

UNIVERSIDADE FEDERAL DA GRANDE DOURADOS - UFGD
FACULDADE DE ADMINISTRAÇÃO, CIÊNCIAS CONTÁBEIS E ECONOMIA - FACE
PROGRAMA DE PÓS-GRADUAÇÃO EM AGRONEGÓCIOS

**UNDERSTANDING THE FACTORS THAT IMPACT ON HOUSEHOLD
FOOD WASTE**

Gabriel Jäger Ramos

Dourados-MS
2018

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PROGRAMA DE PÓS-GRADUAÇÃO EM AGRONEGÓCIOS

UNDERSTANDING THE FACTORS THAT IMPACT ON HOUSEHOLD FOOD WASTE

Dissertação apresentada à Universidade Federal da Grande Dourados, Faculdade de Administração, Ciências Contábeis e Economia, Programa de Pós-Graduação em Agronegócios para a obtenção do título de Mestre em Agronegócios.

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R175u Ramos, Gabriel Jager
Understanding the factors that impact on household food waste [recurso eletrônico] / Gabriel Jäger Ramos. -- 2018.
Arquivo em formato pdf.

Orientador: João Augusto Rossi Borges.
Coorientador: Carla Heloisa de Faria Domingues.
Dissertação (Mestrado em Agronegócios)-Universidade Federal da Grande Dourados, 2018.
Disponível no Repositório Institucional da UFGD em:
<https://portal.ufgd.edu.br/setor/biblioteca/repositorio>

1. 2030 Agenda for sustainable development. 2. Theory of Planned Behavior. 3. Food waste measurements. 4. Food waste in Brazil. 5. Consumer Behavior. I. Borges, João Augusto Rossi. II. Domingues, Carla Heloisa De Faria. III. Título.

Ficha catalográfica elaborada automaticamente de acordo com os dados fornecidos pelo(a) autor(a).

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AGRADECIMENTOS

Dirijo esses agradecimentos a todos que de alguma forma ajudaram, família, amigos, namorada. E também aos que contribuíram para meu aprendizado nos primeiros passos dentro dessa jornada que é a pós-graduação. Amigos da turma de 2017, amigos da turma de 2018, alguns professores e à banca examinadora pelas ótimas contribuições. Todos contribuem para nosso aprendizado.

Em especial direciono meu profundo respeito, admiração e agradecimento aos meus orientadores Dr. João Augusto Rossi Borges e Dra. Carla Heloisa de Faria Domingues. Eles foram totalmente essenciais para que eu pudesse me desenvolver, aprender e me sentir realmente preparado em alto nível. Por causa deles, também não desisti da caminhada.

Muito obrigado!

ABSTRACT

World's population will be about 9 billion in 2050, which highlight a challenge of feeding a rapidly increasing population. However, about 1/3 of the total food produced is discarded, which has negative impacts such as environmental impacts due to greenhouses gas emissions (GHG), freshwater use, cropland and fertilizer use, economic losses and food insecurity. In Brazil, the situation is not different. From its 268.1 million tons of available food, approximately 10% is wasted. Food losses and waste occur in all supply chain points, however, the largest amount of food waste occurs in households. Therefore, it is important to study individual's behaviour for a better understanding of food waste prevention. One of the theories that can be used to understand the psychological factors that influence an individual on wasting food is the Theory of Planned Behavior (TPB). Although there is an increasing trend in studies about food waste at the household level, relatively little is known about the factors that drive people regarding to the food waste behaviour. The general objective of our study was to identify the factors that influence food waste at the household level. The specific objectives were to identify the socio-demographic characteristics that influence on household food waste and, to identify the psychological factors that influence on the food waste behaviour. To achieve the objectives of this research we developed a survey, separated in three groups of questions. The first group consisted of socio-demographic questions, the second group consisted of questions measuring the total amount of food waste and the third part of the survey consisted of questions about the psychological factors that drive people regarding to their quantity and frequency of the households' food waste. In relation to the general amount of food waste, people reported not to waste much food. We perceived a tendency of people to waste more fruits, vegetables and salads. Our results showed that education, income, age and gender have significant correlation with household food waste generation. In relation to the psychological factors, our study showed that intention, personal attitudes, perceived behavioural control, subjective norms, the good provider identity and the household planning habits have significant correlation with food waste for all the six food groups we analyzed.

Key words: 2030 Agenda for sustainable development, Theory of Planned Behavior, Food waste measurements, Food waste in Brazil, Consumer Behavior.

RESUMO

A população mundial será de cerca de 9 bilhões em 2050, o que destaca o desafio de alimentar uma população em rápido crescimento. No entanto, cerca de 1/3 do total de alimentos produzidos no mundo são descartados, o que gera impactos negativos, como impactos ambientais devido às emissões de gases do efeito estufa (GEE), uso de água potável, uso de terras cultiváveis e fertilizantes, perdas econômicas e insegurança alimentar. No Brasil, a situação não é diferente. Dos 268,1 milhões de toneladas de alimentos disponíveis, aproximadamente 10% são desperdiçados. As perdas e desperdícios de alimentos ocorrem em todos os pontos da cadeia de produtiva, no entanto, a maior quantidade de desperdício de alimentos ocorre nas residências. Portanto, é importante estudar o comportamento do indivíduo para uma melhor compreensão da prevenção do desperdício de alimentos. Uma das teorias que podem ser usadas para entender os fatores psicológicos que influenciam um indivíduo a desperdiçar alimentos é a Teoria do Comportamento Planejado (TPB). Embora exista uma tendência crescente nos estudos sobre o desperdício de alimentos no nível domiciliar, relativamente pouco se sabe sobre os fatores que levam as pessoas ao comportamento do desperdício de alimentos. Diante do exposto, o objetivo geral de nosso estudo foi identificar os fatores que influenciam o desperdício de alimentos no nível domiciliar. Os objetivos específicos foram identificar as características sociodemográficas que influenciam o desperdício de alimentos e, identificar os fatores psicológicos que influenciam no comportamento do desperdício de alimentos. Para atingir os objetivos desta pesquisa, desenvolvemos um questionário, dividido em três grupos de perguntas. O primeiro grupo consistia em questões sociodemográficas, o segundo grupo consistia em questões que mediam a quantidade total de desperdício de alimentos nas residências e a terceira parte, consistia em questões sobre os fatores psicológicos que influenciam as pessoas em relação à quantidade e frequência de desperdício de alimento das famílias. Em relação à quantidade geral de desperdício de alimentos, as pessoas relataram não desperdiçar muito. Percebemos uma tendência das pessoas a desperdiçarem mais frutas, legumes e saladas. Nossos resultados mostraram que educação, renda, idade e gênero têm correlação significativa com a geração de desperdício de alimento nas residências. Em relação aos fatores psicológicos, nosso estudo mostrou que intenção, atitudes pessoais, controle comportamental percebido, normas subjetivas, o comportamento de bom provedor e os hábitos de planejamento da residência têm correlação significativa com o desperdício de alimentos para todos os seis grupos alimentares analisados.

Palavras-chave: Agenda 2030 para desenvolvimento sustentável, Teoria do Comportamento Planejado, Mensuração de desperdício de alimentos, Desperdício alimentar no Brasil, Comportamento do consumidor.

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LIST OF ABBREVIATIONS AND ACRONYMS

AP	Animal Protein
APH	Amount of People in the Household
BP	Bakery Products
CAISAN	Câmara Interministerial de Segurança Alimentar e Nutricional (Inter-Ministerial Department of Food and Nutrition Security)
CT PDA	Comitê Técnico de Desperdício de Alimentos (Technical Committee of Food Losses and Waste)
DP	Dairy Products
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuária (Brazilian Company of Agricultural Research)
FAO	Food and Agriculture Organization of The United Nations
FF	Fast Food or Ready-To-Eat Meals
FVS	Fruits, vegetables and salads
GHG	Greenhouse Gas Emissions
TBP	Theory of Planned Behavior
TRA	Theory of Reasoned Action
UN	United Nations
WRAP	Waste & Resources Action Programme

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1. Introduction

Food waste and losses¹ are currently an important topic around the world. Concerns regarding to food waste have made institutions and governments search for manners to deal with this problem (Porpino, 2016). Institutions such as the Food and Agricultural Organization of the United Nations (FAO) have been reporting that food availability might exist only until 2050 and food waste has been predicted to increase in the next 25 years (Chen et al., 2017). If the world does not increase the global food production by 60 per cent higher than it was in 2006/2007, humanity might face global food insecurity.

The food scarcity occurs because of the necessity of feeding a rapidly increasing population that will reach 9 billion people in the middle of the century (Godfray et al., 2010). Therefore, food waste is clearly an unethical and unsustainable situation (Diaz-Ruiz, Costa-Font, & Gil, 2017) and requires the world's attention on finding ways to increase food production and decreases the waste of food. Indeed, most of the necessary effort to increase the global food availability could be actually on food waste reduction (Foley et al., 2011; Kummu et al., 2012; FAO, 2013).

In 2015 the United Nations (UN), together with world leaders, adopted the 2030 agenda for sustainable development. This agenda has 17 goals to end poverty, protect the planet and ensure prosperity for all (United Nations, 2015). Furthermore, many of the new sustainable agenda's goals are related to food waste. For instance, the number two, zero hunger, avoid throwing away food, the number six, avoid wasting water, the number twelve, sustainable consumption and production, and number thirteen, climate action for climate change. However, about 1/3 of the total food produced is discarded (FAO, 2013; Smith & Gregory, 2013), which has negative impacts such as environmental impacts due to greenhouses gas emissions (GHG), freshwater use, cropland and fertilizer use, economic losses and food insecurity (Gustavsson et al., 2011; Kummu et al., 2012).

In addition, while food waste is common in more than 1 billion people's lives, food insecurity is a reality for too many others (Kosseva, 2013; Lundqvist et al., 2010). Therefore, food waste is not just an economic and social issue, it goes beyond, being also an ethical issue (Hebrok & Boks, 2017).

In Brazil, the situation is not different compared to the rest of the world. From its

¹According to the Parfitt et al. (2010), it is called food loss when the food is lost at production, postharvest and processing stages in the food supply chain. The food that is lost at the end of the supply chain (retail and final consumption) is what we define as food waste. Therefore, food waste and loss refer to the decrease in edible food mass throughout the part of the supply chain that specifically leads to edible food for human consumption (Gustavsson et al., 2011).

268.1 million tons of available food, approximately 10% is wasted (CAISAN, 2018). Regarding to the food and nutrition security in Brazil, 77.4% of the households are secure, and 22,6% of the households face food and nutrition insecurity (i.e. 14.8%, 4.6% and 3,2% presenting, low, moderate and severe insecurity, respectively).

Therefore, the Brazilian government together with FAO created the technical committee of food losses and waste (CT PDA), within the CAISAN (Inter-Ministerial Department of Food and Nutrition Security). Based on a 2030 Agenda 12th goal's mark (to reduce by 50% global food waste per capita) and the CT PDA's works, the CAISAN approved in 2017 the Intersectoral Strategy for the Reduction of Food Losses and Waste in Brazil. This strategy has as general objective to coordinate actions aimed at preventing and reducing food losses and waste in Brazil, through more integrated and intersectoral management of government and society initiatives, in line with the National Policy of Food and Nutrition Security (CAISAN, 2018). Based on this scenario, several studies have been conducted in order to investigate food waste causes.

Research on food waste have significantly increased since 2006, especially in countries such as China, USA, South Korea, UK, Japan, India and Canada, where most of the researchers come from (Chen et al., 2017). Studies on this topic mostly involve areas including climate change, sustainable resource management, energy, biodiversity, habitat protection, agriculture and soil protection, which are the areas that are affected by food waste in general (Secondi et al., 2015).

The causes of food waste are diverse and influenced by the organization of the food system and the socio-economic context of a country (Cicatiello et al., 2016). For instance, the amount of food waste depends on crop production choices and patterns, the structure of the distribution channels, consumer-purchasing behaviours and food use practices (Gustavsson et al., 2011).

According to Cicatiello et al. (2016), food losses and waste are generated all along the supply chain. For instance, regarding to the supply chain losses, the causes are damages generated by weather conditions, pest infestation, germ outbreak and processing waste (Production and Processing); fresh produce decomposition and expiration of packaged foods (Retail); consumer leftovers and food preparation waste (Food service). Regarding the supply chain waste, the causes are non-harvest due to low market prices, overproduction, incorrect storage and unsuitable quality standards (Production and Processing level); damaged packaging, incorrect storage, unsuitable quality standards, blemished/misshapen products and non-purchased products (Retail level); over-preparation and incorrect storage (Food service

level); over-purchasing, over-preparation, incorrect storage, food expiration and leftover waste. Besides other problems in earlier stages of the agrifood chain, such as inappropriate packaging (Household level). Therefore, food losses occur in all supply chain points (Parfitt, Barthel, & Macnaughton, 2010), from farm to our plates; however, the largest amount of food waste occurs in households (European Commission & Report, 2010). For instance, according to the Brazilian Agricultural Research Corporation (EMBRAPA, 2018), each household waste an average of 128,8 kilograms of food a year and each person waste on average 41,6 kilograms of food a year in Brazil. Gaiani et al. (2017) reported that household food waste is related to several reasons such as labelling issues, storage, packaging issues, portion sizes, consumer's awareness, planning issues at the purchasing point, knowledge about how to reemploy food in new dishes and preferences.

Since most of food waste occurs at the household level it is important to define what food waste is at the consumption point. According to Parfitt et al. (2010) and WRAP (2009) food waste can be separated in two categories: (1) avoidable and possibly avoidable food waste, regarding to edible food that is thrown away; (2) unavoidable food waste, which is the waste from the preparation that is not edible, such as bones, skins, shells, fishbone, etc. In this research, we will focus only on avoidable and possibly avoidable food waste.

Furthermore, there is a trend of research regarding to study household food waste in order to understand this phenomenon. These studies have investigated the influence of different variables that may influence food waste. However, food waste results from complex factors and behaviours (Secondi et al., 2015). For instance, socio-demographic factors such as age, gender, income and household composition might influence on the amount of food waste (Jörissen, Priefer, & Bräutigam, 2015; Quested et al., 2013; Barr, 2007; Ventour, 2008; WRAP 2009). Psychological factors such as intention to avoid food waste, financial and personal attitudes, perceived health risks, perceived behavioural control, planning habits, personal and subjective norms, food waste awareness and data label and storage knowledge also might have influence on household food waste (Visschers, Wickli, & Siegrist, 2016; Graham-Rowe, Jessop, & Sparks, 2014).

Previous literature found that older people waste less (Secondi et al., 2015; Stancu et al., 2016), while others indicate the opposite (Cecere et al., 2014). Regarding to gender, studies found that women waste more (Visschers, Wickli, & Siegrist, 2016), while others suggest women produce less food waste (Cecere et al., 2014; Secondi et al., 2015). These studies also found that, in relation to education level, people who have a higher education level tend to have an employment status, and, people who are employed tend to generate more

food waste compared to those who are unemployed. Regarding to income, studies found that households with different income differ in relation to their attitudes towards food waste reduction (Principato et al., 2015; Qi and Roe, 2016).

The household planning habits and routines were also investigated revealing that planning our food shopping can be effective against overbuying, which prevents food waste (Parizeau et al., 2015; Secondi et al., 2015). Some studies also found that better planning and organization regarding to cooking and storing food, results in food waste prevention by consuming older products first and improving cooking skills, wasting less on the preparation and making a better use of the leftovers (Graham-Rowe et al., 2014; Porpino et al., 2015; Jörissen et al., 2015; Secondi et al., 2015; Stancu et al., 2016).

However, these different findings seem rather inconsistent, requiring manners of better explanation of their meaning for the food waste behaviour, which has been observed since behaviour theories stated that attitudes play an important role on specific behaviours (Ajzen, 1991; Quested et al., 2013). Therefore, it is important to study individual's behaviour for a better understanding of food waste prevention (Secondi et al. 2015).

One of the theories that can be used to understand the psychological factors that influence an individual on wasting food is the Theory of Planned Behavior (TPB). This theory is designed to predict and explain human behaviour in specific contexts (Ajzen, 1991) such as the household. In the TPB, the central concept is the intention, which is assumed to be the best predictor of an individual's behaviour (Ajzen, 1991). Therefore, the identification of the factors that influence an individual's behaviour might help to develop strategies targeted to reduce food waste at the household level. The development of such strategies occur considering predictors as personal and financial attitudes and values, motivation, knowledge and skills related to behaviour, food reemployment and food waste awareness, perceived social norms and habits (Quested et al., 2013).

There is a range of studies that used the TPB to understand consumers' decisions and behaviours (Evans, 2011, 2012; Graham-Rowe, Jessop, & Sparks, 2014; Parizeau et al., 2015; Quested et al., 2013). In these studies, personal and financial attitudes, personal and subjective norms and perceived behavioural control are the common factors used in order to explain food waste behaviour by the TPB's constructs. However, some other studies used additional factors in the main TPB's constructs, in order to deepen the understanding of food waste behavior, which are: the individual's desire to be a good provider and habits related to shopping and household planning (Evans, 2011, 2012; Graham-Rowe et al., 2014; Visschers, Wickli, & Siegrist, 2016). In our study, we will also use those additional factors.

Although there is an increasing trend in studies about food waste at the household level, most of them have been conducted in Europe (Schanes, Dobernig & Gözet, 2018; Herpen et al., 2018). Therefore, research in this topic is still scarce in South America, which prevents accurate diagnostics about food waste behaviour in these countries.,which have different consumer environments and cultural situations compared to countries in Europe and North America. Besides, to the best of our knowledge, there is no similar study conducted in Brazil so far, which increased the importance of carrying out the present study. In addition, relatively little is known about the factors that drive people regarding to the food waste behaviour.

In the light of the foregoing, the general objective of our study was to identify the factors that influence food waste at the household level. The specific objectives were to identify the socio-demographic characteristics that influence on the food waste; and to identify the psychological factors that influence on the food waste behaviour.

2. Literature Background

2.1 Theory of Planned Behavior (TPB)

The Theory of Planned Behavior is an extension of the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). The TRA was developed to explain people behavioural intentions and presupposes a causal sequence leading from beliefs, through attitude, the social norm and intention, to behaviour. The causal sequence is activated by the emergence of two types of beliefs. The first type embraces those beliefs which a person has about the consequences of performing or not a specific behaviour in combination with an assessment of those consequences. The second type embraces those beliefs, which a person has about whether other people would approve or disapprove the performing of a specific behaviour together with the motivation to comply with what he thinks they would want him or her, to do (Sarver, 1983).

The TPB was created due to the original theory's limitations in dealing with behaviours over which people have incomplete volitional control (Ajzen, 1991). According to the TPB, intentions are assumed to capture the motivational factors that influence behaviour. They are indications of how hard people are willing to try, and of how much of an effort they are planning to exert, in order to perform the behaviour (Ajzen, 1991).

Since intention is the central concept that best predicts an individual's behaviour, for the TPB, there are three factors that affect the intention to perform the behaviour. First, the individual's attitude needs to be in favour of the behaviour. Second, the norms and opinions

of other people who are important to the decision maker need to be in favour of the behaviour, which is named subjective norms. Third, the individual needs to perceive control over the behaviour (Ajzen, 1991; Visschers, Wickli, & Siegrist, 2016). The Figure 1 shows a structural diagram of the theory:

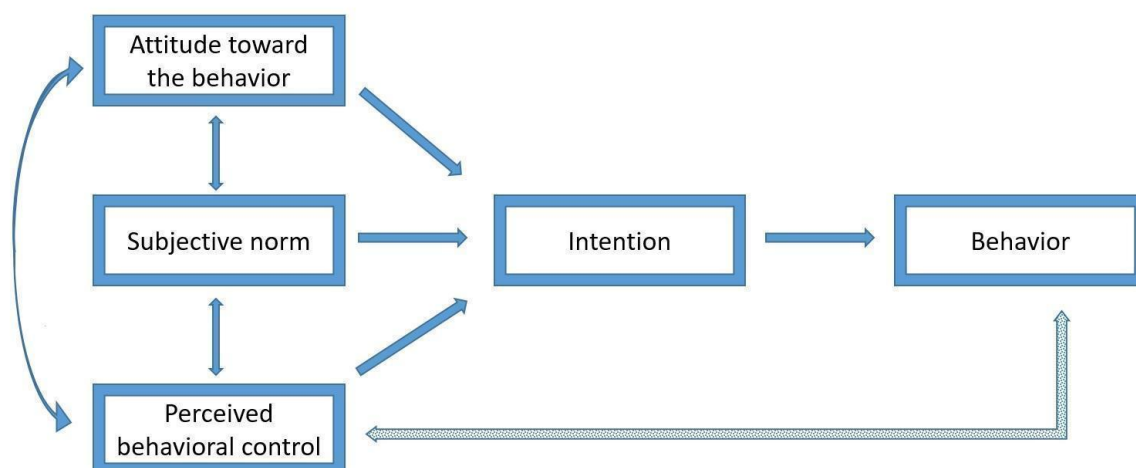


Figure 1: The Theory Of Planned Behavior. Source: Ajzen (1991).

Other psychological constructs can be added to the main constructs of the TPB. For instance, perceived health risks, the good provider identity and household planning habits. Previous studies have shown that these constructs can predict one's intention towards food waste (Visschers, Wickli, & Siegrist, 2016).

Therefore, in the context of this study, intention refers to if the person has the intention to or not to waste food. Personal and financial attitudes refer to what are the person's attitudes towards to food waste behaviour, for instance, if the person tries not to waste food or thinks that waste food is also a waste of money. Perceived health risks refer to how is the perception of a person, in relation to the risks of intake food leftovers or products that have past the expiration date. Perceived behavioural control refers to how much the person is in the control of the food waste behaviour in the household, for instance if the person feels difficulty to prepare food from leftovers or the members of the household makes it difficult to reduce food waste. The subjective norm refers to if the person perceives the norms and opinions of people who are important to him or her are in favour of food waste reduction. The personal norm refers to the own norms and opinions of a person in favour of food waste reduction. The good provider identity refers to the behaviour of people of being a good provider in their household, consequently being likely to overbuying and have food waste behaviour. The

household planning habits refers to how people perceived their shopping planning habits, the more planned it is, the more unlikely is the person tended to overbuying and food waste behaviour. The use of this context and constructs were based on Ajzen (1991) and Visschers, Wickli, & Siegrist (2016).

2.2 Food waste measurements

Since a better understanding of the drivers of food waste is needed, to achieve such understanding, food waste needs to be measured in a reliable and valid way (Herpen et al., 2018). However, establishing a valid estimation of the extent of food waste remains a major challenge (Elimelech, Ayalon, & Ert, 2018; Parfitt et al., 2010), due to the lack of standardized methods to quantify household food waste (Herpen et al., 2018; Porpino, 2016).

There are several methods of measuring household food waste, such as self-report in a diary, self-report survey or interview, waste-composition analysis, self-collection in provided containers and photographs, and in-home observations (Herpen et al., 2018). In order to estimate the advantages and disadvantages of each method, Herpen et al. (2018), followed four criteria. These criteria are: (1) degree to which estimates of food waste can be biased; (2) effort required of respondents; (3) effort and costs for the researcher; and (4) ability of the method to provide information about different states of food waste. Next, we detailed the method used in this study.

2.2.1 Self-report survey / Interview for food waste measurement

In this method, participants answer questions reporting their amount and frequency of food waste without the use of a diary or other instrument. Various measures have been used with this method such as absolute or frequency measures, visually based measures, and proportional waste measures (Herpen et al., 2018; Parizeau et al., 2015; Ventour, 2008). This method has been used in various studies. For instance, Parizeau et al. (2015) showed that the most common type of food wasted by people are those from food preparation and spoiled foods. Young et al. (2017) have successfully used the self-reported survey, measuring the amount and frequency of consumers' food waste, founding that bakery, salads and fruits are the most wasted types of food, confirming WRAP's research (WRAP, 2013a). Martindale (2014) showed that people waste fresh food 47 per cent more than frozen food, highlighting the importance of using frozen food to reduce avoidable food waste.

According to Herpen et al. (2018), the advantages of this method relies on the easiness of collecting data with relatively low cost for the researcher and requires low effort from the

respondent. This convenience is the reason for us to choose this method for our data collection. On the other hand, this method presents some shortcomings: people are more inclined to give socially desirable answers, and the measurement draws upon the individual's memory what can be faulty.

3. Materials and Methods

3.1 Survey and Sampling

To achieve the objectives of this research we developed a survey, separated in three groups of questions (Appendix 1). The first group consisted of socio-demographic questions, including gender, age, social status, region, family composition, employment and level of education. The second group consisted of questions measuring the total amount of food waste. In these questions, participants self-reported the amount and frequency of households' food waste for each of six groups of food (fruits; vegetables and salads; animal protein in general; bakery products; fast food or ready-to-eat meals; dairy products; and pastas). The scales used in the questions to measure the quantity of the households' food waste, had seven response options, which were quite a lot, a reasonable amount, some, a small amount, hardly any, none, I do not have it or I do not consume it. The scale for the frequency measurement questions had nine response options which were: every day, several times a week, once a week, several times a month, once a month, several times a year, once a year, never and I do not consume it. This group of questions was adapted from Ventour (2008) and WRAP (2009).

The third part of the survey consisted of questions about the psychological factors that drive people regarding to their quantity and frequency of the households' food waste. These questions were adapted from Visschers, Wickli, & Siegrist (2016). These questions had items about intention to avoid food waste, personal attitudes, financial attitudes, perceived health risks, perceived behavioural control, personal norms, subjective norms, household planning habits and the good provider identity. Respondents rated these items in a Likert-type scale from 1 to 7 points, which 1 represented "totally disagree" and 7 represented "totally agree".

To collect the data, we conducted an anonymous online survey. The survey was distributed throughout Brazil. Sampling and survey were performed with the support of a specialized market research company. To ensure the necessary level of scientific rigor, we monitored and commented on each step of the sampling and survey implementation. Using this strategy, we could reach all regions of the country and our final sample was 600 respondents. Before starting data collection, we pre-tested the survey with 10 people by using the Google Forms platform, and adapted inconsistencies found.

3.2 Data analyses

To reach our results, we first calculated the total reported amount of food that was wasted for each of the six groups of food by multiplying its coded quantity by the coded frequency of waste reported by the participant. After, we generated a new variable that corresponded to the total amount of food wasted by each respondent for each food group, as we show in Table 1.

Table 1 - Total amount of self-reported food waste per food group (N = 600)

Groups of food	Mean
Fruits, vegetables and salads	19.60
Animal protein in general	13.25
Bakery products	15.29
Fast-food or ready-to-eat meals	9.59
Dairy Products	11.86
Pastas	12.75

Note. The scale for measuring the food waste quantity varied from 1 to 7. The scale for measuring the food waste frequency varied from 1 to 9. When multiplying respondents' answers, we could have the minimum amount of food waste, which could be 1 and the maximum amount of food waste, which could be 63.

Second, each question using Likert-type scales were analyzed and some needed to be reverse coded in order to equal to the same code and meaning, which was 1- totally disagree (which means that the person tends to not waste food) and 7- totally agree (which means that the person tends to waste food). Then, we used the Cronbach's α to check the internal reliabilities of the items used to measure the constructs intention, personal and financial attitudes, perceived health risks, perceived behavioural control, personal and subjective norms, household planning habits and the good provider identity. Due to the low reliability of some Cronbach's α coefficients, we excluded financial attitudes, perceived health risks and personal norms constructs from further analyses. After, we created specific variables for each construct by using the mean of their items. Then, we used the spearman rank correlation coefficient to analyze whether the total amount of waste of the six groups of food were correlated to socioeconomic characteristics and the constructs intention, personal attitudes, perceived behavioural control, subjective norms, the good provider identity and household planning habits. We used the software Stata 14 and Prism 7.

4. Results and Discussion

4.1 Descriptive statistics

4.1.1 Socioeconomic characteristics of the sample

In relation to gender, 31.83% were male and 68.17% were female. Respondents' mean age was 34.9 years old (SD = 12.62). Regarding to the social classes, our respondents belonged to 5 different social classes which were 3% A, 14.83% B, 32.17% C, 27.33% D and 22.67% E. Regarding to region, our survey reached all of the 5 regions of Brazil composing the sample with 48.17% respondents from Southeast, 14.67% from South, 7.67% from Midwest, 23% from Northeast and 6,5% from North.

The respondents' family composition was mostly, formed by families with children (49.5%) and most of the households were formed by three members (28.33%). The majority of the main providers in the respondents' household had the full-time worker as employment status (60.17%) and most of the respondents (41.33%) had the high school as the level of education.

4.1.2 Amount and frequency of food waste

In relation to the general amount of food waste, we observed that most of the respondents reported to waste hardly any or a small amount of food. We present the general amount of food waste reported by the respondents in the Figure 2.

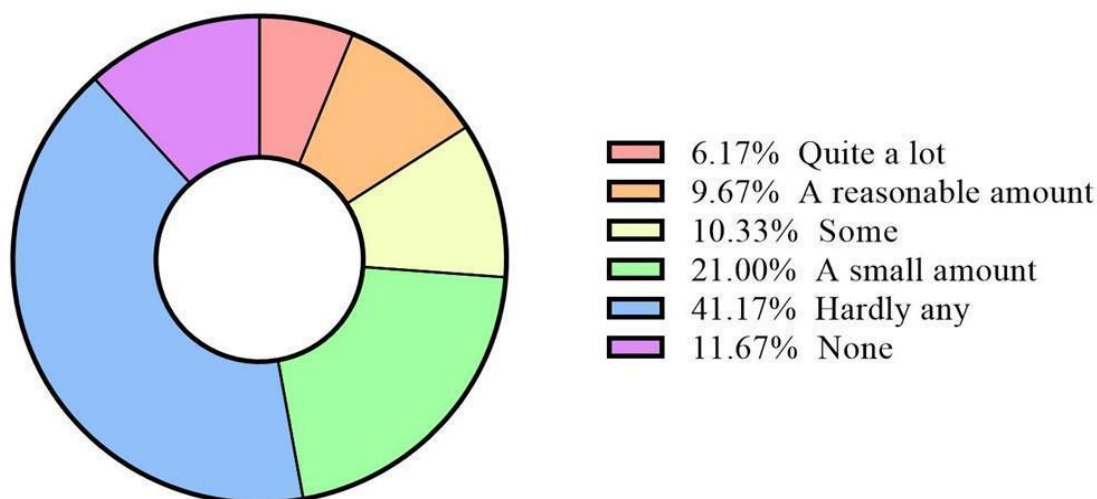


Figure 2: General amount of self-reported food waste.

Regarding to the quantity of food waste reported for each of the six food groups

(Fruits, vegetables and salads (FVS); Animal protein in general (AP); Bakery products (BP); Dairy products (DP); Fast-food or ready-to-eat meals (FF) and Pastas), most of the respondents, claim not to waste or waste hardly any food (Table 2). FVS, BP and AP were the most wasted types of food respectively, while FF, DP and Pastas were the least wasted. FF might have been the least wasted types of food because they were also reported as the least consumed. Due to a problem in our questionnaire's distribution, we could not collect respondent's answer for I do not have it or consume it for the group of pastas regarding to the quantity of self-reported food waste.

We believe that the moral charges upon the individual might have influenced the respondent's answers to less food waste (Herpen et al., 2018). However, the change in the answers' pattern of high rates for not to waste or hardly any waste food, for quite a lot and a reasonable amount in the group of fruits, vegetables and salads, might show the individuals' tendency of wasting more this types of food. Ventour (2008) has found the same tendency of wasting these types of food.

Table 2 – Self-reported quantity of food waste by food group.

	Quite a lot	A reasonable amount	Some	A small amount	Hardly any	None	I do not have it or consume it
FVS	4,33%	9,00%	14,67%	19,33%	40,33%	11,50%	0,83%
AP	2,67%	3,83%	7,17%	9,33%	38,33%	38,00%	0,67%
BP	1,33%	7,33%	11,67%	11,67%	32,00%	35,17%	0,83%
FF	1,33%	2,67%	5,67%	5,33%	25,50%	46,33%	13,17%
DP	1,67%	3,17%	6,00%	10,17%	32,50%	45,17%	1,33%
Pastas	0,67%	3,67%	8,17%	12,33%	40,00%	35,17%	

*P < 0.05. Food groups: FVS: Fruits, vegetables and salads. AP: Animal protein in general. BP: Bakery products. FF: Fast food or Ready-to-eat meals. DP: Dairy products.

Concerning to the self-reported frequency of food waste, most of the participants claim to never waste fast-food or ready-to-eat meals, followed by dairy products and animal protein in general (Table 3). As we observed in the quantity of food waste reported, we observed a similar pattern of answers in the self-reported frequency of waste. So, the same answer's pattern changed for the rates of never waste, decreasing in the group of fruits, vegetables and salads. This changing reinforced the tendency observed in the respondents' answers for the quantity of food waste, highlighting fruits, vegetables and salads as the most wasted food types of our study.

There are some possible explanation for the tendency of waste more fruits, vegetables and salads. For instance, fruits, vegetables and salads, do not have palatability like the other food groups that tend to be more processed, which might make people waste them more than the other food groups. Another explanation is that the causes for wasting fruits, vegetables and salads do not start at the household level. Brazil produces many of these types of food but due to logistics and transportation shortcomings, when these foods reach consumers their shelf life are already compromised.

Table 3 – Self-reported frequency of food waste by food group.

	Every day	Several times a week	Once a week	Several times a month	Once a month	Several times a year	Once a year	Never	I do not have it or consume it
FVS	1,83%	12,50%	12,83%	14,83%	8,83%	18,83%	5,67%	24,00%	0,67%
AP	1,00%	6,83%	6,33%	11,50%	7,50%	18,00%	5,50%	42,67%	0,67%
BP	1,17%	8,17%	9,17%	13,17%	6,50%	17,67%	7,50%	35,33%	1,33%
FF	0,67%	3,00%	4,33%	6,00%	6,50%	13,83%	7,17%	45,83%	12,67%
DP	0,67%	4,17%	4,33%	8,00%	9,50%	19,67%	9,50%	43,50%	0,67%
Pastas	0,83%	4,83%	4,00%	9,67%	8,00%	21,00%	12,67%	37,50%	1,50%

*P < 0.05. Food groups: FVS: Fruits, vegetables and salads. AP: Animal protein in general. BP: Bakery products. FF: Fast food or Ready-to-eat meals. DP: Dairy products.

4.1.3 The psychological constructs' analyses

Since our Likert scale were from 1 to 7 points, we divided it 2 groups. The frequencies in the scale from 1 to 4 points, indicate the respondents who are unlikely to waste food. The frequencies in the scale after 4 to 7 points, indicate the respondents who are likely to waste food.

In this way, respondents' answers about the psychological constructs showed that, regarding to intention, most of the respondents (95.5%) do not have the intention to waste food, 97.17% have personal attitudes against food waste and 81.5% reported to be unlikely to waste food due to their subjective norms.

In relation to the perceived behavioural control, 72% of the respondents reported to have control upon their food waste behaviour, about 45.17% showed to be a good provider, likely to waste food and 87.67% of the respondents reported to have household planning habits unlikely to waste food. We present these percentages and frequencies in Table A2, Table A3, Table A4, Table A5, Table A6 and Table A7, in Appendix 2.

The Cronbach's α coefficient for the perceived behavioural control construct was the

highest (Table 4). We observed the lowest coefficients in personal norms, perceived health control and financial attitudes, which were the constructs excluded from further analysis. Regarding to the low alpha coefficients found for the excluded psychological constructs, we believe that it happened due to some inconsistency in the translation of the items when we adapted them from Visschers et al. (2016), which might have caused respondents' miscomprehension of the items.

Table 4 - Cronbach's α coefficient for each construct

	Number of items	Cronbach's α coefficient
Intention	3	0.64
Personal Attitudes	3	0.75
Financial Attitudes*	3	0.27
Perceived Health Risks*	4	0.49
Perceived Behavioral Control	5	0.77
Subjective Norms	2	0.65
Personal Norms*	4	0.50
Good Provider Identity	4	0.63
Household Planning Habits	4	0.76

Note. * represents the constructs excluded from subsequent analyses. The Cronbach's α coefficient threshold was ≥ 0.6 .

4.2 Spearman rank correlations

4.2.1 Socio-demographic characteristics and the food groups

According to Schanes, et al. (2018), in their systematic review of household food waste, it is hardly possible to single out any socio-demographic factor as an explanatory variable for food waste generation. However, our study revealed in general, significant correlations between socio-demographic variables and the waste of food (see Table 5).

The amount of people in the household (APH) was positively and significantly correlated with the group fruits, vegetables and salads (FVS) and the group pastas. These results indicate that as more people live in the household, more FVS and pastas are wasted. These results are in line with others studies: larger households produce a higher amount of food waste (Jörissen et al., 2015; Parizeau et al., 2015; Queded et al., 2013; Stancu et al., 2016; Visschers et al., 2016).

The level of education was positively and significantly correlated with all the six food groups ($P < 0.001$), which means that the higher the education level, more is the waste of food.

The income was also positively and significantly correlated with all the six food groups ($P < 0.001$), which means that the higher the income more is the waste of food. Some studies showed no significant correlation between food waste and education level, differing from our results (Cecere et al., 2014; Neff et al., 2015). However, Schanes et al. (2018) showed studies in their systematic review, that point employment status potentially associated with food waste generation. Furthermore, Qi and Roe (2016) showed that full-time workers feel they have less time to worry about food waste. In addition, as same as our findings, Stancu et al. (2016) found a positive correlation between income and food waste generation, while other studies found no correlation (Visschers et al., 2016; Wenlock et al., 1980). A possible explanation about our correlation results for education level, income and food waste generation is the hypothesis that people who are more educated are more likely to have an employment status. Having a job impact in the time giving to the preparation of the meals in the household what might make people do not give the required attention about preparation waste or leftovers usage. In addition, employed people might have meals out of their home, in restaurants or at work, more often, which make them reduce food waste at home. Alternatively, to have a higher income and possibility of buying more if they need as well as buying higher amounts and variety of food, because of the Brazilian culture of food abundance (Porpino, 2015). This hypothesis explains the same strong correlation found by other studies, between these two variables and the food waste in all food groups.

According to Schanes et al. (2018), there is no consensus about how far food waste generation is subject to age. In our study, age was negatively and significantly correlated with the groups of animal protein in general (AP), fast food or ready to eat meals (FF), dairy products (DP) and pastas, which means that younger people waste less these types of food. As in our study, most studies found negative correlation between age and the amount of food wasted (Secondi et al., 2015; Stancu et al., 2016; Visschers et al., 2016). However, Cecere et al. (2014) found the opposite. Our hypothesis for our findings is the fact that younger people might have less experience and knowledge about food preparation or storage, as well as food waste awareness, as Qi and Roe (2016) suggested. In the same way, Quested et al. (2013) showed that people over 65 years of age tend to waste less food.

For Principato et al. (2015), gender does not prove to be significant in food waste generation. However, in our study, gender significantly correlated with animal protein, bakery products and fast food or ready-to-eat meals ($P < 0.01$). In the context of our study, it suggests that men waste more these three food groups than women. Other studies also showed similar results for gender (Cecere et al., 2014; Secondi et al., 2015), while Visschers et al. (2016)

found the opposite. Regarding to the Brazilian context, we hypothesized that our results occurred due to the fact that, commonly, women are responsible for food shopping routines and preparation in the Brazilian households, which gives them more knowledge about how to deal with food, for instance, better use of leftovers and products reaching their use-by date. In addition, it is possible that women have more knowledge than men about storage and food preparation.

Table 5 - Spearman correlations estimates between the socioeconomics characteristics and the food groups.

	1.	2.	3.	4.	5.	6.
1. FVS	1					
2. AP	0.64	1				
3. BP	0.67	0.66	1			
4. FF	0.42	0.52	0.50	1		
5. DP	0.61	0.64	0.67	0.54	1	
6. Pastas	0.61	0.68	0.67	0.55	0.66	1
7. APH	0.10**	0.06	0.05	0.06	0.03	0.12*
8. Education	0.17***	0.17***	0.23***	0.17***	0.19***	0.20***
9. Age	-0.06	-0.11**	-0.05	-0.08*	-0.11**	-0.13**
10. Income	0.14***	0.14***	0.21***	0.13***	0.17***	0.14***
11. Gender	-0.06	-0.12**	-0.08*	-0.13**	-0.05	-0.07

* P < 0.05, ** P < 0.01, *** P < 0.001. Food groups: FVS: Fruits, vegetables and salads. AP: Animal protein in general. BP: Bakery products. FF: Fast food or Ready-to-eat meals. DP: Dairy products. APH: Amount of people in the household. Source: author's own calculation (2018).

4.2.2 Psychological constructs and the food groups

The Spearman rank correlations between the psychological constructs and the food groups, revealed, in general, significant correlations between the psychological constructs (intention, personal attitudes, perceived behavioural control, subjective norms, household planning habits and the good provider identity) and the reported amount of food waste for each of the six food groups (see Table 6). However, some constructs did not have high coefficients with the food groups, but still significant.

Table 6 - Spearman rank correlations between the constructs and the food groups.

	FVS	AP	BP	FF	DP	Pastas
Intention	0.36*	0.39*	0.35*	0.24*	0.36*	0.38*
Personal Attitudes	0.34*	0.36*	0.38*	0.26*	0.37*	0.35*
Perceived Behavioral Control	0.29*	0.34*	0.26*	0.26*	0.30*	0.32*
Subjective Norms	0.20*	0.18*	0.20*	0.20*	0.21*	0.21*
Good Provider Identity	0.11*	0.12*	0.12*	0.14*	0.13*	0.13*
Household Planning Habits	0.30*	0.26*	0.27*	0.20*	0.26*	0.24*

*P < 0.05. Food groups: FVS: Fruits, vegetables and salads. AP: Animal protein in general. BP: Bakery products. FF: Fast food or Ready-to-eat meals. DP: Dairy products.

These results showed that the stronger is the influence of these psychological constructs on an individual, the more the individual tends to waste food. In the context of our study based on six food groups, it suggests that as more intention of waste food a person has, more is this person likely to waste food. People with positive personal attitude about food waste would waste less. As much as people perceived to be in control of their household food waste behaviour, less is the food waste. As much as the people living in the household approve the respondent's positive food waste behaviour (subjective norms), less is the food waste. As much as a person has the behaviour of being a good provider, more is this person likely to waste food. As more is planned the household shopping routines, less food waste.

Since, intention is the best predictor for an individual's behaviour, we checked the Spearman rank correlations between intention and all the constructs (see Table 7). It was possible to observe a positive and significant correlation between intention construct and the others, except for the good provider identity. Therefore, in relation to personal attitudes, the results showed that as much as the person perceives that it is not good to waste food, smaller is the person's intention to waste food. As much behavioural control the person has, less intention to waste food. As higher is the food waste behaviour of the people who are important to the respondent, more intention the respondent has to waste food (subjective norms). As more planned is the household shopping routine of the respondent, less intention to waste food.

Table 7 – Spearman correlations between the constructs.

	1	2	3	4	5	6
1. Intention	1					
2. Personal attitudes	0.63*	1				
3. Perceived behavioural control	0.26*	0.24*	1			
4. Subjective norms	0.20*	0.18*	0.48*	1		
5. Good provider identity	0.01	-0.04	0.28*	0.23*	1	
6. Household planning habits	0.37*	0.41*	0.20*	0.07	-0.14*	1

* $P < 0.05$.

According to Principato et al. (2015) concerns about food waste is a significant predictor of food waste reduction and, according to Mondéjar-Jiménez et al. (2016) and Stancu et al. (2016), it has substantial influence on the intention to reduce food waste. Therefore, if a person is concerned about the problems that food waste generates, this person is likely to have positive personal attitudes about food waste behaviour.

This fact explains the strong correlation between personal attitudes and intention, found in our study. In this way, we highlight the importance of developing people's food waste awareness in order to make them more concerned about food waste generation. A person more aware about the food waste issue will have positive intention against food waste, contributing to reduce it. Regarding to perceived behaviour control, people who consider being on the control of their household food waste generation have more intention to reduce food waste or reduce it directly (Graham-Rowe et al., 2015; Mondéjar-Jiménez et al., 2016; Stancu et al., 2016; Visschers et al., 2016).

Schanes et al. (2018) defined subjective norms as commonly approved or disapproved behaviours in a culture. Regarding to household food waste behaviour it means for instance, that if a negative food waste behaviour is disapproved in the individual's culture, this individual is likely to reduce food waste. In our study's context, we verified food waste reduction behaviours within the household, regarding subjective norms. In relation to subjective norms, some studies showed that it increases the intention to reduce food waste (Graham- Rowe et al., 2015; Stancu et al., 2016). In this way, if the commonly approved behaviour in the household is to waste food (due to the lack of awareness of food waste impacts), subjective norms might decrease the intention to reduce food waste. If the people living in the household are more aware about food waste, and the commonly approved behaviour in the household towards food waste reduction, then subjective norms might increase the intention to reduce food waste.

Although the good provider identity had no correlation with intention (see Table 7) in our study, it had correlation with the amounts of food waste in all food groups. This result might be explained by the Brazilian culture of having plentiful and mixed food (Porpino, 2015), so people are mostly tended to overbuying. On the other hand, our results showed a negative and significant correlation between the good provider identity and the household planning habits, which means that as more planned are the shopping routines, less is the overbuying of food. Other studies also found that planned shopping routines might be an effective tool to prevent overbuying and, consequently, food waste (Parizeau et al., 2015; Secondi et al., 2015). Our explanation for no correlation between the good provider identity and intention is that even if a person behaves as a good provider, it does not mean that this person has the intention to waste food.

5. Conclusions

5.1 The study's implications and avenues for future research

We investigated household food waste by both socio-demographic and psychological factors perspective, regarding to six food groups. In relation to the general amount of food waste, people reported not to waste much food. However, when observing the pattern of the answers of the total amount of food waste for each of the six food groups, we perceived a tendency of people to waste more fruits, vegetables and salads.

Regarding to the socio-demographic factors, our results showed that education and income, age and gender have significant correlation with household food waste generation. However, age did not have significant correlation with fruits, vegetables, salads and bakery products, as well as gender did not have significant correlation with fruits, vegetables, salads, dairy products and pastas. In relation to the psychological factors, our study showed that intention, personal attitudes, perceived behavioural control, subjective norms, the good provider identity and the household planning habits have significant correlation with food waste for all the six food groups we analyzed.

Our study's findings can be used in various ways in order to create manners of reducing food waste in Brazil. In this way, public policies could be created to motivate consumers not to waste food, giving them information about the impacts of food waste, through TV and Internet advertisements, public events for discussing the theme in local communities, about the world's food security situation and mostly to increase consumers' knowledge about food preparation, storage and planning for example. Thus, we could influence consumers' through their personal attitudes. We also believe that consumers more

aware about food waste would increase the perceived behaviour control of the members of the household, towards food waste.

Regarding to the significant correlations between socio-demographic variables and food waste found, besides our findings, we suggest for further researches, to focus on the understanding of the impacts of these variables on household food waste in the Brazilian context. Because, more information is required due to Brazil's extension, cultural diversity and necessity of observe the perception of social classes that could not be reached by this research. In addition, although the good provider behaviour might have its explanation related to the Brazilian culture, we found a negative correlation between the good provider identity and shopping routines. Thus, we suggest that future research focus to understand the good provider behaviour in Brazil. Because, as we observed, the good provider identity is rooted in Brazil's culture, which explains just part of this behavior together with bad shopping routine habits.

5.2 Critical Remarks

Our study had some limitations. We chose the self-reported as a method for measuring the amount of food waste. Our reasons for choosing this method was mostly because it is cheaper and required less time to collect data, instead of more precise methods such as the diary or the collection of participants' food waste. However, when answering the self-report, people may not know exactly how often or how much food they discarded (Visschers et al., 2016). Furthermore, people may have reported smaller amounts and lower frequencies than what is actually real, due to the moral issue around food waste behaviour (Herpen et al., 2018).

In addition, the scales we used (Ventour, 2008; WRAP, 2009) for measuring the amount and frequency of food waste might be questionable regarding to its applicability in Brazil. When a Brazilian reports to waste quite a lot of food, is it the same quite a lot as a person may report in the UK? Our answer for this question is that in the context of our study, we were not actually interested in measuring the actual amount of food waste, but have insights about Brazilians' food waste behaviour. Moreover, since we are observing human behaviour, this scale remains valid, but we suggest for further researches a validation study in order to develop a self-report measurement that can be officially valid for use in Brazil.

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Appendix 1

Questionnaire

1- Como é composta sua residência?

Moro sozinho (a)

Residência compartilhada

Família, somente adultos.

Família com crianças.

Outros

2- Quantas pessoas moram na residência?

1

2

3

4

5 ou mais.

3- Qual a situação atual de trabalho do principal trabalhador em sua residência? (Considere o principal trabalhador aquele que contribui com maior parte da renda)

Trabalha integral

Trabalha meio-período

Desempregado

Aposentado

Trabalha sob demanda

4- Qual o tipo de vínculo empregatício do principal trabalhador em sua residência? Caso aposentado ou desempregado, indique o tipo de vínculo do último emprego.

Autônomo

Empregado CLT

Funcionário público

5- Qual o seu nível educacional?

Nenhum ou até o ensino básico completo.

Ensino médio incompleto.

Ensino médio completo.

Superior incompleto.

Superior completo.

Pós-graduação incompleta

Pós-graduação completa

6- No geral, quanto de frutas, verduras ou saladas, cozidos ou não, você joga no lixo?
(Desconsidere, cascas, caroços e partes não comestíveis).

Bastante

Uma quantidade razoável

Um pouco

Uma pequena quantidade

Quase nada

Nada

Não tenho ou não consumo.

7- No geral, quanto de proteínas em geral (Carne bovina, peixe, frango, etc.), cozidos ou não, você joga no lixo?

Bastante

Uma quantidade razoável

Um pouco

Uma pequena quantidade

Quase nada

Nada

Não tenho ou não consumo.

8- No geral, quanto de produtos de padaria (bolos, pães, tortas, sobremesas, etc.) você joga no lixo?

Bastante

Uma quantidade razoável

Um pouco

Uma pequena quantidade

Quase nada

Nada

Não tenho ou não consumo.

9- No geral, quanto de produtos de comidas compradas prontas ou fast-food, você joga no lixo?

Bastante

Uma quantidade razoável

Um pouco

Uma pequena quantidade

Quase nada

Nada

Não tenho ou não consumo.

10- No geral, quanto de laticínios (leite, queijo, iogurtes, cremes, doces, etc.) você joga no lixo?

Bastante

Uma quantidade razoável

Um pouco

Uma pequena quantidade

Quase nada

Nada

Não tenho ou não consumo.

11- No geral, quanto de massas, cozidas ou não, você joga no lixo?

Bastante

Uma quantidade razoável

Um pouco

Uma pequena quantidade

Quase nada

Nada

12- Pensando nos diferentes tipos de alimentos discutidos anteriormente. Quanto de alimento não consumido, você diria que é jogado fora no geral?

Bastante

Uma quantidade razoável

Um pouco

Uma pequena quantidade

Quase nada

Nada

13- No geral, com qual frequência você joga no lixo frutas, verduras ou saladas? Cozidos ou não. (Desconsidere cascas, caroços e partes não comestíveis)

Todo dia

Algumas vezes na semana

Uma vez por semana

Algumas vezes no mês

Uma vez por mês

Algumas vezes no ano

Uma vez no ano

Nunca

Não consumo

14- No geral, com qual frequência você joga no lixo proteínas em geral (Carne bovina, peixe, frango, etc.)? Cozidos ou não.

Todo dia

Algumas vezes na semana

Uma vez por semana

Algumas vezes no mês

Uma vez por mês

Algumas vezes no ano

Uma vez no ano

Nunca

Não consumo

15- No geral, com qual frequência você joga no lixo produtos de padaria (bolos, pães, tortas, sobremesas, etc.)?

Todo dia

Algumas vezes na semana

Uma vez por semana

Algumas vezes no mês

Uma vez por mês

Algumas vezes no ano

Uma vez no ano

Nunca

Não consumo

16- No geral, com qual frequência você joga no lixo comidas compradas prontas ou fast-food?

Todo dia

Algumas vezes na semana

Uma vez por semana

Algumas vezes no mês

Uma vez por mês

Algumas vezes no ano

Uma vez no ano

Nunca

Não consumo

17- No geral, com qual frequência você joga no lixo laticínios (leite, queijo, iogurtes, cremes, doces, etc.)?

Todo dia

Algumas vezes na semana

Uma vez por semana

Algumas vezes no mês

Uma vez por mês

Algumas vezes no ano

Uma vez no ano

Nunca

Não consumo

18- No geral, com qual frequência você joga no lixo massas? Cozidas ou não.

Todo dia

Algumas vezes na semana

Uma vez por semana

Algumas vezes no mês

Uma vez por mês

Algumas vezes no ano

Uma vez no ano

Nunca

Não consumo

A seguir você encontrará afirmações onde você deverá indicar com qual intensidade você concorda ou discorda dessas afirmações, em uma escala de 1 a 7. Onde 1 é discordo totalmente e 7 é concordo totalmente.

(Questões para medir a intenção)

19- Eu não tenho a intenção de desperdiçar alimentos.

1 - Discordo totalmente

2

3

4

5

6

7 - Concordo totalmente

20- Eu sempre tento comer todos os alimentos comprados, para não haver desperdício.

21- Eu tenho a intenção de usar todas as sobras de alimento.

(Questões para medir atitudes pessoais)

22- É desnecessário desperdiçar alimentos. Sempre é possível usá-los de alguma maneira.

23- Eu tento não desperdiçar alimentos porque acho imoral desperdiçar, enquanto outras pessoas no mundo passam fome.

24- Me chateia quando produtos não consumidos vão para o lixo.

(Questões para medir atitudes financeiras)

25- Para mim, desperdiçar alimento também é desperdiçar dinheiro.

26- Para mim, o fato de economizar dinheiro, me motiva a descartar menos alimentos.

27- Eu raramente penso em dinheiro quando descarto alimentos.

(Questões para medir a percepção de riscos à saúde)

28- Eu acredito que é alto, o risco de um alimento vencido fazer mal para minha saúde.

29- Eu não estou preocupado com o fato de que comer sobras de alimentos resulte em danos à minha saúde.

30- Eu acho que não existe problema em consumir sobras de alimentos.

31- Eu acho que alguém pode seguramente, ingerir produtos os quais passaram da data de validade a poucos dias atrás.

(Questões para medir o controle comportamental percebido)

32- Eu acho difícil preparar uma nova refeição a partir das sobras dos alimentos.

33- Eu acho difícil me certificar que apenas pequenas quantidades de alimentos sejam desperdiçadas em minha residência.

34- Eu acho difícil planejar a compra dos alimentos para minha residência, de maneira que tudo que for comprado seja consumido.

35- Eu tenho a sensação de que eu não posso fazer nada com relação à comida que é desperdiçada em minha residência.

36- Os outros membros de minha residência fazem com que seja impossível para mim, reduzir a quantidade de alimentos que é desperdiçada na residência.

(Questões para medir as normas subjetivas)

37- As pessoas que são importantes para mim não se importam em desperdiçar alimentos.

38- As pessoas que são importantes para mim acham que sou mesquinho quando tento reduzir a quantidade de alimentos que eu desperdiço.

(Questões para medir as normas pessoais)

39- Eu me sinto mal quando desperdiço comida.

40- Eu me sinto obrigado a não desperdiçar nenhum alimento.

41- É contrário aos meus princípios quando tenho que desperdiçar alimento.

42- Eu fui criado acreditando que os alimentos não devem ser desperdiçados e eu ainda vivo de acordo com esse princípio.

(Questões para medir a auto identificação como um bom provedor)

43- Eu regularmente compro produtos frescos, embora eu saiba que nem todos eles serão consumidos.

44- Eu gosto de prover uma grande variedade de alimentos nas refeições, assim todos podem ter alguma coisa que gostem.

45- Eu sempre tenho produtos frescos disponíveis para serem preparados ou cozidos, para convidados ou eventos inesperados. (Por exemplo uma doença).

46- Quando eu estou esperando convidados eu gosto de comprar comida além do necessário, porque eu sou um anfitrião generoso.

(Questões para medir os hábitos de planejamento da residência)

47- Quando eu faço uma lista de compras para ir ao mercado, eu sempre sigo a lista.

48- Eu sou uma pessoa que gosta de planejar as coisas.

49- Antes de preparar/cozinhar os alimentos eu sempre considero precisamente o quanto eu preciso fazer e o que eu irei fazer com as sobras.

50- Eu sempre planejo as refeições antes em minha residência e sigo com este planejamento.

Appendix 2

Extra tables

Table A1 - Skewness and Kurtosis test for normality (N = 600)

	Skewness	Kurtosis
Fruits, vegetables and salads	0.0000	3044
Animal protein in general	0.0000	0.0000
Bakery products	0.0000	0.0018
Fast-food or ready-to-eat meals	0.0000	0.0000
Dairy Products	0.0000	0.0000
Pastas	0.0000	0.0000
Intention	0.0000	0.0000
Personal Attitudes	0.0000	0.0000
Perceived Behavioral Control	0.0000	0.0027
Subjective Norms	0.0000	0.0147
Good Provider Identity	0.3074	0.0131
Household Planning Habits	0.0000	0.6541

Table A2 – Respondents' frequency for intention. Likert scale from 1 to 7 points. (N=600).

Intention	Freq.	Percent	Cum.
1	251	41.83	41.83
1.333	83	13.83	55.67
1.667	74	12.33	68
2	63	10.50	78.50
2.333	32	5.330	83.83
2.667	18	3	86.83
3	21	3.500	90.33
3.333	9	1.500	91.83
3.667	13	2.170	94
4	9	1.500	95.50
4.333	6	1	96.50
4.667	5	0.830	97.33
5	6	1	98.33
5.333	3	0.500	98.83
5.667	2	0.330	99.17
6.333	1	0.170	99.33
6.667	1	0.170	99.50
7	3	0.500	100
Total	600	100	

Table A3 – Respondents' frequency for personal attitudes. Likert scale from 1 to 7 points. (N=600).

Personal Attitudes	Freq.	Percent	Cum.
1	322	53.67	53.67
1.333	69	11.50	65.17
1.667	65	10.83	76
2	48	8	84
2.333	25	4.170	88.17
2.667	23	3.830	92
3	13	2.170	94.17
3.333	8	1.330	95.50
3.667	4	0.670	96.17
4	6	1	97.17
4.333	6	1	98.17
4.667	1	0.170	98.33
5	4	0.670	99
5.333	1	0.170	99.17
6.667	2	0.330	99.50
7	3	0.500	100
Total	600	100	

Table A4 – Respondents' frequency for the perceived behavioral control. Likert scale from 1 to 7 points. (N=600).

Perceived Behavioral Control	Freq.	Percent	Cum.
1	66	11	11
1.200	23	3.830	14.83
1.400	21	3.500	18.33
1.600	21	3.500	21.83
1.800	21	3.500	25.33
2	23	3.830	29.17
2.200	47	7.830	37
2.400	19	3.170	40.17
2.600	17	2.830	43
2.800	22	3.670	46.67
3	21	3.500	50.17
3.200	16	2.670	52.83
3.400	44	7.330	60.17
3.600	26	4.330	64.50
3.800	25	4.170	68.67
4	20	3.330	72
4.200	27	4.500	76.50
4.400	19	3.170	79.67
4.600	33	5.500	85.17
4.800	15	2.500	87.67
5	12	2	89.67
5.200	14	2.330	92
5.400	6	1	93
5.600	3	0.500	93.50
5.800	10	1.670	95.17
6	4	0.670	95.83
6.200	4	0.670	96.50
6.400	3	0.500	97
6.600	2	0.330	97.33
7	16	2.670	100
Total	600	100	

Table A5 – Respondents' frequency for subjective norms. Likert scale from 1 to 7 points. (N=600).

Subjective Norms	Freq.	Percent	Cum.
1	232	38.67	38.67
1.500	47	7.830	46.50
2	45	7.500	54
2.500	28	4.670	58.67
3	33	5.500	64.17
3.500	30	5	69.17
4	74	12.33	81.50
4.500	19	3.170	84.67
5	22	3.670	88.33
5.500	21	3.500	91.83
6	10	1.670	93.50
6.500	9	1.500	95
7	30	5	100
Total	600	100	

Table A6 – Respondents' frequency for the good provider identity. Likert scale from 1 to 7 points. (N=600).

Good Provider Identity	Freq.	Percent	Cum.
1	15	2.500	2.500
1.250	3	0.500	3
1.500	5	0.830	3.830
1.750	9	1.500	5.330
2	7	1.170	6.500
2.250	13	2.170	8.670
2.500	30	5	13.67
2.750	21	3.500	17.17
3	18	3	20.17
3.250	35	5.830	26
3.500	25	4.170	30.17
3.750	32	5.330	35.50
4	58	9.670	45.17
4.250	39	6.500	51.67
4.500	41	6.830	58.50
4.750	39	6.500	65
5	38	6.330	71.33
5.250	17	2.830	74.17
5.500	48	8	82.17
5.750	24	4	86.17
6	14	2.330	88.50
6.250	13	2.170	90.67
6.500	12	2	92.67
6.750	4	0.670	93.33
7	40	6.670	100
Total	600	100	

Table A7 – Respondents’ frequency for the household planning habits. Likert scale from 1 to 7 points. (N=600).

Household Planning Habits	Freq.	Percent	Cum.
1	105	17.50	17.50
1.250	25	4.170	21.67
1.500	29	4.830	26.50
1.750	42	7	33.50
2	39	6.500	40
2.250	33	5.500	45.50
2.500	57	9.500	55
2.750	39	6.500	61.50
3	39	6.500	68
3.250	36	6	74
3.500	21	3.500	77.50
3.750	27	4.500	82
4	34	5.670	87.67
4.250	13	2.170	89.83
4.500	10	1.670	91.50
4.750	14	2.330	93.83
5	9	1.500	95.33
5.250	8	1.330	96.67
5.500	7	1.170	97.83
5.750	2	0.330	98.17
6	2	0.330	98.50
6.250	2	0.330	98.83
6.500	5	0.830	99.67
7	2	0.330	100
Total	600	100	