to the Department of Science and Technology–Food and Nutrition Research Institute's (DOST-FNRI) nationwide plate waste survey. These numbers closely correspond to the waste breakdown measured in this study (FNRI, 2023). These results highlight the fact that, despite clear waste reduction, per capita generation is still high, indicating enduring problems with portion management, food preparation practices, and consumption patterns (DOST-FNRI, 2023; Barrion et al., 2023).

Moreover, according to the literature, food waste at the consumer level is the most expensive for the economy and the environment because it happens after the food has been produced, transported, and processed. This emphasizes the significance of focused household-level interventions (Barrion et al., 2023). These findings also lend credence to the idea that while improved waste management techniques and increased public awareness—perhaps brought about by recent campaigns and legislative initiatives—are helping to explain the observed decline, long-term effects still depend on consistent behavioral change (FNRI, 2023; UNEP, 2021).

Types of Food and Patterns of Food Disposal Observed in Filipino Families

The second objective of the study is to evaluate the types of food and patterns of food disposal that are usually observe in Filipino families.

Table 2. Types of Food and Patterns of Food Disposal That Are Usually Observe in Filipino Families

Food Category	Daily Waste (g)	Annual Waste (kg)	Average Price (Php/kg)	Annual Cost (Php)	Percentage Of Total
Rice	49.6	18.1	50	905	35.0%
Meat/Fish/Poultry	7.5	2.7	300	810	31.3%
Vegetables	30	10.9	80	872	33.7%
TOTAL	87.1	31.7	-	2,587	100%

Table 2 presents the economic impact of household food waste by converting the volume of waste into financial losses. It highlights the potential savings of every Filipino household from reduction efforts. Filipino households lose approximately Php 2,587 each year due to food waste; this is equal to around Php 7.09 per day, an amount that is comparable to everyday expenses like jeep fare, coffee, or a soft drink. Interestingly, the economic losses are almost evenly distributed among three major food groups: rice, which holds 35%; meat/fish/poultry, which is 31.3%; and vegetables, which are 33.7%.

The yearly cost of Php 2,587 holds roughly 3% to 5% of a minimum wage earner's yearly income, marking it as a significant expense for households. With the nearly equally distributed losses among various groups of foods, it suggests that successful solutions must address not only a single category but rather focus on overall food management practices. Moreover, it is important to note that the cost estimates are only based on average market prices, which can fluctuate widely depending on the region and season.

The daily vegetable waste, which is 30 grams, is based only on the author's estimated calculations rather than direct observation; therefore, its accuracy is limited. Meanwhile, the high meat cost, which is Php 300 per kilogram, shows that even a slight reduction of meat waste can lead to a significant financial savings. On the other hand, despite the price per kilogram, rice holds the greatest loss, underscoring the need for interventions focused on portion control.

In the Philippines, household food waste has a significant economic impact since it results in the loss of edible resources and unnecessary spending on a variety of primary food categories. Rice, meat/fish/poultry, and vegetables are the three most often thrown away goods in Filipino families, according to studies. Portion sizes, household characteristics, and shopping habits all affect waste patterns (DOST-FNRI, 2023; Redondo et al., 2022). This distribution shows that no one food category is the exclusive cause of the issue, hence solutions must focus on food management procedures as a whole rather than specific foods. Because it includes the loss of all inputs involved in food production and distribution, including labor, energy, and transportation, food waste has substantial economic impact at the consumer level (Barrion et al., 2023).

While interventions in rice consumption, including portion control, can address the highest share of loss despite its relatively lower price per kilogram, even minor percentage reductions in waste can result in significant savings,

especially in high-cost categories like meat (DOST-FNRI, 2021). Additionally, research indicates that better meal preparation, storage, and portion control might cut food waste in households by up to one-third, which would provide them with quantifiable financial relief (Barrion et al., 2023).

Potential Cost Savings that can be Achieved by Filipino Families through App-Assisted Meal Planning Interventions

Table 3. The Potential Cost Savings That Can Be Achieve by Filipino Families Through App-Assisted Meal Planning Interventions

Reduction Scenario	Waste Reduction%	Annual Savings(Php)	Annual Savings (Php)	Daily Savings (Php)
Conservative	15%	388	23.3	1.06
Moderate	20%	517	43.1	1.42
Optimistic	25%	647	53.9	1.77

The table 3 addressed the third objective which is to determine the potential cost savings that can be achieve by Filipino families through app-assisted meal planning interventions. Table 3 shows the potential savings for app-assisted meal planning interventions; however, these projections need to be interpreted carefully, as these have limited empirical evidence. The projected 15% to 25% reduction is only based on the examined data from reputable media sources rather than peer-reviewed academic studies, which hold a key limitation to the analysis. Based on the assumptions, the possible savings that Filipinos could achieve yearly per household would range from Php 388 to Php 647, and even the conservative or lower-end estimate of Php 388 indicates a massive saving for Filipino families, comparable to monthly utility bills or even transportation costs.

The primary limitation of this analysis is its lack of robustness and evidence-based data that will prove the effectiveness of app-assisted meal planning in reducing food waste. The potential 15% to 25% appears to be coming only from industrial claims and not from academically validated studies. With that, this analysis highlights gaps in existing research when it comes to quantified impacts of app-assisted meal planning applications on household food waste. Future studies should prioritize controlled experiments that would compare the actual food reductions between users and non-users of the applications.

App-assisted meal planning interventions has shown a significant cost-saving potential for families through several processes. Studies shows that these applications effectively support families belong to low-income in managing their resources and food preparation and organized meal preparation will lead to an improved food variety and resource utilization. Additionally, commercially available meal planning applications appears to have high utility and engagement with families for productive household management. (Garvin et. al, 2019).

Despite the importance of the potential savings, they still remained theoretical and lacked solid evidence. Even if real-world effectiveness doesn't fully match these estimates, the chances of achieving substantial household savings still justify further study. To properly analyze the real impact, future implementations of meal planning strategies should include a reliable data collection process to track real-world results.

Practical and Potential Benefits of Implementing Digital Meal Planning Solutions Towards Filipino Families

Table 4 shows the practical and potential benefits of implementing digital meal planning solutions towards Filipino families.

Table 4. Practical and Potential Benefits of Implementing Digital Meal Planning Solutions Towards Filipino Families

Benefit Category	Potential Impact	Measurement Method
Nutritional Improvement	15%-30 % better meal variety	Dietary diversity score tracking
Time Savings	2-3 hours weekly meal planning	User activity logs
Environmental Impact	26 kg CO2 reduction annually	Food waste carbon footprint calculation
Food Security Enhancement	15%-25% better source utilization	Household food security assessment

Table 4 tries to estimate the secondary benefits of meal planning as a solution to food waste, although accurate measurement of these outcomes presents significant methodological challenges.

Quantifying benefits like better nutrition and time saved is often based on rough estimates instead of scientifically tested tools. The most reliable way of assessing these advantages would be through direct feedback from the users rather than through exact measurement. Despite the challenges for a precise measurement of these outcomes, they still add meaningful value to meal planning programs. To effectively measure improvement in nutrition, it's important to first understand people's typical dietary habits and apply reliable nutrition assessment tools.

Calculating time savings should consider factors like the time needed to learn the application and differences in how efficiently households operate. Instead of aiming for exact measurement, it might be better and more effective to understand these benefits through users' firsthand experiences and level of satisfaction. Assessing environmental impact would require complex life cycle analysis, which is not part of the study's scope. Even if the main financial benefit from saving wasted food isn't that impressive, the additional advantages might still encourage users to adopt the application. Together, the economic savings, nutritional gains, and added convenience offer users several valuable benefits.

Digital technology has been very useful in people's lives as it continues to evolve. It enables to provide supports in achieving better health. Digital applications are great tool for monitoring nutrition and health since these

applications have made people easily control their diets. (Abeltino et.al, 2024). Moreover, technology has help individuals in finding special offers that could help them cost less. It also provides supports on selection recipes that has health related insights to address health related concern. (Dillahun et.al, 2023). In the context of digital technology towards food wastes, studies indicates that digital platforms are useful tools in fighting food waste, by redefining products that would be rejected as not fit for human consumption. (Cane & Parra, 2020). People who have a positive attitude towards the usage of mobile applications in purchasing food, care sustainability which lead to help waste prevention. (Liorančas & Lee, 2024). According to Hanson & Ahmadi (2021), mobile applications can help reduce waste as long as people has the right technology, time and financial resources however, relying on it would not be enough, and could shift the responsibility for reducing individuals, rather than addressing the broader issues that lead to waste.

Important Factors for Successful Implementation of Meal Planning Apps in The Filipino Context

The fifth objective of this study seeks to explore the important factors to be considered in order for meal planning applications to be effective in the Filipino context. The table shows the factors that makes meal planning applications successful in the Filipino households.

Table 5. Important factors for successful implementation of meal planning apps in the Filipino context

Implementation Factor	Considerations	Recommendations
Cultural Integration	Traditional Filipino dishes , Family eating patterns	Include Adobo, Sinigang, Pakbit, and Rice-based meals.
Economic Accessibility	Budget Constraints, income levels	Budget –focused meal plans
Technology Adoption	Smartphone Penetration, digital Literacy	Simple UI, offline capabilities, voice command in Filipino
Local Food System	Seasonal availability, wet markets, sari-sari stores	Seasonal menu adjustments, integration with local suppliers
Language Localizations	Filipino, Regional Languages	Multi-language support, local food terminology

Table 5 highlights the various factors to be considered in order for app-assisted meal planning to be effective in Filipino settings, taking into account both the potential and existing limitations.

As shown in the table, there are five key areas that are the focus of this framework: integrating cultural practices, ensuring economic affordability, encouraging technology use, supporting systems of local food, and adapting to language preferences. Each of these areas holds unique challenges influenced by the realities of Filipino households, their financial situations, and their capabilities in operating technologies such as smartphones, tablets, etc. For the

intervention to be successful, all these elements should be addressed together at the same time. Filipino dining habits, such as shared meals and unplanned food sharing, may not align well with the strict and structured meal planning approaches.

Given rice's central role in Filipino meals, the application should also emphasize portion control as well as effective management of leftovers. Promoting an affordable pricing model is crucial, as food waste represents a considerable expense for many households. The integration of applications with popular payment platforms such as GCash and PayMaya could help increase accessibility given the fact that smartphones are widely common in urban areas. However, despite this, unreliable internet connections and limited data plans make it essential for the app to offer offline functionality for it to be usable wherever users are located. In multi-generational households, the interface of the application should also be user-friendly for individuals with different levels of digital skills. Additionally, because most Filipinos shop at wet markets and sari-sari stores, the applications will need to depend on manually entered data for prices and availability rather than automatic updates from grocery chains.

Digital applications promote households to try new food preparation methods but knowing the specifics of what are its features will greatly impact favorable outcomes. (Clarke et. al, 2018). For some studies, it indicates that meal planning applications and their features should promote organizations and must propose feasible and time-saving ways in providing healthy food while considering automation and integration, quality of the recipe and nutrition content. (Mauch et. al ,2021). It should adapt on the different levels of users as well as with their attitude towards planning their meal, recipe selection, ways on purchasing groceries.(Garvin, et al, 2019). Moreover, a web-based menu planning tool would really have benefits health and nutrition. It would also improve organization process, and support menu planning role but the perception of the ease of use of the tool were mixed. External factors that influenced the use of the tool, perceived need, time constraints, outside resources, organizational support and food budget. With that, the need for integrated digital features to streamline use of these tools (Kempner et.al, 2022)

In summary, the study's finding demonstrate that although the Philippines has made great strides in lowering household food waste, the problem still exists and has obvious financial ramifications for households. Effective solutions must address total food management rather than concentrating on a single category because waste happens across important food groups. With the potential to save money and provide other advantages including improved nutrition, time savings, and environmental benefits, app-assisted meal planning shows promise. Its success, however, hinges on its meticulous adaptation to the Filipino context, which includes language accessibility, affordability, ease of use for users with different levels of digital literacy, integration with local food systems, and alignment with traditional eating patterns. Overall, the findings show how urgent and promising it is to adopt technologically inclusive, economically viable, and culturally appropriate

technology-driven meal planning systems in order to make long-lasting improvements in household food waste reduction and wellbeing.

CONCLUSIONS AND RECOMMENDATIONS

This study concludes that app-assisted meal planning holds strong potential to reduce household food waste and improve budget management for Filipino families, provided it is designed with cultural relevance, economic practicality, and technological accessibility in mind. Success depends on integrating local recipes, seasonal ingredients, and budget-friendly options based on market prices, while also offering features such as portion control guidance, leftover management tips, and multilingual support.

To maximize impact, agencies like the Department of Science and Technology and the Department of Agriculture should support the development of localized applications and integrate them into food security and nutrition programs, while local governments could pilot test these tools in communities and offer digital literacy training. Developers are encouraged to design user-friendly apps tailored to Filipino eating habits, and households are advised to adopt structured meal planning – whether digitally or traditionally – to reduce waste and save money. Filipino families should consider using structured meal planning, either through a mobile applications or paper and pencil, to save money and reduce food waste. Meal planning encompasses all meal consumed, generating a shopping list based on planned meals and completion of planned meals.

While the analysis promising opportunities, it also highlights important gaps in empirical evidence that future studies might address. This paper primarily uses secondary data. This means that it did not directly gather information about the use of app-assisted meal planning from Filipino families. With that, the result of the study will mainly rely on international studies which might not totally reflect the cultural habits and economic realities of Filipino families.

ADVANCED RESEARCH

Future research should prioritize primary data collection from actual users and assess long-term behavioral changes, ensuring that technology-driven meal planning becomes a sustainable and scalable approach to addressing food waste in the Philippine context. Longitudinal is needed to assess the long-term behavioral changes through app-assisted meal planning to understand how these tools can drive sustainable reductions in food waste. Moreover, future studies must explore how socio-economic and cultural factors could influence the effectiveness of these tool especially, for low income families. Finally, studies might investigate how these applications could be integrated with local food systems to better serve as bridge in addressing food security challenges in the Philippines.

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