PRICE EVALUATION OF ORANGE, UNDER THE FAIR TRADE SYSTEM IN MEXICO

Evaluación del precio de la naranja, bajo el sistema de comercio justo en méxico

ABSTRACT

Orange production in the Totonacapan region of the state of Veracruz it is one of the main economic sources in the region and throughout the state. However, the downward movements in prices and intermediary have led producers to seek new market insertion alternatives such as the fair trade and organic production. The need of producers to have more elements of trial for to decision making regarding the best alternative motivated the present study. Therefore, the objectives of the same is to assess the minimum price paid out in the market farm for fair trade regarding the cost of orange production from four organizations registered under this model. Additionally, contrast results achieved whit a group of producers dedicated to the organic production. In both cases it was used the methodology of the Fairtrade Guideline of Costs of Sustainable Production (COSP). The indicator shows that fair trade organizations are profitable as long as they have an average profit margin that ranks from 20% to 34% of the cost their production per hectare. The profit margin of the organization of organic orange producers is higher than fair trade organizations with a profitability 158% considering of the cost its production per hectare. However, the producers should regard others factors in matter of commercialization, organization, and social profit prevenient to decision making.

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RESUMEN

La producción de naranja en la región del Totonacapan del estado de Veracruz, es una de las principales fuentes económicas de la región y de todo el estado. No obstante, los movimientos a la baja de los precios y el intermediarismo han llevado a los productores a buscar nuevas alternativas de inserción en el mercado como el esquema de comercio justo o el de producción orgánica. La necesidad de los productores de contar con mayores elementos de juicio para la toma de decisiones respecto a la mejor alternativa motivó el presente trabajo. Por lo tanto, el objetivo del mismo es valorar la relación precio mínimo pagado en huerta por comercio justo con respecto al costo de producción de naranja de cuatro organizaciones certificadas bajo este modelo. Adicionalmente, contrastar los resultados alcanzados con un grupo de productores dedicados a la producción orgánica. En ambos casos, se utilizó la metodología de la Guía de los Costos de Producción Sostenible (COSP) de Fairtrade. El indicador muestra que las organizaciones de comercio justo son rentables ya que tienen en promedio un margen de ganancia de entre 20% y 34% del costo de su producción por hectárea. El margen de ganancia de la organización de productores de naranja orgánica es mayor a las de comercio justo con una rentabilidad de 158%. No obstante, los productores deberán considerar otros factores en materia de comercialización, organización y beneficios sociales previo a la toma de decisiones.

Keywords: Production costs; Organic production; Conventional production; Profitability.

Palabras clave: Costos de producción; Producción orgánica; Producción convencional; Rentabilidad.

1 INTRODUCTION

Citriculture is one of the most important fruit activities in the world. According to the statistical bulletin 2016 of the Food and Agriculture Organization of the United Nations, oranges are by far the most widely produced citrus fruits, representing 53.90% of total production, with 69.9 million tons of production worldwide (FAO, 2017). In 2017, Mexico ranked fifth among the top ten orange producing countries, contributing 4.6 million tons of world production, according to FAOSTAT data. The main producers of this citrus fruit are Veracruz, Tamaulipas, and San Luis Potosí; these states account for 72.78% of total production (SIAP, 2018).

Unfortunately, high production levels are not always compensated by market prices. Currently, in the region and throughout Mexico, the fresh and processed orange production subsector is immersed in a stagnation due to a severe crisis expressed in low prices of fruit and concentrated orange juice, overproduction worldwide, low productivity of orchards; high production costs, saturation of the national supply, phytosanitary limitations that restrict exports, and paralysis of juice production plants, among other factors that put members of the orange production chain in various regions of the country in a difficult situation (CEVAGRO, 2002). For this reason, producers dedicated to growing this fruit tree have been seeking alternatives that will allow them to better position themselves in the market by producing in an environmentally friendly manner; guaranteeing the consumer health and quality of the product; and joining other value chains by creating partnerships that will help them reduce uncertainty and improve their income. One of these alternatives is the fair-trade system.

Fair trade is an alternative trade model that seeks to create fairer relationships between consumers in more developed countries and producers in less developed nations. This modality facilitates to the organized producers a direct access to the market in fair and equitable conditions as direct as possible between producers and consumers avoiding the excessive intermediarism that affects so much the margins of profit.

This is the case of four orange production organizations located in the Totonacapan Region, in the state of Veracruz, which have been certified by Fairtrade, allowing them to participate in this marketing system. The certified groups are: Citricultores de Pino Suárez Cooperative S.P.R. de R.L. de C.V., Cítricos Gómez-Corcho S.P.R. de R.L., Paso Real S.P.R. de R.L. de C.V. and Snapapa Sipij S.P.R. de R.L. de C.V. The four organizations bring together 60 partner producers who, in total, have 678 hectares registered for fair trade. The commercialization is oriented to the fresh and industrial product where its main buyer (also certified by Fairtrade) is the company Cítricos Ex S.A de C.V. (Citrex) located in the municipality of Martinez de la Torre, Ver., which is essentially dedicated to the commercialization and industrialization of citrus fruits with exports to countries such as Switzerland, Italy, Holland, France, Spain, Germany, China, United States, Japan, among others.

The four companies have a sales contract with this company, which has been agreed at different times, the oldest being 9 years old and the most recent two years under this marketing scheme. Although the signing of the contract has guaranteed them a stable market, costs and prices have varied since the contract was established to the present time. Hence the need to update the financial analysis of the producers' investment to assess the continuity of fair payment. In addition to the need to review the extent to which fair trade continues to ensure profits for producers, there is the particular interest of producers themselves (and others eager to find better alternatives for their crop) in knowing the profits offered by one more alternative: organic orange production.

The interest of the producers to participate in the market of organic products is explained by the rapid growth of the market for this type of products. While it is true that organic production is not new, the interest in it is quite recent. This situation is related to consumers' concerns about their health and the environment. As a result, the areas dedicated to growing these products and the volumes marketed have increased significantly.

Derived from the above, this article analyzes the production costs of oranges under the in-tree modality (before the harvest) of the period 2018-2019 of each of the four fair trade organizations; according to the Guideline of Costs of Sustainable Production (COSP) of Fairtrade, with the purpose of having the certainty of obtaining a fair payment for their economic activity. Also, a cost-benefit evaluation of the organic orange production is presented to contrast the benefits of both alternatives. Although this comparison is made at the express request of the producers, decision-making cannot be limited to this information, as there are other important factors related to the choice of market in which they wish to participate. Therefore, the research sought to review the advantages and disadvantages of both options.

2 THEORETICAL FRAMEWORK

Fair trade is an alternative way of marketing that was born in the 40s and 50s in the United States and the United Kingdom and that, through an integrated network of producers, non-governmental organizations, traders, and consumers, seeks to shorten the distance between producer and consumer (CECCON; CECCON, 2010). It is an initiative that seeks to correct some of the problems (low prices and low-income levels) suffered by small producers and workers in a context of international trade where multinationals are in the lead; it is a model that can be adopted as a symbol of a different kind of trade, where both producers and consumers benefit (LÓPEZ; CAAMAL, 2009).

The conceptualization of the approach made it necessary to establish certification processes that would guarantee fair treatment and compliance with the agreements between the parties. In 1998, the first fair trade certification was created: the Max Havelaar seal, which opened the way for other certifications such as TransFair and the future Fairtrade mark and certification (COSIONE; MULDER, 2017).

In 1997, from the initiatives of Max Havelaar and TransFair fair trade certifiers (national initiatives), Fairtrade Labelling Organizations International (FLO) was created with headquarters in Bonn, Germany; defined as the main standard setting body and fair trade certifier at a global level (VIZCARRAGA, 2002; CECCON; CECCON, 2010; COSCIONE; MULDER, 2017).

There are many definitions and terms that relate to Fair Trade, the most accepted definition is explicit in the International Fair Trade Charter (2001), which states that:

> Fair Trade is a trading partnership based on dialogue, transparency, and respect, which seeks greater equity in international trade. It contributes to sustainable development by offering better trading conditions and guaranteeing the rights of marginalized producers and workers-especially in the South (WFTO, 2018).

Fair trade provides organized small producers with direct access to the market under fair and equitable conditions, creating a sustainable, solidarity-based, quality marketing channel, as directly as possible between producers and consumers (CLAC, 2019). According to the European Communities Commission, the objective pursued by the organizations that promote fair trade "is to guarantee that producers receive a price that translates into an adequate profitability of their contribution of skills, work, and resources, as well as a percentage of the total benefit proportional to their contribution (MEDINA, 2013). For their part, producers commit to respecting the environment and appropriate labor standards and to offering quality products (LÓPEZ; CAAMAL, 2009).

Fair pay is the fundamental principle of fair trade to pay fair prices and a fair wage to workers, producers, farmers, and artisans (WILLIAMS, 2013). In fair trade, say Lopez and Caamal (2009), the price must cover the full costs of production, including social and environmental costs. In addition, it must be high enough to give producers a dignified life and a margin to invest in the future. The economic criteria include the Fairtrade Minimum Price which aims to provide producers with a safety net against falling prices and allow for long-term planning, along with a fixed Fairtrade Premium (or also known as Social Premium), which provides farmers and workers with additional money to invest in improving the quality of their businesses and communities. This social premium is 5% to 30% of the value of the minimum price (FAIRTRADE INTERNATIONAL, 2019).

Unlike fair trade which arises as a way to correct market failures, the exchange of organic products goes hand in hand with changes in consumer requirements. Consumer tastes have been changing over the last 10 decades, the total participation of new global food and beverage product launches with organic claims has increased from 6% to 10% between August 2009 and July 2019, reported the Food Magazine according to Mintel's Global New Products Database (GNPD), this is due to the current concern of several factors such as: the limited time available, the growing concern about health and commitment to the environment. Hence, there is a growing demand for products that are grown, raised, and processed using natural methods. This means that producers do not resort to chemicals such as pesticides, synthetic fertilizers, or transgenic varieties, resulting in more natural and healthy foods. This last issue is carried out with more severe criteria than those applied in the case of fair trade where respect for the environment is also included.

The growing demand for organic products, together with the fact that this type of production is slower and with lower productivity, has led to high prices, a situation that, in countries like Mexico where most of the population has a low income, is not propitious for increasing consumption as would be expected.

In short, the difference between trade in products grown under fair trade and trade in organic products lies in the way they are grown, but above all in what is involved in marketing and the results of it. This is an issue that, in addition to being valued, must be known by the producers so that their decision making is more informed.

3 METHODOLOGY

The evaluation of the fair trade and organic system was carried out using the methodology of the Fairtrade Guideline of Costs of Sustainable Production (COSP). This guide analyzes the main types of costs incurred at different stages of production of a product from the farm to the export process. It begins with general considerations when estimating yields on annual and perennial crops, labor, inputs/services and capital/investments which are categories included in most stages of production in the COSP calculation.

Under the methodology mentioned, firstly, producers must agree on a yield that represents the situation of the region. The yield estimate should consider a typical or average year to give a meaningful yield estimate. For the categories in the case of labor costs, family labor is generally provided by the producer, hired labor is used mainly for general agricultural operations such as operating equipment, pruning, etc., and temporary hired labor is used for planting, weeding, harvesting, and packing products. On the other hand, to calculate other inputs/services, it is necessary to estimate the quantity applied, the unit of measure, and the cost per unit of the input/service. And finally, the category of capital and investments consists of various expenses paid during the year that accumulate regardless of the size of the production. Some that were considered are: property taxes; office expenses; investment repairs; annual depreciation; interest costs on operating capital; building, machinery, and land investments; and field tools (PRICING SUBUNIT, 2011).

Only four of the seven stages mentioned in the guide were taken into account in the analysis, since small -scale producers are in the first link of the marketing chain (pre-harvest sale): establishment of the crop, operating costs, harvesting costs and organizational costs. A questionnaire was therefore applied to the small producers' organizations according to the production costs of the work, inputs/services, and capital/investment in each of the production stages mentioned. In this phase, information was obtained by interviewing a panel of 3 to 5 producers in a 3-to-4-hour session, through a consensus-building process (PRICING SUBUNIT, 2011).

The general calculations required for the evaluation in each organization are the cost per metric ton and the minimum price per metric ton in the producer's orchard to determine the calculation of the product profitability coefficient under the fair trade and organic system.

3.1 Costs

The calculation of the production costs in the different stages was developed once the detailed calculations were obtained and classified by categories in each production stage. According to the calculations in the FAIRTRADE guide, the first stage consists of establishing the crop; it is important to include an estimate of the annual cost to recover the establishment costs in the annual budget of the years in full production. In other words, it is necessary to distribute these costs over the expected productive life of the crop. This process is called amortization, and it implies that the total costs of establishment for the expected economic life of the crop (in n years) must be borne with interest. The amortized establishment costs are calculated as follows (PRICING SUBUNIT, 2011):

$$A = \frac{PV[t(1+t)^n]}{[(1+t)^n - 1]}$$

Where,

A: Annual payment.
PV: Amount to be amortized (in this case the establishment costs).
n: years (depending on the productive life of the crop).
i: Interest rate.

The formula is applied to the total costs incurred in each of the categories of labor, inputs/services and capital/investments resulting in an annual estimate of the cost per hectare and metric ton (this is obtained from the final value of the cost per hectare between the average value of the yield per hectare).

In the second stage, which refers to operating costs, these costs are incurred only when production takes place and are usually exhausted or transformed during the production cycle. Examples are labor, seed, fertilizer, fuel, pesticides, machinery operations and water, among others (PRICING SUBUNIT, 2011). At this stage, an average of the costs of the productive year was evaluated, taking into account the three categories: labor, input/service, capital and investment.

The third stage describes the activities related to the harvest and could include manual harvesting and field packing, but it can also be classified, sized in specialized machinery, for the case the harvest is manual. It must be considered that working hours for harvesting and related activities will vary from year to year depending on the conditions of the crop and the field. Some crops can be planted and harvested at different times throughout the

year, so it is important to keep this in mind when reporting COSP data. Here the calculation should be made as an average only for the productive year where the harvesting activities apply (PRICING SUBUNIT, 2011).

The last stage which corresponds to the costs of the organization are costs that the small producers of the organization are responsible for paying such as: costs of certifications, audits, salaries or fees, investment in infrastructure, land, legal expenses of the company, insurance, accounting, training, management, operating costs in the installation phases, maintenance, among others. To obtain the value per metric hectare, the total administrative cost in the year evaluated is divided by the total number of hectares registered to fair trade of each organization. (PRICING SUBUNIT, 2011).

3.2 Price

To obtain the minimum price in the producer's orchard, it is first necessary to know and determine the estimated costs incurred in marketing —harvest, storage and transportation costs— per ton of the product in each of the organizations, since the price displayed by the producers is handled under the in-plant modality, in other words, the harvest, the payment of the storage and transportation is borne by the producer up to the agreed-upon point of delivery.

Once the total calculation of these marketing costs is achieved, the minimum price paid in the plant is subtracted, thus obtaining the minimum price in the producer's orchard with and without social premium.

3.3 Profitability ratio

In the particular case of the research, neither a benefit flow nor a cost flow is considered, nor is a discount rate used to calculate the benefit/cost ratio (B/C), since a long-term investment project is not being evaluated with the financial indicators Net Present Value (NPV) and Internal Rate of Return (IRR), but only an estimate of the total costs involved in producing in a specific year against the benefits obtained for that same particular year is being made, which could be interpreted as a profitability coefficient in a simple way similar to the B/C ratio but which allows us to explain the profitability of the organizations in the present paper.

The scenarios can be the following: a) if the ratio is >1, the benefits are greater than the costs and there is a profit margin, b) if the ratio is = 1, there are no losses or gains; costs are recovered, but no profits are obtained and c) if the ratio is <1 no risk is taken, there are losses and not even costs are recovered (PEDRAZA, 2013). The result is interpreted as a gain or loss in cents for each Mexican peso invested.

4 RESULTS AND DISCUSSION

The main orange producing municipalities in the Totonacapan region of Veracruz are: Papantla, Gutiérrez Zamora and Tecolutla.

It is here where the four organizations of small orange producers certified by Fairtrade are located, integrated by 60 partner producers, with a total of 678 hectares of Late Valencia orange cultivation registered to fair trade. Many of the members are *ejidatarios*. Half of them belong to the *ejidos* Augusto Gómez Villanueva, Meza Chica Nueva and Cerro Blanco located in the municipality of Papantla and the other half to the *ejidos* Pino Suárez, Paso Real, Paso de Hidalgo, Vista Hermosa and Calichal corresponding to the municipality of Tecolutla; they are considered as small producers since they do not own land larger than 30 hectares (requirement to enter fair trade).

4.1 Evaluation of orange production costs in the fair trade system

In this study, an evaluation of the total production costs in maintenance for one hectare of conventional orange from fair trade organizations was made. The calculation of the costs was done in a particular way in each organization to differentiate the cost of production per ton in each case, as well as the profitability generated by each organization allowing a better analysis to verify if the four organizations are obtaining benefits within fair trade. In addition to the fact that the determination and calculation of costs in agricultural production are of great importance for the practice, their lack of knowledge can generate trances for the producer, it allows to guide investment decisions, negotiate with customers and the delivery conditions for a product. Through consensus in each organization, the following was determined at each stage of production.

4.2 Gómez-Corcho

Currently the organization is made up of 14 *ejido* members who have more than 25 years of experience in the cultivation of conventional orange production and its facilities are in the town of Augusto Gómez Villanueva in the municipality of Papantla, Veracruz. By the year 2015, the organization joined the fair trade model with 215 registered hectares that in total give an average production of 4000 tons in the harvest period January-March, which represents 29.87% of the total contributed by the 4 organizations and they sell to Citrex company all their orange production.

The production costs generated per hectare with an average density of 250 plants per hectare and an average volume in the production of 19 ton/ha of this organization are shown in Table 1.

The total estimated costs of maintaining one hectare of conventional orange for the Gómez-Corcho organization is $27,675.24, with a cost per ton of $1,455.64; the cost of production is given by the cost of labor in the crop with 37%, followed by capital and investments with 33% and inputs with 30%.

4.3 Snapapa Sipij

Legally constituted organization in 2017 with 14 member producers. Their commercial activity is the production and commercialization of agricultural and livestock products; they have registered 158 hectares of orange cultivation within fair trade with an average production of approximately 3700 tons in the harvest period January-March, which represents 28.17% of the total contributed by the 4 organizations mentioned above. The estimated production costs per hectare with an average density of 260 plants and a production volume of 24 tons/ha of this organization are shown in Table 2.

The total costs to maintain one hectare of conventional orange field in the Snapapa Sipij organization is on average $35,860.67 with a cost per ton of $1,494.19; of the total cost of production, 53% of the costs is given by the expenses of labor in the cultivation, 30% in inputs and services and the rest of the costs by capital and investments.

4.4 Pino Suárez

An organization constituted in 2009, located in the town named Pino Suárez, municipality of Tecolutla, Veracruz; integrated by 14 orange producing partners. The organization registered 90 hectares of orange plantations, with an average fresh fruit harvest of 2000 tons in the January-April sales period, which represents 14.95% of the contributions of the four organizations integrated in the fair trade scheme. For this organization, the production costs generated per hectare with an average density of 280 plants and an average production volume of 23 tons/ha, are shown in Table 3.

The total estimated costs to maintain one hectare of Pino Suárez organization's orange field are on average $39,253.20 with a cost per ton of $1,706.66, most of its production costs are given by the cultivation work expenses with 57%.

4.5 Paso Real

It currently groups 18 members from the *ejidos* of Paso de Hidalgo, Vista Hermosa Calichal and Paso Real belonging to the municipality of Tecolutla, Veracruz. The commercial line of the society is to produce, market and export, not only agricultural products but also products derived from fishing and livestock. The organization has registered 215 hectares of orange production in fair trade with an average of approximately 4000 tons harvested in January to May, representing 26.99% of total production by the organizations studied. The production costs generated per hectare with an average density of 250 plants and an average production of 18 ton/ha of this organization are shown in Table 4.

The total maintenance costs of this organization were on average $30,828.45 with a cost per ton of $1,712.69; of the total production costs, 45% of the expenses are given by the work in the crop.

The conclusion is that the Paso Real organization has a higher cost of producing one ton of oranges because of its low production yields, compared to the Pino Suárez and Snapapa Sipij organizations, which have higher production costs per hectare, but thanks to the high yields of their producers' orchards, the cost per ton is lower than that of the Paso Real organization. On the other hand, the Gómez-Corcho organization has a lower production cost per hectare due to the lower cost of its cultivation work per year. The organizations' total costs range from $1455.64 to $1712.69 per ton. After all, the four organizations have different cash flows due to their total production costs for the plants planted and yields generated per hectare, the number of members and hectares enrolled in the program, the total current investments of each organization, and the labor and input requirements of the crop, as well as the operations of their input, harvesting and transportation equipment suppliers.

Having reviewed the financial aspects of the various groupings, it is pertinent to point out the additional benefits to this scheme. It should be remembered that the certification allows the company to ensure that its daily operations are based on justice, that it complies with social, economic, and environmental standards to trade under Fairtrade conditions and to display the mark on its product. Likewise, they must comply with audits that help reduce the risk of the business, protect the reputation of the company, and verify the social compliance of the company or its contractors, this audit is done every year and has a cost per organization. In addition, the organizations are kept in a constant process of training and workshops that allow them to carry out the principles of trade to comply with the reduction of agrochemicals and proper management in their orchards.

TABLE 1 − Average costs per hectare of Gómez-Corcho's Valencia orange production, production cycle 2018-2019

COST OF ESTABLISHMENT			
Tasks calculation	Quantity	$/Day	$/Ha
Disassembling, burning and cleaning	40	$ 200.00	$ 8,000.00
Carrying the seedling	2	$ 200.00	$ 400.00
Tracing of the plantation (palinear)	4	$ 200.00	$ 800.00
Dropping, planting or transplanting	5	$ 200.00	$ 1,000.00
Seedling reseeding	1	$ 200.00	$ 200.00
Total			$ 10,400.00
Amortization of establishment cost per hectare (40 years at 10%)			$ 1,063.50
Amortization of establishment cost per ton (19 Ton/Ha)			$ 55.97
Input or service calculation	Quantity	$/Unit	$/Ha
Plants	255	$ 15.00	$ 3,825.00
Transport of plants from the greenhouse to the site	1	$ 52.10	$ 52.10
Total			$ 3,877.10
Amortization of establishment cost per hectare (40 years at 10%)			$ 396.47
Amortization of establishment cost per ton (19 Ton/Ha)			$ 20.87
Calculation of capital and investments			$/Ha
Land investment (rental equivalent)			$ 15,000.00
Amortization of establishment cost per hectare (40 years at 10%)			$ 1,533.89
Amortization of establishment cost per ton (19 Ton/Ha)			$ 80.73
OPERATING COSTS 2018-2019			
Concept		Cost per Ha	Cost per Ton
Tasks		$ 9,171.16	$ 482.69
Pruning		$ 3,000.00	
Rounding		$ 400.00	
Review of plots		$ 800.00	
Weed control		$ 3,200.00	
Pest and disease control		$ 1,320.00	
Fertilization		$ 400.00	
Other production costs		$ 51.16	
Inputs or services		$ 7,869.01	$ 414.16
For weed control		$ 1,480.56	
For pest and disease control		$ 945.20	
For fertilization		$ 4,800.00	
For other production costs		$ 643.25	
Capital and Investments		$ 7,623.21	$ 401.22
Office costs		$ 603.26	
Training and education costs		$ 69.77	
Land tax (property tax)		$ 3.50	

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TABLE 1 − Continuation

Investment interest charge per hectare	$ 1,507.77	
Depreciations	$ 5,438.91	
Total	$24,663.38	$ 1,298.07
TOTAL PRODUCTION COST		
Cost per Ha		$ 27,657.24
Cost per Ton		$ 1,455.64

Source: Own elaboration with field data (2019)

TABLE 2 − Average costs per Ha of Snapapa Sipij's Valencia orange production, production cycle 2018-2019

COST OF ESTABLISHMENT			
Tasks calculation	Quantity	$/Day	$/Ha
Disassembling, burning and cleaning	50	$ 200.00	$ 10,000.00
Fertilizer Application	1	$ 200.00	$ 200.00
Carrying the seedling	3	$ 200.00	$ 600.00
Tracing of the plantation (palinear)	4	$ 200.00	$ 800.00
Dropping, planting or transplanting	6	$ 200.00	$ 1,200.00
Seedling reseeding	1	$ 200.00	$ 200.00
Irrigation	5	$ 200.00	$ 1,000.00
Total			$ 14,000.00
Amortization of establishment cost per hectare (40 years at 10%)			$ 1,431.63
Amortization of establishment cost per ton (24 Ton/Ha)			$ 59.65
Input or service calculation	Quantity	$/Unit	$/Ha
Plant	265	$ 15.00	$ 3,975.00
Fertilization	50	$ 10.40	$ 520.00
Transport of plants from the greenhouse to the site	1	$ 80.00	$ 80.00
Water	40	$ 1.50	$ 60.00
Total			$ 4,635.00
Amortization of establishment cost per hectare (40 years at 10%)			$ 473.97
Amortization of establishment cost per ton (24 Ton/Ha)			$ 19.75
Calculation of capital and investments			$/Ha
Land investment (rental equivalent)			$ 10,000.00
Amortization of establishment cost per hectare (40 years at 10%)			$ 1,022.59
Amortization of establishment cost per ton (24 Ton/Ha)			$ 42.61
OPERATING COSTS 2018-2019			
Concept		Cost per Ha	Cost per Ton
Tasks		$ 17,721.52	$ 738.40
Pruning		$ 2,800.00	
Rounding		$ 1,800.00	
Review of plots		$ 800.00	
Weed control		$ 4,200.00	

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TABLE 2 − Continuation

Pest and disease control	$ 2,600.00	
Fertilization	$ 5,400.00	
Other production costs	$ 121.52	
Inputs or services	$ 10,463.43	$ 435.98
For weed control	$ 957.04	
For pest and disease control	$ 2,922.00	
For fertilization	$ 5,276.80	
For other production costs	$ 1,307.59	
Capital and Investments	$ 4,747.52	$ 197.81
Administrative and office costs	$ 682.28	
Training and education costs	$ 181.00	
Investment interest charge per hectare	$ 905.64	
Land tax (property tax)	$ 2.66	
Depreciation	$ 2,975.95	
Total	$ 32,932.47	$ 1,372.19
TOTAL PRODUCTION COST		
Cost per HA		$ 35,860.67
Cost per Ton		$ 1,494.19

Source: Own elaboration with field data (2019)

TABLE 3 − Average costs per Ha of Pino Suárez's Valencia orange production, production cycle 2018-2019

COST OF ESTABLISHMENT			
Tasks calculation	Quantity	$/Day	$/Ha
Disassembling, burning and cleaning	45	$ 200.00	$ 9,000.00
Carrying the seedling	3	$ 200.00	$ 600.00
Tracing of the plantation (palinear)	6	$ 200.00	$ 1,200.00
Dropping, planting or transplanting	6	$ 200.00	$ 1,200.00
Seedling reseeding	1	$ 200.00	$ 200.00
Total			$ 12,200.00
Amortization of establishment cost per hectare (40 years at 10%)			$ 1,247.56
Amortization of establishment cost per ton (23 Ton/Ha)			$ 54.24
Input or service calculation	Quantity	$/Unit	$/Ha
Plant	300	$ 11.00	$ 3,300.00
Transport of plants from the greenhouse to the site	1	$ 186.00	$ 186.00
Total			$ 3,486.00
Amortization of establishment cost per hectare (40 years at 10%)			$ 356.48
Amortization of establishment cost per ton (23 Ton/Ha)			$ 15.50
Calculation of capital and investments			$/Ha
Land investment (rental equivalent)			$ 5,000.00
Amortization of establishment cost per hectare (40 years at 10%)			$ 511.30

Continue...

TABLE 3 − Continuation

Amortization of establishment cost per ton (23 Ton/Ha)		$ 22.23
OPERATING COSTS 2018-2019		
Concept	Cost per Ha	Cost per Ton
Tasks	$ 21,122.67	$ 918.38
Pruning	$ 6,000.00	
Rounding	$ 3,200.00	
Review of plots	$ 1,400.00	
Weed control	$ 3,000.00	
Pest and disease control	$ 2,696.00	
Fertilization	$ 4,800.00	
Other production costs	$ 26.67	
Inputs or services	$ 9,931.98	$ 431.83
For weed control	$ 674.00	
For pest and disease control	$ 2,643.87	
For fertilization	$ 5,320.00	
For other production costs	$ 1,294.11	
Capital and Investments	$ 6,083.21	$ 264.49
Office and administrative costs	$ 967.78	
Training and education costs	$ 80.00	
Land tax (property tax)	$ 3.50	
Investment interest charge per hectare	$ 1,154.54	
Depreciation	$ 3,877.40	
Total	$ 37,137.86	$ 1,614.69
TOTAL PRODUCTION COST		
Cost per Ha		$ 39,253.20
Cost per Ton		$ 1,706.66

Source: Own elaboration with field data (2019)

TABLE 4 − Average costs per Ha of Paso Real's Valencia orange production, production cycle 2018-2019

COST OF ESTABLISHMENT			
Tasks calculation	Quantity	$/Day	$/Ha
Disassembling, burning and cleaning	60	$ 200.00	$ 12,000.00
Fertilizer application	1	$ 200.00	$ 200.00
Carrying the seedling	2	$ 200.00	$ 400.00
Tracing of the plantation (palinear)	6	$ 200.00	$ 1,200.00
Dropping, planting or transplanting	3	$ 200.00	$ 600.00
Seedling reseeding	1	$ 200.00	$ 200.00
Total			$ 14,600.00
Amortization of establishment cost per hectare (40 years at 10%)			$ 1,492.99
Amortization of establishment cost per ton (18 Ton/Ha)			$ 82.94
Input or service calculation	Quantity	$/Unit	$/Ha
Tracking	1	$ 4,000.00	$ 4,000.00

Continue...

TABLE 4 − Continuation

Raizal	1	$ 180.00	$ 180.00
Plant	267	$ 12.00	$ 3,204.00
Transport of plants from the greenhouse to the site	1	$ 401.86	$ 401.86
Total			$ 7,785.86
Amortization of establishment cost per hectare (40 years at 10%)			$ 796.18
Amortization of establishment cost per ton (18 Ton/Ha)			$ 44.23
Calculation of capital and investments			$/Ha
Land investment (rental equivalent)			$ 10,000.00
Amortization of establishment cost per hectare (40 years at 10%)			$ 1,022.59
Amortization of establishment cost per ton (18 Ton/Ha)			$ 56.81
OPERATING COST 2018-2019			
Concept		Cost per Ha	Cost per Ton
Tasks		$ 12,239.07	$ 679.95
Pruning		$ 4,200.00	
Rounding		$ 400.00	
Review of plots		$ 400.00	
Weed control		$ 4,000.00	
Pest and disease control		$ 1,600.00	
Fertilization		$ 1,600.00	
Other production costs		$ 39.07	
Inputs or services		$ 7,803.08	$ 433.50
For weed control		$ 1,124.84	
For pest and disease control		$ 2,401.67	
For fertilization		$ 3,578.90	
For other production costs		$ 697.67	
Capital and Investments		$ 7,474.54	$ 415.25
Office costs		$ 638.60	
Training and education costs		$ 55.81	
Land tax (property tax)		$ 3.50	
Investment interest charge per hectare		$ 1,589.73	
Depreciation		$ 5,186.89	
Total		$ 27,516.69	$ 1,528.70
TOTAL PRODUCTION COST			
Cost per Ha			$ 30,828.45
Cost per Ton			$ 1,712.69

Source: Own elaboration with field data (2019)

In accordance with the approaches associated with certification, the adoption of the fair trade scheme, from the point of view of the producers themselves, has led to the following. i) The establishment of an organization that operates under criteria of equity. In other words, not only commercial equity, but also human equity, in this sense gender equity is fundamental to integrate women to participate in this system; ii) The improvement in the price of the traded product, which has allowed to face the variations that this has in the market. Although they recognize that when prices are high, producers' profits outside the scheme tend to be higher; iii) Greater cohesion among groups causes cooperatives and organizations to function democratically,; iv) Improved human capital

as they have developed knowledge and skills and; v) Greater social responsibility as they have understood the importance of respect for the environment and health care for consumers; vi) Social benefits that help benefit their community, through the income from the social premium received by producers.

4.6 Analysis of organic orange production costs

Regarding the costs of organic orange production, a comparison was made with the organization of the TARACUAN Ranch. In 2017, the TARACUAN Ranch was incorporated as a rural production company with variable capital and a commercial focus on agricultural, livestock, forestry and fishing activities. It is located on the municipal road El Cedro-Gustavo Díaz Ordaz, in the town of El Cedro, in the municipality of Papantla, state of Veracruz. The society is composed by 10 partners.

TARACUAN Ranch has an area of 50 hectares dedicated to the production and marketing of organic Valencia orange through a series of agro-ecological practices evaluated and certified by the Mexican Certification of Organic Products and Processes SC. (CERTIMEX), an agency with national and international accreditation. Due to the experience that this organization has, the proximity of the area in which they are located to other organizations and the accessibility of obtaining the data, it was chosen to carry out the contrast of the production costs, price and profitability of organic oranges with those of fair trade.

The results of Taracuan Ranch producers' organization are that for the maintenance of one hectare of orange cultivation during the 2018-2019 production cycle, the average was $38,191.67 with an average production of 34 Ton/Ha in their orchards, giving a cost per ton of $1,123.28, as well as the other organizations most of their production costs are given by the expenses of work on the crop (see Table 5).

TABLE 5 − Average costs per Ha of Taracuan Ranch's Valencia orange production, production cycle 2018-2019

COST OF ESTABLISHMENT			
Tasks calculation	Quantity	$/Day	$/Ha
Carrying the seedling	2	$ 200.00	$ 400.00
Tracing of the plantation (palinear)	2	$ 200.00	$ 400.00
Dropping, planting or transplanting	4	$ 200.00	$ 800.00
Seedling reseeding	1	$ 200.00	$ 200.00
Planting for pest control and nutrition	2	$ 180.00	$ 360.00
Total			$ 2,160.00
Amortization of establishment cost per hectare (40 years at 10%)			$ 220.88
Amortization of establishment cost per ton (34Ton/Ha)			$ 6.50
Input or service calculation	Quantity	$/Unit	$/Ha
Planting for pest control and nutrition	160	$ 16.00	$ 2,560.00
Transport of plants from the greenhouse to the site	1	$ 80.00	$ 80.00
Crotalaria juncea	5	$ 100.00	$ 500.00
Mucuna pruriens	2.5	$ 270.00	$ 675.00
Ayocote beans	0.5	$ 32.00	$ 16.00
Total			$ 3,831.00
Amortization of establishment cost per hectare (40 years at 10%)			$ 391.76
Amortization of establishment cost per ton (34 Ton/Ha)			$ 11.52
Calculation of capital and investments			$/Ha
Land investment (rental equivalent)			$ 15,000.00
Amortization of establishment cost per hectare (40 years at 10%)			$ 1,533.89
Amortization of establishment cost per ton (34 Ton/Ha)			$ 45.11

Continue...

TABLE 5 − Continuation

OPERATING COST 2018-2019		
Concept	Cost per Ha	Cost per Ton
Tasks	$ 16,800.00	$ 494.12
Inputs or services	$ 11,595.72	$ 341.05
Capital and Investments	$ 7,649.42	$ 224.98
Total	$ 36,045.14	$ 1,060.15
TOTAL PRODUCTION COST		
Cost per HA		$ 38,191.67
Cost per Ton		$ 1,123.28

Source: Own elaboration with field data (2019)

Before comparing the profitability indicators of the cultivation schemes addressed, it is convenient to point out a series of advantages and disadvantages that the adoption of this form of cultivation by the groups interested in a transition implies. The first of these refers to the time required. For a product to be certified as a citrus or perennial crop, a five-year transition period is required. In other words, if you stop applying chemicals today and the transition period begins today, by the fifth year you are already producing as an organic product. It should also be recognized that this type of production requires significant development of human capital. This aspect is relevant given the role it plays in obtaining organic products. It is a fact that organic products have greater possibilities of being placed on the international market. It is known that the countries that are increasingly demanding this type of product are those in North America and Europe. However, entering foreign trade requires, in addition to quality standards, volumes that are difficult to achieve by these small groups. An attractive alternative is that of certified juicers, although, as in the previous case, the volumes demanded must be considered. Meeting them would mean broadening the organizational process, which would be positive but complex because of producers' reluctance to work in partnership.

As far as the national market of organic products is concerned, it does not offer great opportunities in the case of oranges. In this sense, we must bear in mind that the main consumption of oranges in Mexico is to produce fresh juice. Therefore, it is difficult to think that the large number of consumers (many of them of medium and low income) are willing to pay the high price of the organic product. However, it should be noted that if the transition takes place, costs will be reduced over time, which translates into higher profits.

4.7 Fair trade and organic production profitability

Before analyzing the indicator of the coefficient of profitability of the orange production in the fair trade system, it was mentioned in the methodology that first it was necessary to calculate the minimum price per ton of oranges in-tree with and without the social premium, since the price exposed by the producers is handled under the in-plant modality. As shown in Table 6 for the fair trade organizations Gómez-Corcho and Snapapa Sipij have a minimum set in-tree price of $1986.00 and with the social premium it amounts to $2,247.90, Pino Suárez has a minimum price of $2,057.71 plus the social premium amounts to $2, 359.61 and last Paso Real has a minimum price of $2,051.00 and with the social premium a price of $2,352.90. The same calculation was used to determine the organic in-orchard price in Taracuan Ranch where a price of $2,900.00 was obtained even though there is no additional support from organic certification the price is still high compared to the fair trade price.

The calculation of the coefficient of profitability is obtained with the price of the orchard to the producer between the total cost of production for each organization. Table 7 shows the profitability results for each organization, considering that each one has different costs, yields and number of members.

For the Gómez-Corcho organization, the profitability coefficient with the minimum price per ton of oranges is 1.34, that is, for each mexican peso invested, the money is recovered and additionally, net profits of thirty-four cents are obtained. On the other hand, with the minimum price plus the social premium, the profitability coefficient is 1.54, that is, for each mexican peso invested, the money is recovered and additionally, net profits of fifty-four cents are generated. With the social premium the organization is obtaining average profits of 54%.

TABLE 6 − Calculation of minimum in-orchard prices of fair trade and organic organizations (Taracuan Ranch)

Prices/Ton	Gómez-Corcho	Snapapa Sipij	Pino Suárez	Paso Real	Taracuan Ranch
Minimum in-plant price	$ 2,846.00	$ 2,846.00	$ 2,846.00	$ 2,846.00	$ 3,600.00
Social Premium	$ 301.90	$ 301.90	$ 301.90	$ 301.90	-
Price + Social Premium	$ 3,147.90	$ 3,147.90	$ 3,147.90	$ 3,147.90	-
-Marketing cost	$ 900.00	$ 900.00	$ 788.29	$ 795.00	$ 700.00
Minimum in-orchard price	$ 1,946.00	$ 1,946.00	$ 2,057.71	$ 2,051.00	$ 2,900.00
Minimum price + social premium in-orchard	$ 2,247.90	$ 2,247.90	$ 2,359.61	$ 2,352.90	-

Source: Own elaboration with field data (2019)

TABLE 7 − Summary of profitability of Valencia orange production in fair trade and organic market in-orchard, production cycle 2018-2019

Production Costs	Fair trade				Organic
	Gómez-Corcho	Snapapa Sipij	Pino Suárez	Paso Real	Taracuan Ranch
Costs of Establishment/ Ha	$ 2,993.86	$ 2,928.20	$ 2,115.34	$ 3,311.76	$ 2,146.53
Tasks calculation	$1,063.50	$ 1,431.63	$ 1,247.56	$ 1,492.99	$ 220.88
Input or service calculation	$396.47	$ 473.97	$ 356.48	$796.18	$ 391.76
Calculation of capital and investments	$1,533.89	$ 1,022.59	$ 511.30	$1,022.59	$ 1,533.89
Operating costs 2018-2019	$ 24,663.38	$ 32,932.47	$ 37,137.86	$ 27,516.69	$ 36,045.14
Tasks calculation	$ 9,171.16	$ 17,721.52	$ 21,122.67	$ 12,239.07	$ 16,800.00
Input or service calculation	$ 7,869.01	$ 10,463.43	$ 9,931.98	$ 7,803.08	$ 11,595.72
Calculation of capital and investments	$ 7,623.21	$ 4,747.52	$ 6,083.21	$ 7,474.54	$ 7,649.42
Yield	19	24	23	18	34
Total Cost per HA	$ 27,657.24	$ 35,860.67	$ 39,253.20	$ 30,828.45	$ 38,191.67
Total Cost per Ton	$ 1,455.64	$ 1,494.19	$ 1,706.66	$ 1,712.69	$ 1,123.28
Income per Ton					
Minimum Price	$ 1,946.00	$ 1,846.00	$ 2,055.81	$ 2,049.60	$ 2,900.00
Minimum Price + Social Premium	$ 2,049.60	$ 2,147.90	$ 2,357.71	$ 2,351.50	-
Non-premium B/C ratio	1.34	1.30	1.21	1.20	2.58
Premium B/C ratio	1.54	1.50	1.38	1.37	-

Source: Own elaboration with field data (2019)

In the Snapapa Sipij organization, the profitability coefficient with the payment of the minimum price per ton of oranges is 1.30, that is, for each mexican peso invested, the money is recovered and in addition, net profits of thirty cents are being obtained. The additional minimum price with the social premium is 1.50, that is, for each mexican peso invested, the money is recovered and in addition, net profits of fifty cents are being obtained.

The Pino Suárez organization is receiving a return on production costs and the minimum price paid in the orchard of 1.21 and the return on the minimum price plus the social premium of 1.38. While the Paso Real organization has a profitability ratio of 1.20 with the minimum price and a profitability of 1.37 minimum price plus the social premium.

In summary, the four organizations obtain returns with the minimum price of between 20% and 34% without considering any type of aid. With the additional payment of the premium on the minimum price, returns of between 37% and 54% are obtained.

On the other hand, the organic organization (Taracuan Ranch) as mentioned above is not in the fair trade system so there is no social premium for the organization

and neither is there any extra income or support from organic certification. Therefore, it is only evaluated with the minimum price paid in the orchard. For this organization, the profitability coefficient is 2.58, meaning that for each mexican peso invested, the producers receive back the money plus an additional $1.58. This organization has a profit margin of 158% in its profits, however, which indicates that this crop obtains higher profit margins than fair trade.

5 CONCLUSIONS

The value of the minimum field price in relation to the total production costs of each of the four certified fair trade organizations in the Totonacapan Region indicates a return on the crop investments. In this way, the minimum price paid per ton of orange assigned to the four organizations under the fair trade scheme is profitable.

However, within the logic of the producer, the fair trade organizations expect to obtain an average profit of 50%, under this consideration they currently obtain profits with the minimum price of between 20% and 34%, which places them far below their expectations. On the other hand, with the minimum price plus the payment of the premium, two organizations, Gómez-Corcho with 54% and Snapapa Sipij with 50%, expect to make a profit. Despite not obtaining the desired profit in the four fair trade organizations, they are still profitable given that they make a good income.

Equally important is the comparison of the relationship between the price and production costs of the organic and fair trade systems. In both modalities, maintenance work has a higher cost in the cultivation, but the price of the product helps to cushion the high costs of this activity. Without a doubt, organic production is above the four organizations, obtaining profits of 158% due to the high yields it has in the orchards.

It is concluded that both production and commercialization modalities are profitable. Being that the organic production shows higher profits than those obtained in the fair trade scheme. However, the adoption of this alternative by producers who are currently in the fair trade scheme or even those operating in the conventional scheme should consider the transition and, above all, assess the requirements of access to a market located mainly in developed countries or in specific niches.

6 DISCLOSURE STATEMENT

There was no conflict of interest in the subject or materials

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