



## COMPARISON OF PRODUCTION COSTS IN PEQUI CULTURE (*Caryocar brasiliense* Camb.)

COMPARATIVO DOS CUSTOS DE PRODUÇÃO DO PEQUIZEIRO (*Caryocar brasiliense* Camb.)

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*pequi, cerrado, unidade de comercialização, hectare*

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### Abstract

The cerrado is one of the main biomes belonging to the Brazilian territory. Among the species present in this biome is the pequi (Caryocar brasiliense Camb). In general, even with extractive exploitation, several families benefit from the pequi crop, with culture as a source of income and employment, and up to 57% of the annual income of rural workers in the cerrado is evidenced by the commercialization of fruits in the region. In view of this, the objective of this work was to compare the production costs of the pequi in four Brazilian cities, Poconé, in Mato Grosso, Japonvar, in Minas Gerais Iporá, in

Goias and Crato, in Ceará in the agricultural years 2017 and 2018. The greatest reduction in production costs, per commercialization unit and per hectare of the agricultural year from 2017 to 2018 was in the municipality of Japonvar, MG. In the municipality of Iporá, GO, there was an increase in the production cost per commercialization unit and per hectare of the agricultural year from 2017 to 2018. The municipality of Japonvar, MG, among the cities analyzed, has the highest profitability in the pequi culture.

### Resumo

O cerrado é um dos principais biomas pertencentes ao território brasileiro. Entre as espécies presentes neste bioma está o pequi (Caryocar brasiliense Camb). De maneira geral, mesmo com a exploração extrativa, várias famílias se beneficiam da safra de pequi, tendo a cultura como fonte de renda e emprego, sendo que até 57% da renda anual dos trabalhadores rurais do cerrado é evidenciada pela comercialização dos frutos da região. Diante disto, objetivou-se com esse trabalho, comparar os custos de produção do pequi em quatro cidades brasileiras, Poconé, no Mato Grosso, Japonvar, em Minas Gerais Iporá, em Goiás e Crato, no Ceará nos anos agrícolas 2017 e 2018. A maior redução de custo de produção, por unidade de comercialização e por hectare do ano agrícola de 2017 para 2018 foi no município de Japonvar, MG. No município de Iporá, GO houve aumento no custo de produção por unidade de comercialização e por hectare do ano agrícola de 2017 para 2018. O município de Japonvar, MG, entre as cidades analisadas, apresenta a maior lucratividade na cultura do pequi.

### INTRODUCTION

The cerrado is one of the main biomes belonging to the Brazilian territory, with an area of about two

million km<sup>2</sup>, occupying a large part of the Northeast, Midwest and Southeast regions (SANTOS et al., 2013; GARCIA et al., 2017).

Among the species present in this biome is the pequi (*Caryocar brasiliense* Camb). The pequi is a typical Brazilian species, belonging to the family Caryocaraceae, with tree size that can vary from 8 to 12 m in height (CAMARGO et al., 2014).

The pequi fruits consist of a greenish-colored epicarp, coloring the outer mesocarp that comes out yellowish and whitish. At the center of the fruit seed, also known as pyrene and putamen, fleshy with an inner core (corresponding to the pulp), rich in oil, yellow or orange, a stony endocarp covered with a core and covered with spines (GARCIA et al., 2017).

This fruit is widely used as a food source and can be consumed fresh or cooked, in the preparation of sweet or savory foods, being a source of lipids, proteins, vitamins (A and C) and minerals (BOAS et al., 2013; RODRIGUES et al., 2016).

Although the exploitation of these fruits is seasonal, especially in rural areas, the economic contribution of this activity is much greater than that indicated by official statistics, being the complement of the income of several farming families (FELFILI et al., 2004; RIBEIRO et al., 2008).

In general, even with extractive exploitation, several families benefit from the pequi crop, with culture as a source of income and employment (SILVA, 2009), and up to 57% of the annual income of rural workers in the cerrado is evidenced by the commercialization of the region's fruits (GOMES, 2000; OLIVEIRA, 2006), and in the north of Minas Gerais, 17.73% of the family income of the producers is represented by the commercialization of pequi (POZO, 1997) and in Goiás, it can reach up to 80% of the family income of the farmer (SANTOS et al., 2013).

Given the above, this work aimed to compare the costs of production of the pequi in four Brazilian cities, Pocone, in Mato Grosso, Japonvar, in

Minas Gerais, Ipora, in Goiás and Crato, in Ceará in the agricultural years 2017 and 2018.

## MATERIAL AND METHODS

As for the technical procedures used in this study, descriptive research was carried out with statistical data provided by the Agricultural Information Portal at the Agricultural Observatory of the National Supply Company (CONAB, 2018).

Statistical data were analyzed in the agricultural years of 2017 and 2018, of the pequi culture (*Caryocar brasiliense* Camb.) In four Brazilian municipalities. The municipalities were Pocone, in Mato Grosso (MT), located at latitude: 16° 15 '24 "S and longitude: 56° 37' 22" W, in Japonvar, Minas Gerais (MG), located at latitude: 15° 59 '41 "S and longitude: 44° 16 '12" W, in Ipora, Goiás (GO) located at latitude: 16° 26' 31 "S and longitude: 51° 07 '04" W and Crato, Ceará (CE) located at latitude: 07° 14 '03 "S and longitude: 39° 24' 34" W.

In production costs, the costs of the following items were considered: (a) administrator: consists of the rural producer, whose objective is to plan; to control; decide; monitor or control the results of the rural property; (b) Packaging (only in the municipalities of Pocone - MT, and Ipora - GO): they are tools used to sell the product to the final consumer; (c) manpower: manual worker generally employed in the production of the pequi culture; (d) financing interest: rate from the financing made by the producer with credit concessionaires; (e) CESSR: special contribution to rural social security; (f) administrative expenses: expenses with telephone bills, reception, cleaning, and others; (g) external transport (only in the municipalities of Pocone - MT, Japonvar - MG, and Ipora-GO): displacement in transport to sell the product.

In both municipalities, production costs will be described per commercialization unit (R\$/25kg) and

per hectare (R\$/ha) in two agricultural years: 2017 and 2018, as a reference for the months of July 2017 and August 2018, respectively.

The productivity per hectare (t/ha) and the cost of production per hectare (R\$/ha) in the two agricultural years in the four Brazilian municipalities will be analyzed, in order to establish a ratio obtained by dividing the productivity by the production cost. The data obtained were tabulated by an electronic spreadsheet and presented in the form of tables.

## RESULTS AND DISCUSSION

In Table 01, the production cost in Pocone, MT per commercialization unit decreased by 2.2% (R\$ 0.40) and per hectare, it decreased by 2.1% (R\$ 288). When looking at the data, it is noted that the reduction is related to the reduction of the special contribution to rural social security (CESSR). Pequi production in Pocone, MT in 2018 was 3 ton (t) with a production value of R\$ 4,000.00 (BRASIL, 2018a).

**Table 1.** Production cost per commercialization unit and per hectare of pequi in two agricultural years in the municipality of Pocone, MT.

Item Cost	2017		2018	
	Commercialization Unit Cost (R\$/25kg)	Cost per hectare (R\$/ha)	Commercialization Unit Cost (R\$/25kg)	Cost per hectare (R\$/ha)
ADMINISTRATOR	0.04	28.11	0.04	28.62
PACKAGING	0.42	306.69	0.42	306.69
MANPOWER	14.54	10,687.50	14.54	10,687.50
FINANCING				
INTEREST	0.16	117.47	0.15	111.97
CESSR	0.59	431.08	0.20	147.66
ADMINISTRATIVE COSTS	0.45	330.67	0.45	330.68
EXTERNAL TRANSPORT	2.41	1,771.88	2.41	1,771.88
<b>TOTAL COST</b>	<b>18.61</b>	<b>13,673.40</b>	<b>18.21</b>	<b>13,385.00</b>

Data from a collection carried out in the municipality of Pocone, in Mato Grosso in July 2017 and August 2018. Adapted from CONAB (2018).

According to Melo et al. (2016), 27% of family farmers plant fruit trees (bananas, watermelons, pequi ...), with 93% of farming families practicing more than one production system in production units (MENDES et al., 2014), with 41% of activities, farmers plant to commercialize maize, manioc, pumpkin, sweet potato, banana, pequi, among others (MELO et al., 2016).

In Table 02, the production cost in Japonvar, MG per commercialization unit decreased by 14.2% (R\$ 2.12) and per hectare, it decreased by 14.1% (R\$ 615.37). Note that the biggest reductions were the cost of labor, financing interest, CESSR, and administrative

expenses. Pequi production in Japonvar, MG in 2017 was 1,124 t with a production value of R\$ 786,000.00 (BRASIL, 2017a) and 2018 was 1,255 t with a production value of R\$ 815,000.00 (BRASIL, 2018b).

The processing of pequi involves the use of labor, without the need to leave the community, allowing to increase the market value of products and extend the time of commercialization of the pulp (AFONSO et al., 2014).

**Table 2.** Production cost per commercialization unit and per hectare of the pequi in two agricultural years in the municipality of Japonvar, MG.

Item Cost	2017		2018	
	Commercialization Unit Cost (R\$/25kg)	Cost per hectare (R\$/ha)	Commercialization Unit Cost (R\$/25kg)	Cost per hectare (R\$/ha)
ADMINISTRATOR	0.10	28.11	0.10	28.62
MANPOWER	13.85	4,050.00	12.31	3,600.00
FINANCING INTEREST	0.15	41.75	0.05	13.82
CESSR	0.74	215.30	0.31	90.83
ADMINISTRATIVE COSTS	0.42	122.34	0.37	108.86
EXTERNAL TRANSPORT	1.75	511.88	1.75	511.88
<b>TOTAL COST</b>	<b>17.01</b>	<b>4.969.38</b>	<b>14.89</b>	<b>4,354.01</b>

Data from a collection carried out in the municipality of Japonvar, in Minas Gerais in July 2017 and August 2018. Adapted from CONAB (2018).

**Table 3.** Production cost per commercialization unit and per hectare of the pequi in two agricultural years in the municipality of Ipora, GO.

Item Cost	2017		2018	
	Commercialization Unit Cost (R\$/25kg)	Cost per hectare (R\$/ha)	Commercialization Unit Cost (R\$/25kg)	Cost per hectare (R\$/ha)
ADMINISTRATOR	0,02	18,74	0,02	19,08
PACKAGING	0,25	152,50	0,25	165,00
MANPOWER	14,00	11.250,00	14,75	12.000,00
FINANCING INTEREST	0,03	71,16	0,03	76,81
CESSR	0,25	288,76	0,25	151,88
ADMINISTRATIVE COSTS	0,50	342,64	0,50	365,52
EXTERNAL TRANSPORT	1,50	1.232,00	2,00	1.540,00
<b>TOTAL COST</b>	<b>16,55</b>	<b>13.355,80</b>	<b>17,80</b>	<b>14.318,29</b>

Data from a collection carried out in the municipality of Iporá, Goiás in July 2017 and August 2018. Adapted from CONAB (2018).

In Table 03, the production cost in Ipora, GO per commercialization unit increased by 7% (R\$ 1.25) and per hectare increased by 6.7% (R\$ 962.49). Despite the reduction in the cost of CESSR, there is a marked increase in the cost of labor and external transportation. According to Oliveira et al. (2005), Ipora and Gúlias et al. (2008), Damianópolis are pequi productive chains in the State of Goiás, it stands out as an activity of social inclusion for absorbing low qualified labor and above-average remuneration in relation to agricultural activities (OLIVEIRA et al., 2017).

In Table 04, the production cost in Crato, CE per commercialization unit decreased by 4.1% (R\$ 0.73) and per hectare, it decreased by 3.7% (R\$ 88.24). Despite the increase in labor costs, the reduction in financing interest and CESSR showed a reduction in the total cost. Pequi production in Crato, CE in 2017 was 345 t with a production value of R\$ 338,000.00 (BRASIL, 2017b) and 2018 was 303 t with a production value of R\$ 303,000.00 (BRASIL, 2018c).

**Table 4.** Production cost per commercialization unit and per hectare of the pequi in two agricultural years in the municipality of Crato, CE.

Item Cost	2017		2018	
	Commercialization Unit Cost (R\$/25kg)	Cost per hectare (R\$/ha)	Commercialization Unit Cost (R\$/25kg)	Cost per hectare (R\$/ha)
ADMINISTRATOR	0.25	18.74	0.25	19.08
MANPOWER	15.50	2,115.00	16.50	2,250.00
FINANCING INTEREST	0.25	33.08	0.03	10.64
CESSR	1.75	235.98	0.25	30.78
ADMINISTRATIVE COSTS	0.50	64.01	0.50	68.07
<b>TOTAL COST</b>	<b>18.25</b>	<b>2,466.81</b>	<b>17.53</b>	<b>2,378.57</b>

Data from a collection carried out in the municipality of Crato, Ceará in July 2017 and August 2018. Adapted from CONAB (2018).

The micro-region of Crato, CE, the largest producer in 2006, with (42.34%) of the national production is unstable in its production histories, especially in 2003, with the emergence of new management techniques, increased demand and economic interest (ROCHA et al., 2008).

For the producer, the production cost spreadsheet is a necessary tool in the analysis of costs in order to assist in decision making (VENTURA et al., 2020a). Knowledge of agricultural production costs is effective in controlling agricultural activities, as it is possible to create strategic planning in the acquisition of inputs (ARTUZO et al., 2018). Thus, Ventura et al. (2020b) recommends more descriptive and regional studies to analyze production costs to make decisions and determine the viability of the production unit regarding external demands and factors

## CONCLUSIONS

The biggest reduction in production costs, per commercialization unit and per hectare of the agricultural year from 2017 to 2018 was in the municipality of Japonvar, MG.

In the municipality of Ipora, GO, there was an increase in the cost of production per

commercialization unit and per hectare of the agricultural year from 2017 to 2018.

The municipality of Japonvar, MG, among the cities analyzed, presents the highest profitability in the pequi culture, even if the municipality did not include the packaging.

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