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Average basket of goods: an economic analysis

ORIGINAL RESEARCH

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Cesta básica de alimentos: uma análise econômica

ABSTRACT

Introduction: The Law nº 185 of January 14, 1936, established that the minimum wage would be able to satisfy the normal needs of food, housing, clothing, hygiene, and transportation of an adult worker, without distinction of gender, per day of service. The average basket of goods was designed to come across the basic nutritional needs of a family unit composed of 2 adults and 2 children. The calculation of the average basket of goods is relevant to understand market practices and food price policies, and their impact on consumption behavior along with the diet of the Brazilian family. Such analysis is particularly relevant during the current inflationary framework experienced in Brazil. **Objective**: To investigate the selling prices of the foods that make up the Brazilian average basket of goods and quantify the equivalent hours of work needed to acquire the set. **Method**: An extensive price survey was conducted in distribution centers and commercial establishments in Belo Horizonte, Minas Gerais, allowing the establishment of the average value necessary and the minimum work hours to acquire a basic list unit. **Results**: It was evidenced that the composition of the foods included in the average basket of goods burdens 41,25 % of a family's budget. **Conclusion**: Given a workload of

220 hours per month, the hourly wage is equivalent to approximately 5.92 R$/hour. Thus, to pay for a food list, people work around 91 hours a month.

Keywords: Diet; Nutrition Programs and Policies; Feeding in Urban Context.

RESUMO

Introdução: A Lei nº 185 de 14 de janeiro de 1936 estabeleceu que o salário-mínimo seria capaz de satisfazer as necessidades normais de alimentação, habitação, vestuário, higiene e transporte de um trabalhador adulto, sem distinção de sexo, por dia de serviço. A cesta básica foi projetada para atender às necessidades nutricionais de uma unidade familiar composta por 2 adultos e 2 crianças. O cálculo da cesta básica é relevante para entender as práticas de mercado e as políticas de preços dos alimentos, e o seu impacto no comportamento de consumo e na alimentação da família brasileira. Tal análise é particularmente relevante durante o atual quadro inflacionário vivenciado no Brasil. **Objetivo**: Investigar os preços de venda dos alimentos que compõem a cesta básica brasileira e quantificar o equivalente de horas de trabalho necessário para adquirir o conjunto. **Método**: Uma pesquisa extensiva de preços foi realizada em centros de distribuição e estabelecimentos comerciais em Belo Horizonte, Minas Gerais, permitindo a determinação do valor médio necessário e das horas correspondentes de trabalho para adquirir uma unidade de cesta básica. **Resultados**: Evidenciou-se que a composição dos alimentos contemplados pela cesta básica onera 41,25 % do orçamento familiar. **Conclusão**: Dada uma jornada de 220 horas mensais, o salário-hora equivale a, aproximadamente, 5,92 R$/hora. Assim, para custear uma cesta, trabalha-se cerca de 91 horas por mês.

Palavras-chave: Dieta; Programas e Políticas de Nutrição e Alimentação; Alimentação no Contexto Urbano.

INTRODUCTION

On April 30, 1938, the Law No. 185 of January 14, 1936 was regulated by Decree Law No. 399[1], which establishes that the minimum wage is the remuneration due to an adult worker, without distinction of sex, per normal day of service, capable of satisfying, at a given time and region of the country, their normal needs for food, housing, clothing, hygiene and transport[2], among other items.

At the same time, the initial proposal for the average basket of goods (see *Table 1*) was formulated with the goal of providing subsistence, being designed to meet the demands of a family unit composed of 2 adults and 2 children[3].

As it can be seen, the average basket of goods is made up of 13 foods, as explained below, and the minimum provisions for each of them vary between different regions of the country. According to Santana[4], the parameters for the composition of the average basket of goods have an important criterion: the proportion of salary necessary to cover it, being established at different levels, according to the different regions of the country.

GRUPO DE ALIMENTOS	UNIDADE	REGIÃO 1	REGIÃO 2	REGIÃO 3
Carne	Kg	6,00	4,50	6,60
Leite	L	7,50	6,00	7,50
Feijão	Kg	4,50	4,50	4,50
Arroz	Kg	3,00	3,60	3,00
Farinha	Kg	1,50	3,00	1,50
Batata	Kg	6,00	-	6,00
Tomate	Kg	9,00	12,00	9,00
Pão Francês	Kg	6,00	6,00	6,00
Café em pó	Kg	0,60	0,30	0,60
Banana	Um	90,0	90,0	90,0
Açúcar	Kg	3,00	3,00	3,00
Óleo	L	0,75	0,75	0,90
Manteiga	Kg	0,75	0,75	0,75

Região 1: SP, MG, ES, RJ, GO e DF.
Região 2: PE, BA, CE, RN, AL, SE, AM, PA, PI, TO, AC, PB, RO, AM, RR e MA.
Região 3: PR, SC, RS, MT e MS.

Table 1 – Minimum provisions according to Decree Law n.º 399 - Taken and adapted of Paula[2].

Region 1 encompasses the states of the Southeast plus the Goiás and Federal District; Region 2, North and Northeast and, at last, Region 3, which makes up the South of the country together with Mato Grosso and Mato Grosso do Sul. Since different levels of income per family unit are observed in each state, smaller or larger quantities of a certain type of food are therefore justified in different regions of Brazil.

Based on population data surveys, such as: the Family Budget Survey (FBS), performed at Fundação Getúlio Vargas (FGV)[5] in the years from 1961 to 1963; as well as the National Family Expenditure Study (ENDEF)[6], elaborated by Brazilian Institute of Geography and Statistics (IBGE)[7] from 1974 to 1975; and respective POFs in the years from 1987 to 1988, through IBGE[8] and 2008 to 2009 by IBGE[9]; according to Barreto[10], the main components of the diet practiced by the average family at a certain time, place and circumstance can be determined. It is important to verify that individuals' consumption choices and preferences are based on the economic rationality of seeking to maximize well-being, given available income and current prices.[10].

The calculation of the average basket of goods – in addition to being an important instrument for economic analysis of the country – provides relevant data on market practices regarding pricing policies, and a variation may substantially impact short-term behavior when making decisions to purchase food consumer goods[2]. Additionally, as highlighted in Givisiez, *et al.*[11], the calculation of the average basket of goods also serves as a preventive parameter against the economic order, for instance, the practice of abusive prices.

In a retrospective longitudinal study, based on the evolution of the real values of the minimum wage and the average basket of goods, Santana[4] analyzed the

evolution of the purchasing power of this remuneration standard, in relation to the ability to acquire minimum essential ration items in the municipality of São Paulo – SP between the years of 1959 and 2018 (*Figure 1*). Upon inspection, it was observed that in January 1959, the family unit spent approximately 20 % of the monthly minimum wage to suit food needs.

Annually, the fraction needed to satisfy this same purpose grew, so that, between 1984 and 1994, there was a critical period of loss of the population's purchasing power. During this period, the cost of the average basket of goods in relation to the minimum wage exceeded unity, only in the following decades did this ratio decrease, stabilizing its values – with few fluctuations – at levels between 40 and 55 % of the base wage.

According to data provided by the Brazilian Institute of Geography and Statistics ***IBGE***[12], from January 2018 to May 2023, there was an increase of 30.57 % in the Broad National Consumer Price Index (IPCA), that is, in the average prices practiced by the market, which includes foods present in basic list (*Figure 2*).

Figure 1 – Evolution of the Basic List Price / Minimum Wage ratio in [R$/R$] between the years of 1959 and 2018 – Taken and adapted from Santana[4].

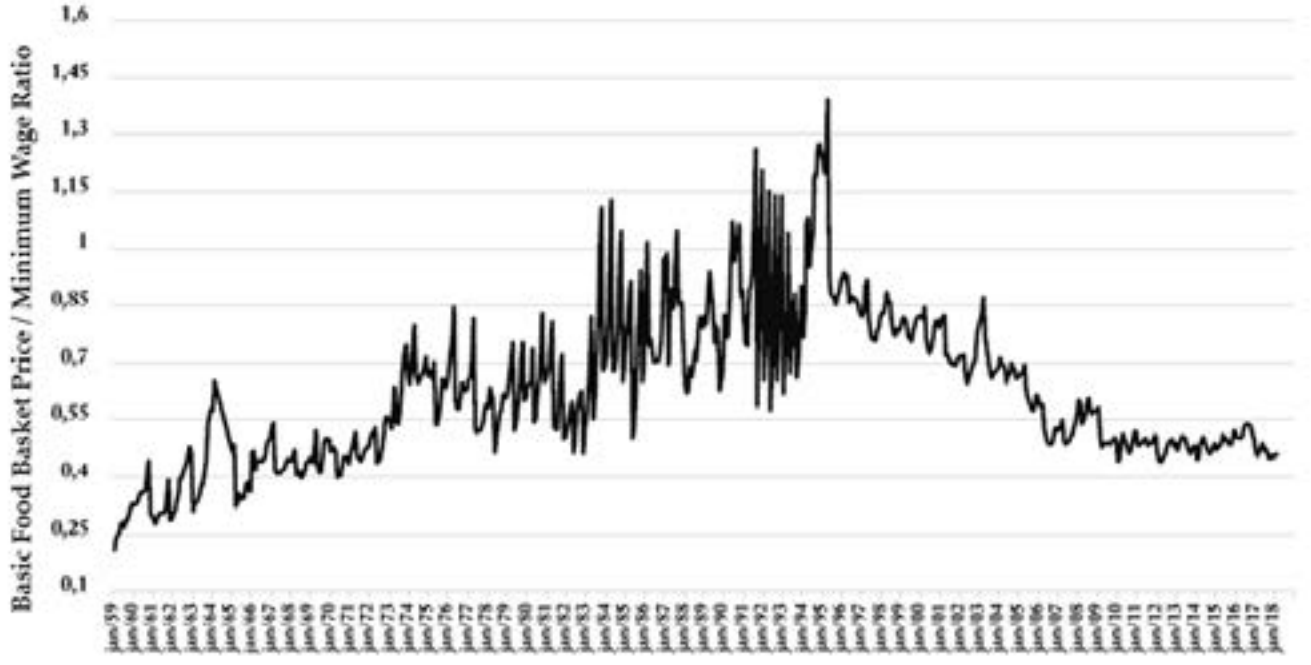
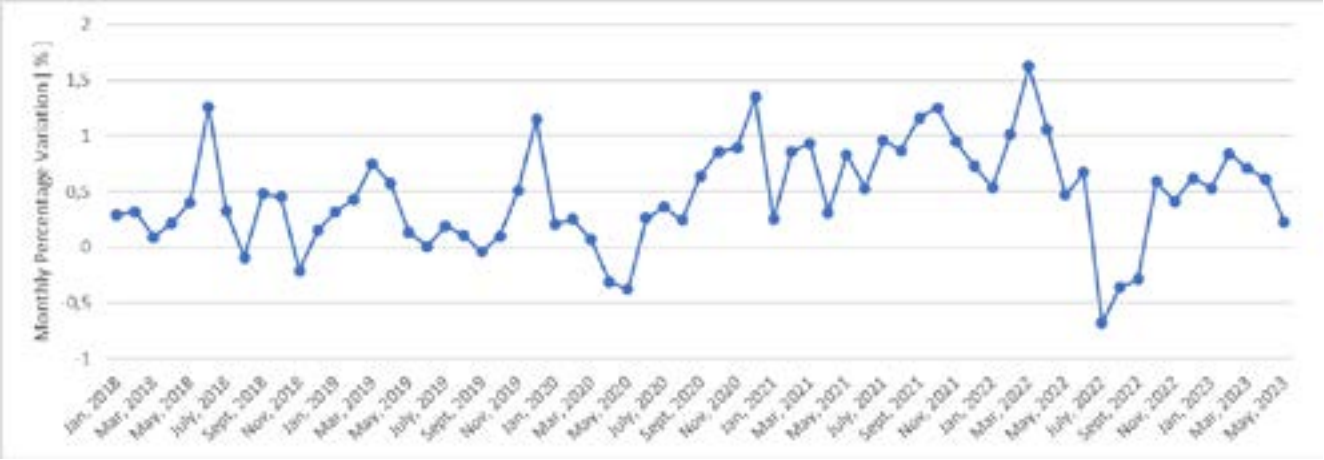


Figure 2 – Monthly variation of the IPCA during the Real Plan (%), during the period from January 2018 to May 2023 – Taken and adapted from IBGE[12].



Faced with an inflationary situation in food prices, the motivation for an economic analysis of the items present in the average basket of goods arises, assessing whether they place too much burden on the budget of the current Brazilian family unit.

Thus, the objective of the work is to investigate the sales prices of the foods that make up the average basket of goods charged by the market in the city of Belo Horizonte, in addition to quantifying the equivalent number of working hours required to acquire the set as a whole.

METHODOLOGY

This is a study whose purpose is basic, that is, it aims to generate knowledge of an economic nature – more specifically, to identify expensive and replaceable foods -, information which is relevant to serve as a theoretical framework for the development of future scientific work. The aim is to provide the necessary technical argument to establish criteria and guidelines that justify the creation and/or reformulation of a new average basket of goods, which is capable of providing a more accessible, economical and flexible food standard to the needs of the Brazilian family unit.

To this end, a form of quantitative approach was chosen, that is, the information collected and extracted will be presented objectively through numbers, for example, average food prices in monetary units of ***reais*** (*R$*) and the contribution portions of these food items in the composition of the basic list by means of percentage (%).

It is evident, therefore, that this work is observational in nature, meaning that it does not propose to carry out any intervention that could interfere with any

outcomes. The aim is to simply present, in a descriptive way, the results found from a price survey of 13 foods present in the average basket of goods, whose data were collected cross-sectional from January 1, 2023 until April 15, 2023.

The first step to be taken, in order to satisfy the objective outlined in the previous section, is to answer the following question: "*What is the minimum number of supermarkets to visit*"? In order to achieve this goal, it was crucial to establish effective communication with a highly influential institution in the retail sector that possesses comprehensive data on registered establishments within this commercial network.

In addition to the need mentioned above, so that the research on the sales prices of foods present in the basic list could be carried out, given the large number of supermarkets present in the state of Minas Gerais, as well as in the metropolitan region of Belo Horizonte (RMBH), it was decided to restrict the location of establishments of those who were only in the region covered by the city of Belo Horizonte – MG.

Through the exchange of messages via email, the *Associação Mineira de Supermercados* (AMIS), an institution with a high degree of representation and responsible for this retail sector, informed that 885 supermarket stores are registered in the city of Belo Horizonte, a variable which corresponds to the space sample, that is, the size of the population under study.

Once both of the needs mentioned above were satisfied, immediately afterwards, communication was sought with the professional responsible for the statistics sector of the *Faculdade Ciências Médicas de Minas Gerais* aiming to answer the question about the minimum number of supermarkets to be visited, raised above, and then determine the calculation of this number "n" of samples to be collected.

The systematic process for calculating this variable is detailed in *Equation 1* (see Attachments), the result was rounded to the nearest whole number. Thus, the minimum number of samples, n = 269, to be collected was determined, that is, the necessary number of supermarkets to be visited in the city of Belo Horizonte – MG, within the space of N = 885 registered commercial establishments.

In addition to facilitating the logistics of project participants, by determining the minimum number "n" of samples, i.e., the smallest necessary number of visits to supermarkets, through the statistical procedure adopted, it is possible at the same time to maintain a high level of verisimilitude with the entire sample space "N", in a way, the final product of the collections carried out corresponds, on average, to the prices generally charged in the market.

Next, the participants were instructed to perform a price survey of the 13 items present in the average basket of goods, in the various supermarkets present in the neighborhoods located within the 9 administrative regions in the city of Belo Horizonte, so that each member of the research I would be responsible for visiting 30 supermarket stores.

The necessary number of supermarkets in each member should be investigated was a proportional divi-

sion between the minimum number of samples "n" obtained in *Equation* 1 and the number of administrative regions in the city of Belo Horizonte. The choice of commercial establishment to be visited in the neighborhoods in each region was random, and the results obtained, food prices, were recorded in an electronic spreadsheet.

Due to different standards of multiples and sub-multiples of units, mass and volume of products sold, for example, packages with 1 kg, 2 kg, 5 kg, of items, such as sugar, white rice, wheat flour; 200 g, 250 g and 500 g of coffee and butter; 900 mL, 1 L, of soybean oil and whole milk, it was decided to standardize the results obtained using units of currency per units of mass or volume, that is, in R$/kg and R$/L of said food.

The quantity in kilograms or liters of each food used in this study, necessary to calculate the final value of the average basket of goods, was defined based on the minimum monthly provisions per individual corresponding to the Region 1 (seen *Table 1*), which contemplates the state of Minas Gerais, since the price research, as previously stated, was limited to the city of Belo Horizonte.

As highlighted by Givisiez, *et al*.[11], at the time of the Decree Law that established the national average basket of goods, the sale of products by units and dozens was a very common practice in Brazilian businesses. With the exception of banana, which is presented in numerical units, other foods present in the national average basket of goods are quantified in kilograms or liters, therefore, to maintain standardization, it was stipulated, by hypothesis, that 90 units are equivalent to 7.75 kilograms of banana (86,11 g/unit).

Information regarding the minimum provisions required per individual per month (resident in the city of Belo Horizonte – MG) are condensed in the first line of the *Table 2* (seen Results), with the appropriate adjustments. The second line refers to the average price in monetary units of ***reais*** (*R$*) of each item present in the average basket of goods, which was obtained through the arithmetic average of the prices surveyed in commercial establishments.

Then, in the third line of the *Table 2*, there is the cost per item, which represents the value to be released when the stipulated minimum of the food is purchased, given the average price found. This variable is determined by multiplying the first and second row in the same column. In the last column, there is the sum of all the elements present in this line (partial cost of each item), which corresponds to the final cost of the average basket of goods, a portrait of the average prices charged in the market.

Finally, in the fourth line, which is obtained by dividing each element present in the third line in relation to the last term of that same line, which represents the percentage value of how much each food item affects the final value of the average basket of goods.

Taking as a basis the minimum wage practiced from January 1st, 2023 and, making a relationship between the final cost of the average basket of goods and this, a percentage value of how much it influences the family budget is obtained. Furthermore, given a working day of 44 hours per week or 220 ***reais*** per month, it is possible to estimate the minimum number of working hours needed to acquire one unit of the average basket of goods.

RESULTS

Table 2, next, presents the data obtained throughout the work. The results of the price survey of the various supermarkets by administrative region are summarized in the *Tables A to I*, available for further consultation at an electronic address (see Supplementary Material).

Table 2 – Minimum provisions required per individual, average prices, partial cost per item and percentage relationship with the final cost of the average basket of goods in the city of Belo Horizonte – MG in the months of January to April 2023.

-	Sugar [kg]	Rice [kg]	Banana [kg]	Potatoe [kg]	Coffee powder [kg]	Meat [kg]
Minimum provision - Region #1:	3,00	3,00	7,75	6,00	0,60	6,00
Average price [R$]:	3,81	4,81	8,01	7,06	28,78	15,78
Cost per item [R$]:	11,43	14,42	62,10	42,38	17,27	94,66
Partial cost per item:	2,13%	2,68%	11,56%	7,89%	3,21%	17,62%

Wheat Flour [kg]	Bean [kg]	Milk [L]	Butter [kg]	Vegetable Oil [L]	French Bread [kg]	Tomato [kg]	Total:
1,50	4,50	7,50	0,75	0,75	6,00	9,00	-
5,68	8,65	4,91	48,93	9,33	16,02	7,86	-
8,53	38,93	36,85	36,70	7,00	96,12	70,76	**R$ 537,15**
1,59%	7,25%	6,86%	6,83%	1,30%	17,90%	13,17%	**100,00%**

In this way, it may be inferred that, in general, the average price charged by the market for the purchase of a basic list, with 13 food items, which comes across the demand of an individual residing in the city of Belo Horizonte, MG, for a period of one month, it is equivalent to five hundred and thirty-seven *reais* and fifteen cents (R$ 537,15).

Regarding on January 1st, 2023, the current minimum wage established was one thousand three hundred and two *reais* (R$ 1,302.00) monthly, therefore, an adult must spend around 41.25% of this amount to satisfy their basic food needs. Given a working day of 220 hours per month, the hourly wage is equivalent to approximately R$ 5.92/hour. Thus, to pay for a food list, people must work around 91 hours per month.

DISCUSSION

According to the statistical procedure adopted by *Equation* 1, the minimum number of samples n = 269 to be collected was determined. Despite being a much lower quantity than the number N = 885 of commercial establishments registered in Belo Horizonte – MG, even so, this high number of face-to-face visits to supermarkets was the main difficulty – in logistical terms – in carrying out the present study.

However, 256 visits were performed, 13 less than expected,. Considering that the minimum number of supermarkets was not reached, an attempt was made to manipulate the *Equation 1* to isolate the variable that gives an indication of how much the collected samples represent the original population. Throughout *Equation 2* (See Attachment), the result was a Z-score of z = 1.90. Assuming that this random variable follows a Gaussian distribution, this value corresponds to a confidence interval of α = 94.26 %, (a difference of -0.78 % compared to the standard range of α = 95 %) which confirms low impact on the likelihood of the results found. In this way, despite the logistical obstacles encountered, in which it was not possible to fully perform the various trips to supermarket units, the quality of the results was not compromised.

Comparing with the results obtained by Paula[2] in the municipality of São Sebastião do Paraíso – MG, evaluated from November 2010 to April 2011, the average price of the average basket of goods, practiced over the time horizon under study, is equivalent to two hundred and four *reais* and seventy-six cents (R$ 204,76). This represented the equivalent of 40,14 % minimum wage in force in 2010, which was five hundred and ten *reais* (R$ 510,00), being readjusted to five hundred and forty-five *reais* (R$ 545,00) in the following year.

Thus, given a working day of 220 hours per month, the hourly wage in 2010 is equivalent to approximately 2,32 R$/hour. To pay for a food list, it was necessary to work around 88 hours per month, which is, over time, there is a loss of purchasing power, as well as an increase in the working day necessary to acquire the same goods.

It is worth highlighting that, from May 1, 2011 – the month following the end of the study in question – until May 2023, accumulated inflation, according to data from the IBGE[7], was 70,6 %, in other words, correcting the value of the average basket of goods practiced in 2011, so that it becomes comparable with present values, it should be three hundred and forty-nine *reais* and thirty-two cents (R$ 349,32), much lower value than the one found in this current price search.

Other comparisons can also be performed in a similar way in surveys carried out in the state of Goiás, also belonging to Region 1. Silva, *et al.*[13] found that on March 2012, in the city of Pires do Rio, the average basket of goods cost two hundred and seventy-six *reais* and thirty-one cents (R$ 276.31), which represents 44.42 % of a salary of six hundred and twenty-two *reais* (R$ 622,00).

Borges, *et al.*[14] stated that the price of meat, bread and bananas, respectively, 32 %, 18 % and 11 % of the total cost of the average basket of goods practiced in the city of Catalão in the year of 2015. Additionally, Castro[15] prepared comparative tables, month by

month, of the percentage of the minimum wage necessary to acquire the set in Anápolis, in the year of 2016, and on average, it was necessary to spend two hundred and forty-nine *reais* and eight cents (R$ 249,08) or work approximately 79 hours.

Yet in Region 3, Costa[16] noted that, in Alegrete – RS, in the year of 2018, the final value of the food list, three hundred and five *reais* and thirty-eight cents (R$ 305,38), was inferior to those practiced in the capitals Curitiba, Florianópolis and Porto Alegre. Neckel[17] assessed that on May 2019, in the city of Concórdia – SC, the worker would need 86 hours to cover food costs, around three hundred and ninety *reais* and twenty-three cents (R$ 390,23).

Arantes[18] identified that in the cities of Campanha and Cambuquira, both located in the state of Minas Gerais, apart from some seasonal variations, in the year of 2018, the most expensive foods are meat, bread and tomatoes. Pimenta[19] highlights that in the municipality of Divinópolis – MG, on average over the 12 months of 2021, the meat represented 42,32 % of the total cost of the average basket of goods. Gonçalves, *et al.*[20], in a more impactful way, emphasizes that spending on food already corresponds to 70.32 % of the minimum wage on December 2018, in the city of Araras – SP.

The results presented in the previous section may provide important information to guide reformulations in the proposal for a new average basket of goods. For example, despite only containing 13 food items, by inspection of the *Table 2*, it appears that only 3 foods put too much burden on the set, and are, therefore, subject to interventions.

It includes bread, meat – represented by chicken breast – and tomatoes, which represent, in descending order, 17,90 %, 17,62 %, 13,17 %, that means, added together correspond to 48,69 % of spending on the average basket of goods. Such results are in accordance with those presented by Paula[2], which also listed – not necessarily in the same order – these same foods, as well as bananas, a representative of fruits, as those that cost the most and influence the final value of the average basket of goods.

Therefore, they can be replaced by foods that are more accessible or have, for instance, their quantity in mass or reduced volume, opening the door for another food item to be added to the composition of the list. Yet, to motivate the development of a more balanced and functional proposal, with the presence of more foods, expanding its diversity.

CONCLUSION

It was clear that there is a need to establish a reformulation of the variety, diversity and quantity of foods present in the average basket of goods to provide a more accessible, economical and flexible dietary pattern to the nutritional needs of the Brazilian family unit, identifying three items that can, in this way, undergo some type of intervention. It is noteworthy that bread, meat – represented by chicken breast – and tomatoes, represent, in descending order, 17.90 %, 17.62 %, 13.17 % and that together, they correspond to 48.69 % of spending on the average basket of goods.

At last, the minimum wage in force established from January 1, 2023 was one thousand three hundred and

two reais (R$ 1.302,00) a month, in this perspective, an adult individual must spend around 41.25 % of this amount to satisfy their basic food needs. Given a working day of 220 hours per month, the hourly wage is equivalent to approximately R$ 5.92/hour. Thus, to pay for a food list, you work around 91 hours per month.

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ATTACHMENTS

Equation 1 – Calculation of the number of samples to be collected.

$$n = \frac{z^2_{(1-\gamma)/2} \cdot N \cdot p \cdot (1-p)}{e^2 \cdot (N-1) + z^2_{(1-\gamma)/2} \cdot p \cdot (1-p)}$$

$$n = \frac{1{,}96^2 \cdot 885 \cdot 0{,}5 \cdot (1-0{,}5)}{0{,}05^2 \cdot (885-1) + 1{,}96^2 \cdot 0{,}5 \cdot (1-0{,}5)}$$

$$n = \frac{849{,}954}{2{,}21 + 0{,}9604}$$

$$n = 268{,}090$$

where N is the sample population, the confidence level was α = 95 %, with its respective Z-score = 1,96, the maximum error allowed corresponds to *e* = 5 % and a standard deviation (with conservative estimation) of p = 50 %.

Equation 2 – Z-score calculation.

$$z_{(1-\gamma)/2} = \sqrt{\frac{e^2 \cdot (N-1) \cdot n}{p \cdot (1-p) \cdot (N-n)}}$$

$$z_{(1-\gamma)/2} = \sqrt{\frac{0{,}05^2 \cdot (885-1) \cdot 256}{0{,}5 \cdot (1-0{,}5) \cdot (885-256)}}$$

$$z_{(1-\gamma)/2} = 1{,}90$$

where N is the sample population, n is the number of samples collected, the maximum error allowed corresponds to *e* = 5 % and a standard deviation (with conservative estimation) of p = 50 %.

ADDITIONAL MATERIAL

https://cmmg.edu.br/wp-content/uploads/2023/11/7a.-Materialsuplementar_Art2.pdf