

Fruit Consumption in the City of Lavras - MG (Brazil) from 2002 to 2017

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Abstract— The advancement of fruit research has enabled the generation of new technologies for the production of most of these plant species in quantity and quality. This made possible a great development of fruit growing in Brazil, highlighting as one of the most prominent sectors of agribusiness, achieving significant results and generating business opportunities. On the other hand, the change in people's behavior for a better quality of life, among them, the increase in fruit consumption, has further boosted the trade of this product in the retail market. The objective of this work was to know the evolution of the fruit trade in the city of Lavras, state of Minas Gerais, from 2002 to 2017 in relation to the quantity sold, losses in the gondolas of retail establishments and consumption per capita of fruits by the population of this City.

Index Terms— Fruit, Market, Consumption per capita

I. INTRODUCTION

One of the most important sectors in the world agribusiness is fruit growing, which includes a large number of fruit trees. Brazil with a great territorial extension, allied to the climatic diversity, allows the production of the most diverse fruits, generating great opportunities for the agribusiness. Estimated fruit production for 2017 is approximately 44 million tonnes. This volume keeps Brazil as the third largest fruit producer in the world, behind only China and India [1].

Brazilian production is focused on tropical, subtropical and temperate fruits, thanks to its territorial extension and geographic position. According to the Brazilian Fruit Institute (Ibraf), fruit growing in Brazil occupied an area of 2.2 million hectares, moved 16.5 billion dollars and employed 5.6 million people, representing 27% of the labor force. - farm of the country [2].

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The fruit market has grown considerably in the last decades, both in quantity and in quality. This was possible because of advances in research and development in the industry. In four decades, Brazil has gone from being an importer to exporter of some temperate fruits, such as apples. In the 1970s, the national production of this fruit represented only 10% of domestic consumption. Today, there are over 36 thousand hectares producing high quality apples, enough to meet the domestic market and even for export [3].

The changes in consumer behavior, with regard to food consumption, has been responsible for the increase in the fruit market [4]. Faced with this trend, the Center for Advanced Studies in Applied Economics, University of São Paulo (Cepea-USP), conducted a survey on fruit consumption in Brazil, which showed an average increase of approximately 4.38 kg per person per year, from 2005 to 2011 [5]. This consumption should continue to rise in the coming years, in particular due to the growing interest of the Brazilian consumer for a healthier diet [1].

This work had as objective to know the fruit trade of the city of Lavras - MG, in relation to the commercialized volume, percentage of losses in gondolas and per capita consumption of fruits of the population in the period from 2002 to 2017.

II. MATERIALS AND METHODS

This research was carried out in five stages in the city of Lavras - MG, Brazil, the first in 2002/2003; the second of 2004/2005, the third of 2011/2012, the fourth of 2014/2015 and the fifth of 2016/2017 in the months of July to June, in the various networks of supermarkets, saloons and free-trade fairs.

The data collection was performed monthly, through a spreadsheet with questions about quantity marketed, total value of consumer prices and percentage of losses in gondolas. The data collected were tabulated and analyzed monthly.

Sampling of the number of establishments interviewed was performed according to the criteria of [6], in which locality with more than fifty fruit shops the sample is 10%, ten to forty of 20% and with less than ten of 100 %. For this research carried out in the city of Lavras, Minas Gerais, Brazil, the sample was 100% of the four networks of supermarket establishments and ten retail establishments.

III. RESULTS AND DISCUSSION

According to the data presented in Table 1, in the first stage (2002/2003) an average of 318.5 t of fruit per month was traded in the second 374.4 t (2004/2005, third 621.0 t

(2011/2012), the fourth 770.5 t (2014/2015) and the fifth 804.3 t (2016/2017).

According to the data presented, there is an increase of 17.55% from the first to the second stage and from 94.97% from the first to the third stage [7]. From the third to the fifth stage, there was an increase of 29.51% and the first to the fifth of 152.52%, showing the tendency of increase in the fruit consumption by the population, motivated mainly by the aspects related to health and the search for a better quality of life [3].

In six years, from the second to the third stage, per capita fruit consumption in Lavras rose from 47.76 kg / inhabitant / year [7] to 58.90 kg / inhabitant / year [8]. In that interval, per capita consumption increased by 11.14 kg per person per year, which was more than double the average in Brazil, which registered an increase of 4.38 kg per person per year, according to data released by Cepea-USP [5].

Comparing the evolution from the first to the third stage, per capita consumption increased from 47.76 kg / hab / year [8] to 78.63 kg / hab / year, representing an increase of 30.87 kg / year, ie an increase of 64.63% in per capita consumption. In 2016, per capita consumption in the city of Lavras was 96.51 kg / inhabitant / year, an increase of 102.07% over a period of fifteen years [3].

According to [9], per capita consumption in Brazil was 57.00 kg / hab / year, in Italy, 114.00 and in Spain, 120.00 kg / inhab / year.

In Lavras, although per capita consumption is above the national average, it is still below that in Italy and Spain [3]. This fact can be explained by the increase in the supply of fruit in the retail market, as a consequence of the increase in the demand for the population, due to the behavioral changes of the population that started to look for healthier foods, together with an improvement of the purchasing power of the society in general, as well as the improvement of the supply and distribution of these products by the retail network with assiduity and punctuality.

Table 1 – Quantity (t) of the fruit marketed in Lavras from 2002 to 2017

Month/ Stages	Stages				
	2002/ 2003	2004/ 2005	2011/ 2012	2014/ 2015	2016/ 2017
July	292,1	393,2	582,0	714,0	758,2
August	312,3	385,9	642,6	746,0	783,3
September	309,6	383,0	634,9	782,9	822,0
October	330,9	350,9	589,1	810,8	851,3
November	356,4	355,0	591,1	760,4	798,4
December	372,1	401,1	667,7	832,4	874,0
January	282,5	389,7	644,8	785,4	824,6
February	298,1	396,9	629,2	768,9	798,6
March	311,4	344,2	595,2	748,3	782,5
April	322,6	382,4	612,4	758,6	788,9
May	352,8	354,5	621,4	762,8	791,2
June	281,9	366,3	642,0	776,2	779,2
Total	3.922,7	4.493,1	7.452,4	9.246,7	9.652,2
Average	318,5	374,4	621,0	770,5	804,3

The losses of the fruits in supermarket shelves and bakeries went from 7.8% [8], in the first stage, to 4.6% in the third stage, according to the report of those responsible for the hortifrúti section of the researched establishments. There was a reduction in losses from 64.24 t / month to 40.48 t / month, that is, 23.76 t / month less, representing a saving in waste per

month. This is due to the efforts made by the management of the retailers (supermarkets and saloons) in the logistics of distribution to the final consumer.

Table 2 shows the data of the main fruits commercialized in the city of Lavras, MG, in the fifth stage of this research, from August 2016 to January 2017.

The banana was the most commercialized fruit, with a monthly average of 139.42 t, of which the cultivar Prata contributes with 102.29 t and the Nanica, with 37.13 t.

The second most traded fruit was the 'Pêra' orange, with a monthly average of 108.68 t, followed by the national apple, with 49.24 t, and papaya with 39.65 t, with 20,70 t of papaya 'Formosa', and 18.95 t of the 'Amazonas' papaya.

In December 2016, the 'Rosada' grape was the 5th placed with 37.74 t and in January 2017 this position was occupied by the 'Palmer' mango, with 35.72 t.

In this stage it is verified that the month of December was the month of greatest fruit supply in the city of Lavras. It can be said that this event is due to the greater supply of fruits, accompanied by the greater demand of these products by the population, a factor motivated by the Christmas festivities and also by the increase of income, with the receipt of the 13th salary.

As for the increase in the volume of fruit traded, it can be said that it is a consequence of the increase of productivity and quality, as well as the constant supply of these products during all months of the year. This offer, in turn, is provided by the technological development resulting from the results of continuous scientific research, which has made possible the advancement of fruit growing in the various geographic regions of Brazil.

IV. CONCLUSIONS

The commercialization of fruit in Lavras has increased simultaneously to the increase of the consumption and the supply of fruits with quality, assiduity and punctuality;

Losses in facilities decreased as a result of more efficient distribution logistics;

Technological development has provided better quality fruit during all months of the year, favoring increased consumption, which has also been driven by changing consumer habits.

Table 2 - Most commercialized fruits (t) in Lavras - MG, from August 2016 to January 2017

Fruit/Month	Aug/16	Set/16	Oct/16	Nov/16	Dez/16	Jan/17	Average
Silver banana	92,79	109,66	109,93	102,24	104,72	94,38	102,29
Banana nanica	28,29	27,09	33,30	40,79	47,85	53,46	37,13
Orange pear	105,85	109,66	121,90	107,99	102,13	104,60	108,68
National apple	44,52	41,29	56,05	38,87	69,30	45,44	49,24
Papaya formosa	19,50	24,29	19,37	20,86	18,73	21,50	20,70
Papaya amazonas	15,01	18,70	16,37	20,15	21,14	22,34	18,95
Pear pineapple	20,86	18,92	18,72	24,01	30,60	18,29	21,23
Pink grape	-	-	-	-	37,74	-	-
Manga palmer	-	-	-	-	-	35,72	-
Sub-total*	326,82	349,58	375,64	354,91	432,21	395,73	358,22
Others	456,78	472,42	475,66	433,49	441,79	428,87	467,38
TOTAL	783,30	822,00	851,30	798,40	874,00	824,60	825,60

* Subtotal for banana, orange, apple, papaya and pineapple.

REFERENCES

- [1] CNA BRASIL. Fruticultura: **Balço 2016/Perspectiva 2017**. Brasília, 201. Disponível em: http://www.cnabrazil.org.br/sites/default/files/sites/default/files/uploads/10_fruticultura.pdf. Accessed in dec. 10, 2017.
- [2] IBRAF, 2010. **Produção Brasileira de Frutas, 2009**. [S.n.t.] Disponível em: [http://www.ibraf.org.br/estatisticas/Produção Brasileira de Frutas 2009-Final.pdf](http://www.ibraf.org.br/estatisticas/Produção%20Brasileira%20de%20Frutas%202009-Final.pdf). Accessed in dec. 10, 2017.
- [3] ANDRADE, Jose Clélio de; PEREIRA, Lair Victor; ALVARENGA, Angelo Albérico.; FERREIRA, Ester Alice; NORBERTO, Paulo Márcio. **Evolution of the fruit market in the city of Lavras-Minas Gerais-Brazil: 2004 to 2015**. International Journal of Environmental & Agriculture Research, v. 3, p. 32-36, 2017.
- [4] PIMENTEL, P.M.; PIMENTEL, L.P. **Tendências do mercado de frutas de uso imediato**. Pelotas: Embrapa Clima Temperado, [2011]. Disponível em: [www.ceinfo.cnpct.embrapa/artigo_contexto.plep?op=1&](http://www.ceinfo.cnpct.embrapa.br/artigo_contexto.plep?op=1&). Accessed in dec. 10, 2017.
- [5] SILVEIRA, J. et al. Quem é o consumidor brasileiro de frutas e hortaliças? **Hortifruti Brasil**, Piracicaba, ano 10, n.103, p.8-23, jul. 2011. Disponível em: www.cepa.esalq.usp.br/hfbrasil/edicoes/103/full.pdf. Accessed in dec. 10, 2017.
- [6] COCHRAN, W. G. The Planning of Observational Studies of Human Populations. **Journal of the Royal Statistical Society. Serie A (General)**, Vo. 128, Nº 2 (1965), pp. 234-266.
- [7] PEREIRA, L.V.; ABRAHÃO, E.; ANDRADE, J.C.; FRÁGUAS, J.C.; ALVARENGA, A.A. Análise do mercado de frutas em Lavras-MG. **Ciência e Agrotecnologia**, v.32, n.6, p. 1981-1984, no./dez.,2008.
- [8] ANDRADE, Jose Clélio de, PEREIRA, Lair Victor; ABRAHÃO, Enilson; ALVARENGA, Angelo Albérico; MALTA, Marcelo Ribeiro. **Mercado de frutas em Lavras – MG**. Lavras:EPAMIG-CTSM, 2012, 3p. (EPAMIG-CTSM. Circular Técnica, 149).
- [9] FAO. **Faostat**. Rome, 2015. Disponível em: <http://faostat.fao.org>. Accessed in dec. 10, 2017.