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VIII Encuentro Latinoamericano Prunus sin Fronteras

Peach

costs analysis and crop profitability in Uruguay

Duraznero

análisis de costos y rentabilidad del cultivo en Uruguay

Pêssego

análise de custos e rentabilidade do cultivo no Uruguai

Editor

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Abstract

Peach crop area in Uruguay has seen a reduction over the last years. A possible reason for this is a decrease in return. Consequently, this paper aims at studying whether or not peach growing is a profitable activity for growers. Data supporting this study came from Mercado Modelo of Montevideo and the Ministry of Livestock, Agriculture and Fisheries. Results show that higher productivity in early harvested peaches is necessary to meet the break-even point. Indeed, current cultivar assortment in Uruguay, according to harvest period, prevents peach from being a profitable activity. Consequently, improvements are suggested in order to increase returns. That is the case of selecting cultivars with high production per hectare along with high quality characteristics. In addition, fruit thinning times and methods as well as number of pickings during the harvest season should be revised in order to decrease harvest costs. Furthermore, peach growers should choose technologies that allow an increase of labor efficiency in pruning, thinning and harvest. Therefore, higher number of plants by hectare should be fostered along with implementing training and pruning systems that reduce final size of plants. All the mentioned adjustments would help to decrease costs of production.

Keywords: consumption, economic return, hand labor, *Prunus*, productivity

Resumen

En los últimos años el área de duraznero en Uruguay ha disminuido y una de las explicaciones sería la caída en los niveles de ganancia. Por ello, el presente artículo estudia si este cultivo es una actividad rentable o no. Los datos empleados para el análisis provienen del Mercado Modelo de Montevideo y del Ministerio de Ganadería, Agricultura y Pesca. Los resultados obtenidos sugieren aumentar la productividad en los cultivares de duraznero temprano para alcanzar el punto de equilibrio, dado que la distribución de variedades, según la época de cosecha, impide que esta sea una actividad rentable. Para alcanzar niveles de ganancias positivos, se deberían seleccionar cultivares con alta productividad y elevados parámetros de calidad. Además, el período de cosecha debe revisarse junto con la adopción de un número menor de repases en esta etapa ya que ello reducirá los costos de cosecha. El fruticultor también debe elegir una tecnología que aumente la productividad de la mano de obra en las labores de poda, raleo y cosecha. Además, se deberían favorecer plantaciones con mayor densidad de plantas y con sistemas de conducción y poda que reduzcan el tamaño final de las plantas. Tomando todas estas medidas se reducirían los costos de producción.

Palabras clave: consumo, retornos económicos, mano de obra, *Prunus*, productividad

Resumo

Nos últimos anos, a área de pêssego no Uruguai sofreu uma redução significativa, e uma das explicações é uma queda nos níveis de rentabilidade. Portanto, o artigo tem como objetivo estudar se o cultivo do pessegueiro no Uruguai é uma atividade lucrativa ou não. Os dados que suportam este estudo provêm do Mercado Modelo e do Ministério de Pecuária, Agricultura y Pesca. Como resultado, menciona-se a necessidade de uma maior produtividade nos pêssegos precoces para alcançar o ponto de equilíbrio. De fato, a distribuição de cultivares no Uruguai segundo época de colheita impede que os pêssegos sejam uma atividade rentável. Como consequência, se deveria selecionar cultivares com alta produtividade e com elevados parâmetros de qualidade. Além disso, o período de colheita deve ser revisado juntamente com a adoção de menor número de repasses, pois isto reduzirá os custos de colheita. O agricultor também deve escolher tecnologias que aumentam a produtividade laboral nas etapas de poda, raleio dos frutos e colheita. Nesse sentido, é importante que o produtor privilegie plantios com maior número de plantas por hectare e com sistemas de condução e poda que reduzam o tamanho final das plantas. Dessa forma, seria possível reduzir o custo de produção.

Palavras-chave: consumo, retorno econômico, mão-de-obra, *Prunus*, produtividade

1. Introduction

Peaches are the second most important deciduous fruit trees in Uruguay in regard to production. On average, mean national fruit offer was 12,464 tons for the period 2014/15 - 2018/19, whereas grown area reached 1,563 ha for the seasons between 2011/12 and 2015/16. In the last five seasons, included 2018/19, 97% of the harvest went to the fresh fruit market. During this period, exports were less than 1 ton per year, which means that growers are not attracted to selling this product abroad. On the other hand, imports reached 457 tons on average per year. Nevertheless, in low productive seasons, such as 2017/18 when it reached 1,517 ton, imports act as a complement to Uruguayan offer[1][2].

It is worth mentioning that, in the past, Uruguayan fruit growers with low to middle-size operations decided to grow peaches due to three reasons:

a) When compared to apples and pears, available technology allowed peach growers an earlier access to the market as well as a faster recovery of the initial investment;

b) Initial investment in peaches is lower than other crops, like apples;

c) Different cultivars with different harvest date give growers the possibility of a continuous income from spring to the end of summer.

On the other hand, statistics show a steady decrease of peach planted area since season 2007-08. Such a decrease was greater among farmers with operations ranging from 10 to 20 ha. In addition, farmers with operations of up to five ha show a reduction in their actual market share compared with that at the beginning of the present century. Therefore, which are the causes behind this reduction in area?

1. Small and medium fruit growers are those who more frequently abandon this activity.
2. Peaches are no longer a crop that allows farmers a fast recovery of the investment in comparison with other fruits.
3. Peach crop shows a trend towards reduction in returns, at least for a great deal of producers.

Given those facts, this paper aims at studying whether or not peach growing is a profitable activity in Uruguay. It also focuses on analyzing the involved variables playing a role in the profitability of this crop. Additionally, possible improvements in order to increase the returns in this activity are identified.

2. Materials and methods

2.1 Source of data

The Mercado Modelo of Montevideo (main gross market for deciduous fruits and vegetables of Uruguay) provided wholesale prices used in this manuscript. In addition, commercial yield and processed fruit data were obtained from the Statistics section of the Ministry of Livestock, Agriculture and Fisheries (MGAP - DIEA) of Uruguay. For those years in which no data was available, forecasts were obtained from the 2019 yearbook of the Specialized Office of Agricultural Policies, OPYPA. Exports and imports information were downloaded from Penta transaction service.

Finally, fruit growers belonging to CREA groups (an organization that involves 9% of fruit area in the country and whose work methodology consists of exchanging and discussing problems among the members of small groups of farmers) gave data about cost production of peaches.

2.2 Statistics

Prices were grouped according to the period in which peaches are harvested. In this sense, early peaches range from November to the first half of December. Season peaches go between second half of December and the end of January. Late peaches are harvested in February and March.

On the other hand, consumption is calculated adding local production to imports while subtracting exports, processed and culled fruit[3].

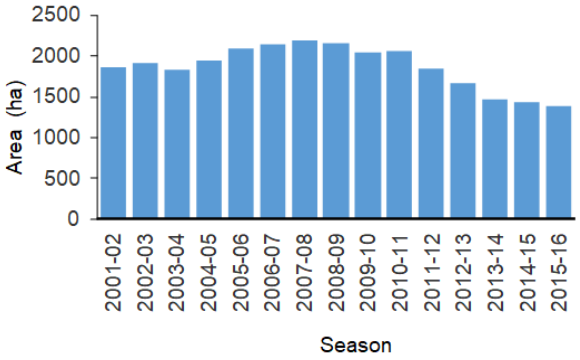
Additionally, the break-even point is calculated using costs provided by the CREA fruit growers and wholesale prices. Post-harvest costs are related to: 1. transport between the fruit orchard and Mercado Modelo, 2. the selling costs in the gross market premises.

3. Results and discussion

3.1 Brief history of peaches in Uruguay

It should be noted that there has been a decrease in the peach trees area in Uruguay since 2007-08, as Figure 1 depicts.

Figure 1. Evolution of peach production area (2001-02 to 2015-16 seasons, Uruguay)



Source: MGAP (DIEA)[4][5][6][7][8][9][10][11][12][13][14][15]

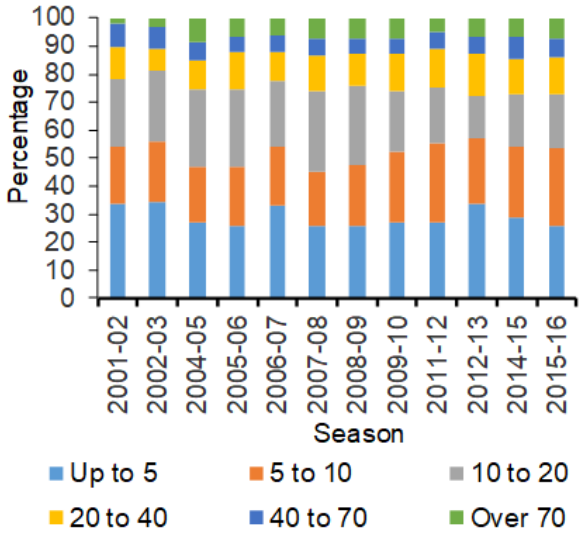
Statistics also show that farmers up to 5 ha represent the same share over the period 2007/08-2015/16, but it became slightly lower than at the first years of the present century. After 2008/09, those growers with 5 to 10 ha increased their share in comparison with the previous period. Operations of farmers with 10 to 20 ha have undergone a great reduction in their percentage for the last observed seasons. To the end of the period, operations with 20-40 ha increased their share in peach production. With the exception of some seasons, those between 40 and 70 and over 70 ha remained stable (Figure 2).

Comparing 2007/08 (greatest value) to 2015/16, the area reduction for farms up to 20 ha is 61%, and for those over 20 ha reaches 51%. Thus, low-to-middle size peach farms have undergone the greatest decline. Considering farms with less than 20 ha, those up to 5 ha and the group 10-20 ha showed the highest reduction (Figure 2).

3.2 Yield and productivity

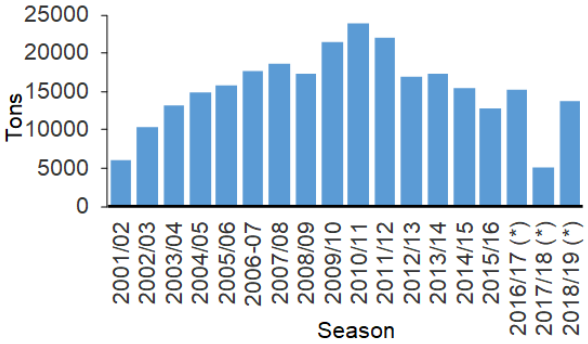
The pattern in peach production is slightly different from that observed in the planted area. Total peach volume reduction is present since 2011/12, and four seasons after the peak in planted area (Figure 3).

Figure 2. Peach farm size (2001-02 to 2015-16 seasons, Uruguay)



Source: MGAP (DIEA)[4][5][6][7][8][9][10][11][12][13][14][15]

Figure 3. Evolution of peach production (2001-02 to 2018-19 seasons, Uruguay)



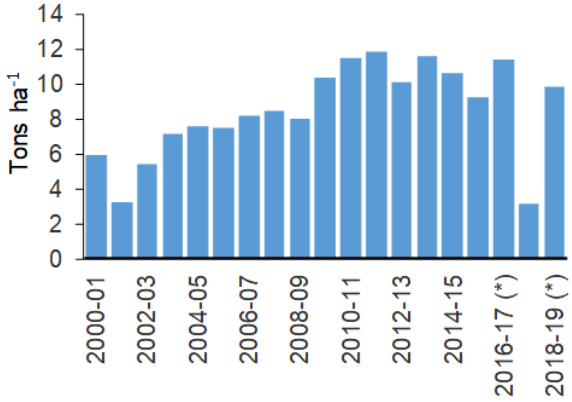
Source: MGAP (DIEA)[4][5][6][7][8][9][10][11][12][13][14][15]
(*) = Estimated values.

Data showed that, since 2008, production decline in lost areas (mainly low productive surfaces) was compensated by areas with higher yields[1][2]. The fact that caused this circumstance was the excessive rainfall in the 2001/02 season, which due to drainage problems of soils affected peach trees. Consequently, a high number of trees died, causing an area decrease, since it lead to tree uprooting.

Then, new areas were planted with newer technology.

Therefore, the new plantings showed a better yield stability maintaining annual production with lower planted area. Regarding productivity by hectare, Figure 4 confirms the mentioned trend. Indeed, after 2008-09 it was registered an increase in productivity which compensated the area reduction.

Figure 4. Productivity of peaches (2001-02 to 2015-16 seasons, Uruguay)



Source: MGAP (DIEA)(4)(5)(6)(7)(8)(9)(10)(11)(12)(13)(14)(15)
(*) = Estimated values

Nevertheless, such a compensating effect was over once those new plants reached the maximum potential. Consequently, productivity started to decrease after 2011/12. Furthermore, preliminary statistics from MGAP suggest that mean tons by hectare was 9.2 in 2019/20 season. Thus, from season 2012/13 there are three facts working together:

1. a reduction in peach area;
2. a reduction in total production, and
3. a reduction in productivity.

Finally, this reduction in area and production is probably caused by a lack of interest due to the low profitability, being one of the main reasons for this a far from acceptable productivity (Figure 4).

3.3 Costs

The evolution in average cost of production for the period 2013/14 - 2018/19 is shown in Table 1. This is a weighed cost, corresponding 60% to early season peaches and 40% to season peaches.

Table 1. Evolution of average cost (in US dollars) of peach production in Uruguay. CREA's associated fruit growers (2013-14 to 2018-19 seasons, Uruguay)

Item	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Agrochemicals	1,094	859	1,001	1,060	1,111	1,413
Labor	4,484	3,653	3,350	5,371	3,122	8,210
Fuel	345	402	219	323	290	271
General expenses	1,778	2,053	1,612	1,847	1,960	1,816
Plants devaluation	334	337	70	84	146	166
Machinery devaluation	103	98	103	103	101	129
Total (USD ha^{-1})	8,138	7,402	6,355	8,788	6,730	12,005
Kg ha^{-1}	18,300	10,850	14,200	14,750	7,394	20,785
Cost (USD kg^{-1})	0.44	0.68	0.45	0.60	0.91	0.58
Exchange rate (U$ USD^{-1})	23.4	27.6	30.7	29.2	21.5	35.5
Labor (USD kg^{-1})	0.25	0.34	0.24	0.36	0.42	0.39
Share of labor in the total costs (%)	57	50	53	60	68	67

It can be seen that peaches showed an increase in their costs of production from 0.44 USD kg^{-1} in 2013/14 to 0.58 USD kg^{-1} in 2018/19. Nevertheless, if it is regarded an exchange rate of 23.4 $U USD^{-1} for 2013/14 and 35.5 $U USD^{-1} in 2018/19, prices rose from 10.3 U$ kg^{-1} to 20.6 U$ kg^{-1} in that period. In dollars, it represents a 32% increase, whereas it achieves a 100% in Uruguayan pesos. Therefore, increment of prices in local currency clearly surpasses the 60% increase registered in the consumer price index (elaborated by National Institute of Statistics of Uruguay), for that period.

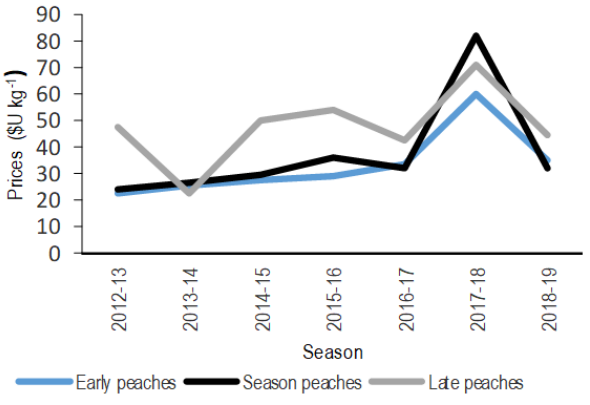
It is also important to focus on the increase in the share of labor in cost´s structure, which is at least 50% and averaging 59% for the studied period. This explains why in low productive seasons costs per kg are low too. Coincidently, MGAP - DIEA data indicate that 46% of labor costs are related to harvest activities.

Therefore, the increase in cost per kg could lead to reduced peach production profitability. Furthermore, the trend of labor cost indicates the importance of crop management and the selection of technologies that reduce labor requirements with simpler systems and use of machinery.

3.4 Wholesale prices

Sale prices from Mercado Modelo of Montevideo are shown in Figure 5.

Figure 5. Wholesale prices of peaches according to harvest period (2012/13 to 2018/19 seasons, Uruguay)



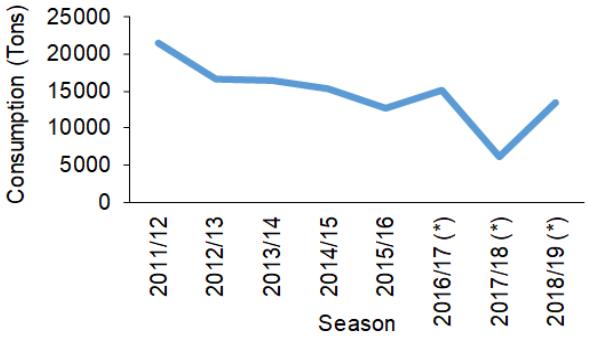
Source: Mercado Modelo[3].

In 4 out of 7 seasons, price level in early season peaches is lower if compared to season and late season peach cultivars. On the other hand, prices for season peach cultivars are in between early and late season ones in 2012/13, 2014/15 and 2015/16. In addition, prices for late season peaches are above the rest of the cultivars for most of the period. Another aspect to mention is that, in 2017/18 period, the production of peaches was affected by climatic problems (one of the main factors was the occurrence of extraordinary high temperatures in 2017 winter, provoking low hours-cold accumulation for this cultivar)[2]. Even though the whole cultivar was affected, season and late peaches had the worst performance. Such an aspect was an important reason for the great increase in 2017/18 prices.

3.5 Consumption

Not only is it important to focus on the offer of peaches, but also to put emphasis on the demand side of this crop. Hence, Figure 6 shows what occurs with this aspect. Indeed, there is a decreasing trend in consumption of fresh peaches in Uruguay since 2011/12.

Figure 6. Consumption of peaches in Uruguay (seasons 2011-12 to 2018-19, Uruguay)



Source: MGAP (DIEA)[4][5][6][7][8][9][10][11][12][13][14][15]
(*) = Estimated values

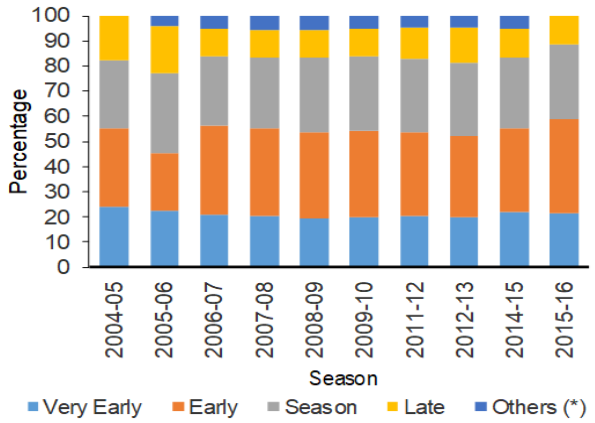
The decrease was of 38% in the period between 2011/12 and 2018/19. Such a trend is the result of a reduction in the nationwide peach crop. A clear example of that was the 2017/18 period, when season's low consumption was due to the abovementioned climatic problems that led to a sharp decrease in total yield.

3.6 Cultivar distribution

The planted area and production have a slightly higher value for early and very early peach cultivars. Except for 2005/06, planted area for these groups was over 52%. Regarding production of peaches, this crop share is higher than 52% with the same exception above-mentioned. The reason behind it lies on the fact that growers need to have earnings as early as possible in the season. Therefore, the entire harvest season is extended to sell peaches early intending to obtain higher prices, too. In addition, research has been focused on the introduction and evaluation of early peach cultivars, which reinforced these actions (Figures 7 and 8).

The farmer's preference for growing early, season, and late peaches should be studied in relation to costs and prices obtained for different cultivars. Given this fact, two questions arise: Firstly, what has happened with costs and prices of today's planted peach cultivars? And secondly, is it true that cultivar distribution could affect the whole profitability of this fruit crop? With the purpose of answering these questions, the required production per hectare, considering a fixed wholesale market price, in order to cover production costs in every season is calculated. These break-even points are shown in Table 2.

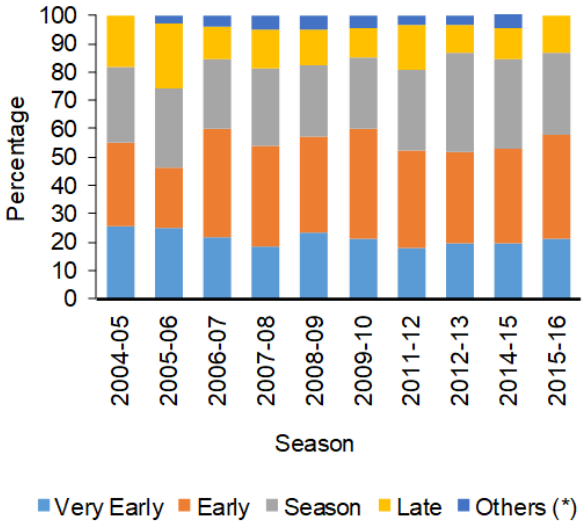
Figure 7. Area distribution of peach plantings according to cultivar's harvest date (2004-05 to 2015-16 seasons, Uruguay)



Source: MGAP (DIEA)(4)(5)(6)(7)(8)(9)(10)(11)(12)(13)(14)(15)

(*) = Others are cultivars that have not been properly identified

Figure 8. Commercial production distribution of peaches according to cultivar's harvest date (2004-05 to 2015-16 seasons, Uruguay)



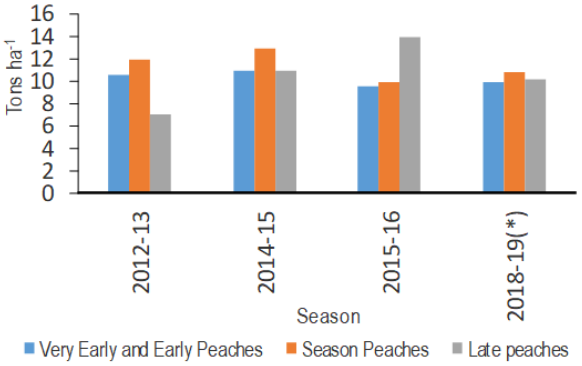
Source: MGAP (DIEA)(4)(5)(6)(7)(8)(9)(10)(11)(12)(13)(14)(15)

(*) = Other means cultivars that have not been properly identified.

In order to enrich the analysis, the mean peach productivity according to different cultivars for seasons 2012/13, 2014/15, 2015/16 and 2018/19 is shown in Figure 9.

Very early and early cultivars have the greatest stability in their yield. On the other hand, late peaches are not as constant as the rest, since their yield ranges from 7 to 14 tons ha^{-1}.

Figure 9. Mean productivity in peaches grouped by harvest season (2012/13, 2014/15, 2015/16 and 2018/19 seasons, Uruguay)



Source: MGAP (DIEA)(4)(5)(6)(7)(8)(9)(10)(11)(12)(13)(14)(15)

(*) = Estimated values

There is a need for higher productivity in very early and early peach cultivars in order to achieve the break-even point (Table 2 and Figure 9). As a result, this group of cultivars was not profitable, at least for the 2012/13, 2014/15, 2015/16 and 2018/19 seasons.

Conversely, for the reported periods, season and late peach cultivars are a profitable activity since their mean productivity exceeds the break-even point.

On the other hand, over 50% of the area of peaches are early or very early cultivars. Given that these cultivars are far apart from reaching the break-even point, it can be concluded that peach cultivar assortment in the operation will affect its global profitability. Furthermore, the current peach cultivar distribution in Uruguay prevents peaches from being a reliable and profitable option to growers.

Table 2. Effect of peach cultivar harvest time on crop profitability (2012-13 to 2018-19 seasons, Uruguay)

Cultivar	Item	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Early and very early peaches	Mercado Modelo Price (U$ kg^{-1})	22.6	25.4	27.4	29.2	33.8	60.4	35.03
	On farm price (U$ kg^{-1})	18.4	20.6	22.4	23.9	27.7	50.3	28.7
	Costs (U$ ha^{-1})	216,164	233,291	249,955	276,438	303,224	313,998	306,180
	Break-even point (ton ha^{-1})	11.8	11.3	11.2	11.6	10.9	6.2	10.7
Season peaches	Mercado Modelo Price (U$ kg^{-1})	24.2	26.8	29.8	36.2	31.9	82.1	32.33
	On farm price (U$ kg^{-1})	19.7	21.9	24.5	29.9	26.1	68.7	26.4
	Costs (U$ ha^{-1})	189,155	204,257	218,816	241,876	265,312	274,961	243,000
	Break-even point (tons ha^{-1})	9.6	9.3	8.9	8.1	10.1	4.0	10.6
Late peaches	Mercado Modelo Price (U$ kg^{-1})	47.5	22.4	50.3	54.1	42.9	71.4	44.8
	On farm price (U$ kg^{-1})	39.5	18.1	41.8	45.1	35.4	59.6	37.0
	Costs (U$ ha^{-1})	200,191	216,230	231,628	255,979	280,780	291,098	N/A
	Break-even point (ton ha^{-1})	5.1	12	5.5	5.7	7.9	4.9	(*)

(*)No data available

4. Conclusions

Firstly, this study carries out an analysis supported by mean data, which represents a good tool to explain what occurs in terms of trend. Nevertheless, it should be taken into account that in Uruguay there is a great deal of variability in productivity as well as profitability. Such an aspect depends on applied technology and methods that fruit growers decided to use in their operations.

It was also mentioned that labor has a great share of the total cost, mostly due to those activities related to harvest. What is more, profitability is close to zero (particularly for very early and early cultivars), and given the high cost of labor, the option to increase profits greatly resides on a better productivity.

Based on this analysis, distribution of cultivars, seen at national level, is far from being optimal since very early and early options have a negative impact on profitability of the peach crop.

If the previously mentioned tendencies keep steady (along with low planted areas with new cultivars), there will be a decrease in peach production in the coming years.

Consequently, it is necessary to change the scenario that peach growers are facing. In order to achieve such a change, a planned renovation must be put into practice at the productive systems level, focusing mainly on three factors to be implemented:

a. To select peach cultivars with high production per hectare and high fruit quality parameters that satisfy up-to-date consumers' taste. In addition, the implementation of harvest activities has to be revised in order to reduce both the amount of needed fruit thinning interventions as well as the amount of fruit harvests for each single cultivar. This will allow to decrease harvest costs.

b. To define technology that allows an increase in labor productivity in the stage of pruning, fruit thinning and harvest. In this sense, it is of utmost importance that growers reduce the final size of plants without reducing quality and productive characteristics of the crop. Therefore, when the farmer decides to set an orchard fruit, it is necessary to analyze the decisions involved in defining plant vigor, rootstock to use, number of plants by hectare, training and pruning systems, among others.

c. To Increase the mechanization of activities.

Additionally, the authors of this paper consider that a reduced period of offer for the local crop could have a negative impact on people that are willing to consume this fruit. Therefore, any policy attempting to increase profitability of peaches should also consider the demand side.

Finally, the above studied factors led to an additional and final topic: that peaches should be considered no more as a complementary activity. On the contrary, a specialized peach operation could offer the grower a way to achieve better results.

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Author contribution statement

Andrés Diaz compiled statistical information on the aspects of commercialization and production costs, in addition to having the mission of writing the article; Marcelo Buschiazzo contributed with technical-productive statistical information, contributing his vision as an extension technician and advisor; Eduardo Vázquez provided information collected directly from the CREA fruit growers' farms regarding production costs, production levels and profitability. The three authors participated in the analysis and discussion of the information collected, generating the conclusions and observations that are published in this article.

References

1. Ackermann M, Diaz A. Frutales de hoja caduca: situación y perspectivas. In: Anuario OPYPA 2019. Montevideo: MGAP; 2019. p. 225-44.

2. Ackermann M, Diaz A. Fruticultura: situación y perspectivas de la citricultura y los frutales de hoja caduca. In: Anuario OPYPA 2018. Montevideo: MGAP; 2018. p. 253-78.

3. Observatorio Granjero. Anuario estadístico: Mercado Modelo [Internet]. Montevideo: CAMM; 2019 [cited 2020 Dec 30]. 70p. Available from: https://bit.ly/3hrrg85.

4. Ministerio de Ganadería, Agricultura y Pesca, DIEA (UY). Encuesta frutícola de hoja caduca: zafra 2016 [Internet]. Montevideo: MGAP; 2016 [cited 2020 Dec 30]. 22p. (Serie de encuestas; 338). Available from: https://bit.ly/3o3Zdhe.

5. Ministerio de Ganadería, Agricultura y Pesca, DIEA (UY). Encuesta frutícola de hoja caduca: zafra 2015 [Internet]. Montevideo: MGAP; 2016 [cited 2020 Dec 30]. 27p. (Serie de encuestas; 332). Available from: https://bit.ly/3mXHvdV.

6. Ministerio de Ganadería, Agricultura y Pesca, DIEA (UY). Encuesta frutícola de hoja caduca: zafra 2013 [Internet]. Montevideo: MGAP; 2014 [cited 2020 Dec 30]. 28p. (Serie de encuestas; 317). Available from: https://bit.ly/3pGwks9.

7. Ministerio de Ganadería, Agricultura y Pesca, DIEA (UY). Encuesta frutícola de hoja caduca:

zafra 2011/12 [Internet]. Montevideo: MGAP; 2012 [cited 2020 Dec 30]. 28p. (Serie de encuestas; 308). Available from: https://bit.ly/2KGjf3c.

8. Ministerio de Ganadería, Agricultura y Pesca, DIEA (UY). Encuesta frutícola de hoja caduca: zafra 2009/10 [Internet]. Montevideo: MGAP; 2010 [cited 2020 Dec 30]. 28p. (Serie de encuestas; 294). Available from: https://bit.ly/3py0kGs.

9. Ministerio de Ganadería, Agricultura y Pesca, DIEA (UY). Encuesta frutícola de hoja caduca: zafra 2008/09 [Internet]. Montevideo: MGAP; 2009 [cited 2020 Dec 30]. 28p. (Serie de encuestas; 280). Available from: https://bit.ly/2L7sglq.

10. Ministerio de Ganadería, Agricultura y Pesca, DIEA (UY). Encuesta frutícola: zafra 2007/08 [Internet]. Montevideo: MGAP; 2008 [cited 2020 Dec 30]. 37p. (Serie de encuestas; 265). Available from: https://bit.ly/3hur7kj.

11. Ministerio de Ganadería, Agricultura y Pesca, DIEA (UY). Encuesta frutícola: zafra 2006/07 [Internet]. Montevideo: MGAP; 2007 [cited 2020 Dec 30]. 40p. (Serie de encuestas; 254). Available from: https://bit.ly/3hqLA9A.

12. Ministerio de Ganadería, Agricultura y Pesca, DIEA (UY). Encuesta frutícola: zafra 2005/06 [Internet]. Montevideo: MGAP; 2006 [cited 2020 Dec 30]. 41p. (Serie de encuestas; 240). Available from: https://bit.ly/3huobUB.

13. Ministerio de Ganadería, Agricultura y Pesca, DIEA (UY). Encuesta frutícola: zafra 2004/05 [Internet]. Montevideo: MGAP; 2005. [cited 2020 Dec 30]. 44p. (Serie de encuestas; 232). Available from: https://bit.ly/3n1aoWT.

14. Ministerio de Ganadería, Agricultura y Pesca, DIEA (UY). Encuesta frutícola: zafra 2002/03 [Internet]. Montevideo: MGAP; 2003 [cited 2020 Dec 30]. 44p. (Serie de encuestas; 216). Available from: https://bit.ly/3rFrlJW.

15. Ministerio de Ganadería, Agricultura y Pesca, DIEA (UY). Encuesta frutícola: producción, variedades, comercialización y endeudamiento: zafra 2001/02 [Internet]. Montevideo: MGAP; 2002 [cited 2020 Dec 30]. 39p. (Serie de encuestas; 210). Available from: https://bit.ly/2JtcGQG.