

COFFEE PRODUCTION IN MEXICO: WINDOW OF OPPORTUNITY FOR THE AGRICULTURAL SECTOR IN CHIAPAS

Felipe Flores Vichi
flovich@gmail.com

Autonomous University of Nuevo León.



ABSTRAC

The role of government programs that support the coffee sector of Mexico with direct support to farmers' income is a measure of appropriate policy which covers the difference between costs and total revenues of coffee farming. The state of Chiapas has the necessary conditions to cope and compete in an international market, however, the absence of economic policy tools that integrate risk and uncertainty does not allow for short-term increase in the incomes of small farmers.

Actions tend to generate stability in the production of coffee is represented by the Productive Coffee Development Program, which has generated productive activities among small producers that induce productivity and the incorporation of organic crops. This paper analyzes the conditions of production and the market in the domestic and international contexts of the coffee sector. It also describes and identifies the importance of the state of Chiapas in trade integration processes. Finally, government action was taken during the period 2007-2013 through the *Procampo* Production Program and the Productive Coffee Development component.

Keywords: *Chiapas, coffee, productivity, producer, organic.*

Coffee is considered one of the most important raw materials that are followed in the global economy. Thus, for many of the least developed countries, coffee exports represent a fundamental part of their foreign exchange earnings-in some cases over 80% (Banking Association of Guatemala, 2012).

Coffee production has a high economic and social value, and the activity plays an important environmental role, since its production is conducted under systems that maintain an almost permanent plant cover on the soil, thus reducing erosion problems. The combination of economic, social and environmental benefits that coffee cultivation makes it necessary that the agents involved in the sector promote the necessary incentives to support competitiveness and economic growth of the grain.

Coffee provides ideal conditions for international cooperation between producing and consuming countries, which secures an adequate remuneration for producers while providing consumers quality coffee at affordable prices (Barrera, Parra, Herrera, Jarquín & Pohlen ensures , 2004). The imbalance between supply and demand has traditionally affected the coffee trade, and correcting this imbalance is a constant goal in forums of international cooperation. Currently, there is an export market with a highly differentiated dynamic, where there are high exports of robust and natural coffee with a sharp decline in exports of washed Arabica. The main conclusions of international meetings are limited to establishing a system of information exchange between countries to identify opportunities and actions to improve current and future conditions of the international coffee market (Barrera, Parra, Herrera, Jarquín & Pohlen, 2004).

In addition, producers face a window of opportunity before the growth of global coffee consumption. According to Euromonitor International, the total and *per capita* consumption of coffee has increased since 2005, and is expected to continue to grow until 2015. Thus, in 2005 the consumption was 2.0 million bags of green coffee ¹, in 2010 it was 2.7 million, and it

is estimated that in 2015 the category will represent 3.6 million bags. Moreover, *per capita* consumption in 2005 and 2010 stood at 1.16 and 1.43 kg, respectively, and it is expected that 2015 consumption will stand at 1.85 kilograms.

The global coffee consumption will not only continue to grow at annual rates of 2.5%, but could even overcome supply in 2014, with an average of more than 145 million bags (La Patria, 2013).

There are about 75 million potential consumers each year, which are demanding at least three million additional bags. This is during a lower global production, especially caused by drought problems that are currently recorded in Brazil, the largest producer in the world (La Patria, 2013).

The purpose of this document is to describe the state of global and domestic production of coffee, and recognize that the state of Chiapas has important elements and variables that can enhance the coffee sector in the region. Additionally, the tool of the component to promote the production of coffee is presented as the linchpin and motivator for productive activities among small producers.

WORLD COFFEE PRODUCTION

The average world production of green coffee in the 2000-2012 period was 7 million 964 thousand tons. Of this amount, 75 percent was contributed by the ten major producing countries. Brazil ranks first in reporting 30.5 percent of total production, followed by Viet Nam, Indonesia and Colombia with a contribution of 12.4, 8.1 and 7.8 percent of world production, respectively. India and Mexico rank fifth in representing 3.5 percent of world coffee supply.

¹ The unit of measure of 60 kilograms of green coffee per bag is considered.

Based on Table 1, in the period 2000-2012 Mexico had an average production of 282 000 569 tons of green coffee. However, an Average Annual Growth Rate (AAGR) of -2.61 percent was recorded, unlike its main competitors who presented a positive AAGR.

Table 1. Main green coffee producing countries, 2000-2012
(Thousands of tons)

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average 2000-2012	AAGR %
Brazil	1,904	1,820	2,650	1,987	2,466	2,140	2,573	2,249	2,797	2,440	2,907	2,700	3,038	2,436.2	3.97
Indonesia	803	841	700	794	914	831	985	1,251	1,056	1,058	1,106	1,277	1,292	993.7	4.05
Colombia	555	569	682	664	647	640	682	676	698	683	684	639	657	652.0	1.42
Mexico	637	656	697	694	674	667	725	757	689	469	535	469	465	626.7	-2.60
Ivory Coast	292	301	301	275	271	276	274	288	262	262	290	302	314	285.2	0.61
Vietnam	338	303	313	311	312	294	280	269	260	264	245	237	246	283.6	-2.61
Ethiopia	312	276	222	244	250	248	235	244	248	249	248	243	248	251.3	-1.90
India	192	196	213	203	231	189	273	226	274	243	265	332	303	242.5	3.90
Peru	230	157	160	126	156	172	241	273	260	265	371	377	276	236.7	1.52
Uganda	193	206	173	175	185	191	214	236	241	231	229	282	300	220.7	3.73

Source: Based on data from the Food and Agriculture Organization, FAO. Consulted: April, 2014.

Internationally, the production figures for 2013-14 crop will depend on the involvement of drought in the next harvest in Vietnam, and the production volume in Central America, damaged due to drought and the presence of rust.

According to an analysis by the National Coordination of Coffee Organizations (CONOC) for the 2013-14 coffee cycle, production is emerging a little lower than consumption unlike in the 2012-13 cycle, where an approximate harvest was estimated of 6 million bags more higher than consumption.

The agency notes that according to a report from Bank Rabobank, the 2013-14 cycle of world production of coffee could be a million bags less than consumption. Production in Central America and Mexico could be affected by rust by about 3.3 million bags.

Table 2. Area harvested worldwide of green coffee, 2000-2012 (Thousands of hectares)

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average 2000-2012	AAGR %
Brazil	2,268	2,336	2,371	2,396	2,368	2,326	2,312	2,264	2,222	2,136	2,160	2,149	2,120	2,263.6	-0.56
Indonesia	1,261	1,313	1,372	1,382	1,304	1,255	1,309	1,296	1,295	1,266	1,268	1,293	1,234	1,296.0	-0.17
Colombia	675	705	711	721	771	807	786	798	733	765	778	739	778	751.3	1.18
Mexico	701	747	725	743	761	762	763	772	767	766	741	688	695	740.9	-0.07
Ivory Coast	829	602	455	410	740	719	748	777	650	623	450	153	160	562.8	-12.81
Vietnam	477	474	493	481	479	484	483	489	500	507	512	544	574	499.7	1.56
Ethiopia	250	244	218	232	260	261	295	407	391	395	499	516	529	346.0	6.43
India	308	314	321	321	325	333	341	343	345	351	356	360	369	337.4	1.49
Peru	264	274	287	292	295	302	321	324	333	343	350	367	312	312.7	1.39
Uganda	301	264	218	264	264	263	220	285	345	320	270	320	310	280.3	0.24

Source: Based on data from the Food and Agriculture Organization, FAO. Consulted: April, 2014.

Following Table 2 we can see that the global area harvested for green coffee in the world in the period 2000-12 averaged 10 million 497 thousand hectares, of which nearly half are concentrated in Brazil (21.6%), Indonesia (12.4%) , Colombia (7.2%) and Mexico (7.0%). However, these countries with the exception of Colombia have lost the ability to incorporate a greater number of hectares for rice production, which is shown by the negative AAGR during the period 2000-2012.

According to Table 3, the average global yields of coffee stood at 691 kilograms per hectare (kg / ha). Significant highlights include Belize (2,312 Kg / Ha), Vietnam (1,977 Kg / Ha), Tonga (1,961 Kg / Ha), Sierra Leone (1,897 kg / ha) and China (1,801 Kg / Ha).

Table 3. Yield of green coffee, 2000-2012
(Kilograms / hectare)

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average 2000-20012	AAGR %
Vietnam	1,683	1,775	1,420	1,652	1,907	1,718	2,039	2,559	2,111	2,085	2,160	2,347	2,250	1,977	2.45
Brazil	839	779	1,118	830	1,041	920	1,113	993	1,259	1,143	1,346	1,257	1,433	1,082	4.56
Guatemala	1,143	1,010	905	990	1,010	1,002	947	980	995	993	995	972	992	995	-1.17
Honduras	917	949	845	767	783	799	855	989	996	953	849	1,066	1,128	915	1.74
India	947	959	938	859	832	826	803	840	761	748	815	838	852	847	-0.88
Colombia	943	931	981	962	874	827	923	949	940	612	688	634	597	836	-3.74
Peru	725	716	740	696	784	626	850	697	821	711	757	903	971	769	2.47
Ethiopia	920	645	734	543	600	657	818	672	665	672	743	730	521	686	-4.62
Indonesia	440	433	497	480	496	510	521	522	539	539	539	494	533	503	1.61
Mexico	482	405	432	418	411	386	366	348	340	345	331	344	354	382	-2.54

Source: Based on data from the United Nations Food and Agriculture Organization, FAO.
Consulted: April, 2014.

In the case of major coffee producers in the world, Mexico is the least positioned in the list of countries presented above in performance, averaging a production of 382 Kg / Ha-In other words, eighty percent below the average world production. In addition, the AAGR indicates a negative trend in production acreage.

NATIONAL COFFEE PRODUCTION

Coffee is one of the most important tropical crops not only for the 56 producing countries of the Third World, but for the United States, Europe and Japan which consume 80% of the coffee produced worldwide (Moguel & Toledo, 1996).

Based on the record of National Register of Coffee Production (*Padrón Nacional Cafetalero* -PNC), coffee cultivation in Mexico takes place in 12 states, 404 municipalities, and 4,572 localities by 510,544 producers in 675,258 hectares (AMECAFE-SIAP).

Coffee production is grouped into four regions (SIAP, 2014):

- Gulf slope: composed of the states of San Luis Potosi , Hidalgo, Puebla, Mexico, and Veracruz.
- Pacific slope: belonging to the states of Colima, Guerrero, Jalisco, Nayarit and part of Oaxaca.
- Soconusco region: comprising a large proportion of the state of Chiapas, noted for the production of organic coffee, which is in high demand in the North American and European markets.
- North Central región of Chiapas.

Coffee cultivation is practiced at altitudes ranging from 300 to almost 2000 meters above sea level in areas that exhibit a variety of climates, soil and vegetation types. However, the most suitable elevation for coffee production is between 600 and 1200 m, in mainly semi-arid areas located right on the border between tropical and temperate ecological regions (CIMAT, 2006).

40% of land planted with coffee corresponds to high and medium (humid tropical) forests, 23% pine and oak forests, 21% low tropical deciduous forests and 15% high mountain cloud forest. This means that from a biological point of view, the coffee regions in Mexico are among the richest and most diverse in flora and fauna (Bartra, 2006).

Based on Table 4, coffee production is concentrated in the states of Chiapas, Veracruz, Puebla and Oaxaca representing 94% of total production, 85% of the harvest area and 83% of producers. Production is primarily small landholders, with about 90% of farmers having plots smaller than five hectares. Approximately 80% of coffee production is destined for export markets. In good years, foreign exchange earnings generated by coffee sales are about \$800 million dollars, second only to oil exports (Bartra, 2006).

Table 4. Indicators of coffee cherry production and GCE by state, 2012 cycle.

Entity	Production (Tons)	Yield (Tons/Ha)	Production value (Thousands of Pesos)	Production GCE (Tons)	Production GCE (Bags of 60 Kg)
Chiapas	532,582.79	2.09	3,481,899,684.22	98,048.49	1,634,141.53
Veracruz	369,455.21	2.65	2,584,749,838.42	68,016.70	1,133,611.74
Puebla	202,947.48	3.43	1,564,469,924.11	37,362.63	622,710.52
Oaxaca	117,439.81	0.94	440,579,491.44	21,620.67	360,344.48
Guerrero	48,447.37	1.03	186,851,849.40	8,919.16	148,652.68
Hidalgo	32,880.30	1.25	212,070,140.00	6,053.26	100,887.72
San Luis Potosi	11,829.87	0.70	18,784,136.00	2,177.88	36,297.98
Nayarit	10,785.20	0.58	90,265,603.59	1,985.56	33,092.59
Jalisco	5,311.38	1.33	33,419,020.20	977.83	16,297.08
Colima	2,043.58	0.82	16,366,251.20	376.22	6,270.38
Tabasco	953.68	0.92	7,131,360.75	175.57	2,926.21
Querétaro	108.00	0.40	972,000.00	19.88	331.38
National	1,336,882.11	1.92	8,647,580,349.05	242,510.41	4,041,840.25

Source: Based on data from SIAP. **Note:** GCE refers to “green coffee equivalent” to its calculation is considered that 1 kg of coffee cherries is equal to 0.1841 kg of green coffee.

Chiapas is the leading producer of coffee, and also has a yield per hectare higher than the world average. Its conditions in this area are similar to countries like Vietnam and China. During the 2012

growing season, it had a production of 532,000 tons of coffee cherries, equivalent to 1 million 634 thousand bags of green coffee which resulted in the generation of 40% of the value of coffee production in the country. Chiapas, Veracruz and Puebla jointly accounted for 88% of the value of coffee production in 2012. It is also important to note that Veracruz and Puebla have a high yield in tons per hectare, which is mainly due to the effect of the coffee plot renovation program.

The sector has great advantages in product marketing because there is a very limited use of hybrid varieties and use of agrochemicals-factors that are of international interest due to the global trend of consuming healthy foods. It can be argued that coffee production in Mexico is virtually artisanal, and a significant percentage of producers are principally indigenous (ASERCA, 2013).

According to Table 5, the states of Chiapas, Oaxaca and Veracruz are the states with the largest number of producers, which as a whole make up 74% of farmers who grow the grain, with Chiapas having the largest number of producers at approximately 36%. In the same manner, the state has a third of the land area dedicated to coffee growing in the country.

Chiapas has the highest proportion of hectares devoted to growing coffee, and represents 36% of the national total followed by Veracruz and Oaxaca, with 20 and 19% respectively.

Table 5. Characteristics of coffee production in Mexico, 2010

Entity	Number of producers	Plots (Number)	Surface area (Ha)	Men (Number)	Women (Number)
Chiapas	183,761	198,320	241,876	148,916	34,733
Oaxaca	103,052	146,134	128,802	62,854	39,991
Veracruz	90,248	137,704	138,427	64,190	26,011
Puebla	48,215	66,166	67,137	32,632	15,555
Guerrero	22,699	29,867	39,507	12,616	10,045
Hidalgo	35,379	46,635	23,925	25,702	9,667

Nayarit	5,327	9,415	16,402	4,108	1,199
San Luis Potosí	18,048	29,115	14,001	13,524	4,504
Jalisco	1,413	1,785	2,656	1,018	394
Colima	863	1,169	1,304	671	186
Querétaro	312	413	222	203	109
Tabasco	1,227	1,398	1,000	1,078	149

Source: Mexican Association of the Coffee Production Chain, A.C. (AMECAFE)

In addition, 41% of men and 24% of women dedicated to coffee production are concentrated in the state of Chiapas. This indicates that a significant portion of the workforce in this sector is directly associated with the province with the highest coffee production in the country.

Chiapas is the world's largest producer of organic coffee. 18 million tons per year are produced by more than 60,000 producers, of whom one third are indigenous and peasant women who grow coffee plants under the shade of native trees without using agrochemicals to avoid contaminating the soil (Marshall, 2011).

Chiapas is a state with a long tradition in the cultivation and marketing of coffee. The variety of coffee most produced in the state (just as in the rest of the country) is "Arabica". "Robust" coffee is another species that is commercially produced in the world and is used mostly in the soluble coffee industry (Barrera & Vine).

Organic coffee is defined as the product obtained through a production process where agrochemicals are replaced by organic elements, and involves practices to prevent soil erosion, improve soil fertility, maintain biodiversity, rejuvenate plantations and use an integrated management agro-ecosystem to control weeds, pests and diseases. It also involves rigorous implementation of the tasks of harvesting, processing, storage and transport in order to obtain a high quality product (Trápaga and Torres, 1994).

PRODUCTIVE DEVELOPMENT PROGRAM COFFEE

The commercialization policies for grains and oil seed have sought, in first place, to adapt to new conditions generated by the national openness to international markets, and as a second purpose to respond to the demands of some of the country's producers (Riedemann, 2007).

The Procampo Production Program of 2013 included a component that allowed grants that went directly to income to support coffee producers based on the productivity of the land, and through actions sought to stimulate agro cultural activities in coffee plantations to continuously improve the competitiveness founded in yield per hectare and sales volumes. Furthermore, the promotion of organic farming was considered, and was supported with additional resources to farms whose production was certified or had some other sustainable certification.

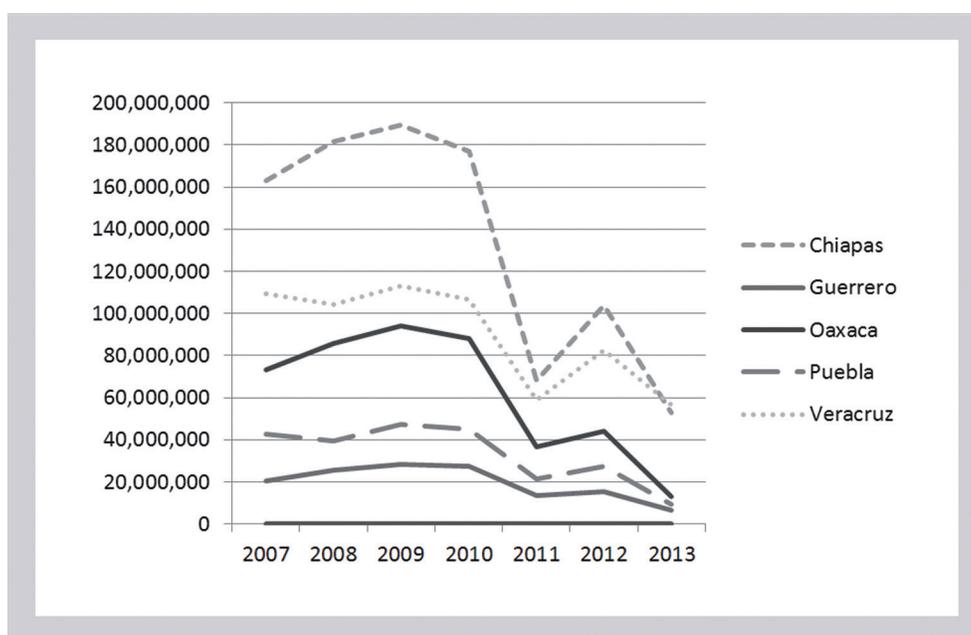
The objective of this program was to increase the capitalization of the economic units of coffee production, allowing an increase in production volume per hectare and promote commercialization. The target population considered legally constituted individuals or entities, registered in the National Coffee Production Registry (PNC), producers with direct marketing activities, registered and / or validated in the Information System of National Coffee Production (SICN), located in the 12 states with the highest coffee economic activity, which are: Chiapas, Colima, Guerrero, Hidalgo, Jalisco, Nayarit, Oaxaca, Puebla, Querétaro, San Luis Potosí, Tabasco and Veracruz. Additionally, sustainable coffee producers were sought. In this case, they had to present and individual or group certificate issued by a certification company.

The distribution of the financial support considered surface area (30%) and productivity (70%), and in cases of certified organic production an additional (40%) of support was considered. The area subject to the benefits had a threshold of 10 hectares,

while support for integrated productivity was considered up to 10 quintals² yield per hectare.

Following the information in Chart 1, the evolution of the program budget presented a significant weakening in recent years. The main producing states have experienced a negative annual average rate of growth with the most relevant cases being Oaxaca and Puebla, which presented during the period 2007-2013 a rate of -22 and -25 percent, respectively. Meanwhile, Chiapas and Guerrero have had a weakened budget during the same period of -17 percent. Veracruz experienced a decline of -10 percent rate of budget growth.

Graph 1. Evolution of the budget for the Productive Coffee Development Program, 2007-2013 (In current pesos)



Source: Based on data from the Procampo Productive Program, 2013

² Un quintal (Qq) de café equivale a 57.5 kilogramos de café pergamino (46 kilogramos de café oro).

According to Table 6, the other coffee producing states have been subject to this dynamic budget loss, with Queretaro and Tabasco not receiving support by the program during 2013.

Table 6. Evolution of the amounts allocated by state
Productive Coffee Development Program, in current Pesos

Entity	2007	2008	2009	2010	2011	2012	2013
Chiapas	162,816,740	181,562,919	189,527,424	176,726,967	68,351,783	103,874,139	52,918,412
Colima	906,593	560,677	1,061,838	1,106,875	409,824	524,660	277,550
Guerrero	20,714,923	25,611,743	28,407,998	27,590,988	13,471,513	15,389,488	6,602,806
Hidalgo	9,042,172	2,539,379	3,741,113	3,836,899	2,314,653	2,760,214	211,637
Jalisco	181,788	219,189	1,143,530	1,183,095	62,192	177,839	57,697
Nayarit	12,143,894	13,105,081	17,733,563	17,097,670	7,558,563	10,841,986	4,662,686
Oaxaca	73,220,460	85,720,354	93,890,889	88,164,244	36,850,474	44,298,043	12,913,369
Puebla	42,743,506	39,290,134	47,209,350	44,835,253	21,288,719	27,282,588	9,518,108
Querétaro	69,600	1,150	1,000	950	3,571	3,399	0
San Luis Potosí	4,287,025	6,103,960	7,038,938	7,187,544	3,043,898	2,774,643	676,049
Tabasco	316,150	650	650	617	0	0	0
Veracruz	109,560,620	104,351,305	112,896,271	106,398,874	58,729,796	82,499,481	56,376,159
TOTAL	436,003,471	459,066,541	502,652,564	474,129,976	212,084,986	290,426,480	144,214,473

Source: Based on data from the Procampo Productive Program, 2013

Table 7. Characteristics of the beneficiaries of the Productive Development Program Coffee, 2013

State	Beneficiaries (Number)	Amount (Current Pesos)	Hectares
Chiapas	22,750	52,918,412	44,771
Colima	153	277,550	317
Guerrero	4,287	6,602,806	9,133
Hidalgo	275	211,637	268
Jalisco	27	57,697	62
Nayarit	1,212	4,662,686	5,167
Oaxaca	6,582	12,913,369	16,105
Puebla	4,212	9,518,108	9,268
San Luis Potosí	794	676,049	1,003
Veracruz	25,239	56,376,159	46,676
TOTAL	65,531	144,214,473	132,770

Source: Based on data from the Procampo Productive Program, 2013.

Basing the information in Table 7, the state of Chiapas has 35% of the total program beneficiaries who were given about 53 million pesos, representing an average of \$ 1,181 pesos per hectare.

According to Lopez and Caamal (2007), in Chiapas the total costs to maintain one hectare of conventional coffee are on average \$ 9,443.40 pesos. Of this amount, nearly 72.6% were spent on the payment of wages, while the rest was for the use of fertilizers. The average yield per hectare was 10 quintals per hectare, so that the average income stood at \$ 9,200 pesos per hectare. In other words, revenues were lower than costs.

Therefore, the support provided by the program can cover in the majority of cases the difference between revenue and total

costs. However, this situation is conditioned by the structure of prices and future demands of the grain. Despite envisioning a horizon of a high demand for coffee in the national and global markets, it is important to incorporate policy tools which cover risks and uncertainty.

CONCLUSIONS

The state of Chiapas presents an important opportunity to continue as a leading producer of coffee in Mexico, and has yield levels per hectare that allow for the incorporation into international markets, coupled with the production of organic coffee which must have additional alternatives to conventional certification as is the case with participatory certification. The incorporation of a greater number of hectares to organic coffee production should be a priority action for the government and social movements.

The State as a whole must orchestrate a series of sectorial policy measures to enable the sector to maintain its average annual growth rates. Chiapas should also be consolidated with a central element or “cluster” of coffee farming in the country. To this end, institutions and programs should direct their efforts to consolidate certification processes that allow small producers into global agricultural food chains.

According to Silva (2006), the production costs of conventional coffee are lower compared to organic coffee, primarily due to the fact that there is a greater amount of labor for the maintenance of an organic coffee plantation, and secondly, by the amount of organic fertilizer used- resulting in a higher purchase price. However, the price premiums achieved by organic coffee compared to those of conventional coffee, together with the prices or “prize” that is given to belonging to the Fair Trade system, allow organic producers to stay in the market for this product

worldwide, absorbing the high costs generated during maintenance of the coffee plantations.

The profitability of organic coffee producers is superior by far to conventional coffee, which is also reflected in increased responsiveness by organic producers against possible misfortunes, because their income reduces the impacts of their costs giving greater stability in the coffee market compared to conventional coffee producers.

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