INTERNATIONAL COFFEE ORGANIZATION
ORGANIZACIÓN INTERNACIONAL DEL CAFÉ
ORGANIZAÇÃO INTERNACIONAL DO CAFÉ
ORGANISATION INTERNATIONALE DU CAFÉ

ICC **105-12**

15 September 2010
Original: French

E

Study

International Coffee Council
105th Session
21 – 24 September 2010
London, England

ICO indicator prices and selected economic variables

Background

In the context of its programme of activities, the Organization pays particular attention to changes in economic variables that may have an impact on the purchasing power of coffee growers. This document contains a comparative analysis on the evolution of coffee prices and selected economic variables such as inflation, exchange rates, and agricultural input prices, particularly costs of fertilizers used in coffee farming.

Action

The Council is requested to take note of this document.

ICO INDICATOR PRICES AND SELECTED ECONOMIC VARIABLES

INTRODUCTION

1. In the coffee industry the behaviour of certain economic variables can contribute to strengthening or weakening, or indeed neutralizing the real impact of changes in coffee prices on the value of trade. Among the variables that can affect coffee export earnings, the most commonly mentioned are prices of inputs used in coffee farming, currency exchange rates against the United States dollar, and inflation. On the one hand, this report aims to provide a comparative analysis between the ICO composite indicator price expressed in the currencies of selected importing countries and on the other, the relationship between the evolution of these prices and fertilizer prices.

2. The methodology of the study is based on observation of annual averages of the ICO composite indicator price during the period from 1970 to 2009. The evolution of the composite price will then be compared with the behaviour of prices for fertilizers currently used in coffee farming. In addition, the composite indicator price will be expressed in the currencies of selected importing countries in order to determine the extent to which exchange rates against the United States dollar influence real levels of green coffee prices. The following national currencies were selected for this analysis: the euro, the pound sterling (United Kingdom), the Swiss franc (Switzerland), and the Yen (Japan).

I. EVOLUTION OF THE ICO COMPOSITE INDICATOR AND FERTILIZERS PRICES

A. Fertilizers used in coffee farming

3. Broadly speaking two main types of fertilizer are used in agriculture: organic fertilizers and mineral fertilizers. A third group is composed of organic-mineral fertilizers, a combination of the first two types. Organic fertilizers are of animal or plant origin, mostly derived from vegetable waste (compost) or by-products of livestock rearing, including manure. Chemical fertilizers were developed by the chemical, coal and petroleum industries. Mineral fertilizers were originally produced on the basis of natural phosphate and potassium deposits as well as from the manufacture of chemical fertilizers. In order to mark the difference with organic fertilizers, fertilizers of chemical origin are designated as mineral fertilizers even though they have the same components. Mineral fertilizers are the most widely used soil nutrients for improving productivity in coffee farming – these are mainly nitrogen, phosphate and potassium fertilizer. Secondary elements, or oligo-elements, contribute to soil enrichment – these are mainly manganese, iron, boron and zinc. These nutrients or fertilizing elements are used in many coffee exporting countries to improve crop productivity. For coffee, as for many other crops, the three essential elements that promote growth are: nitrogen, phosphate and potassium.

Nitrogen fertilizers

4. Nitrogen fertilizers play a vital role in promoting the growth of coffee trees and the formation of new branches and leaves as well as in photosynthesis. The chemical industry developed nitrogen fertilizers by synthesizing ammonia using nitrogen from the atmosphere and a hydrogen contribution provided by natural gas. The chemical process produces a number of substances including urea, ammonium sulphate and ammonium nitrate, among others. Nitrogen fertilizers account for 59% of world fertilizer production. The main nitrogen fertilizers are derived from ammonia and urea. The urea price will be used as the reference price for nitrogen fertilizers. The leading nitrogen fertilizer producers are Canada, China, India, Indonesia, Pakistan, the Russian Federation and the United States of America.

Phosphate fertilizers

5. Phosphate fertilizers come from natural deposits. Phosphates are the source of phosphorus. Coffee trees have relatively low phosphorus needs, although this helps to promote the development of roots, flowering and fructification. Phosphate fertilizers account for 24% of world fertilizer production. The world's leading producers are: Brazil, China, Israel, Jordan, Morocco, the Russian Federation, Senegal, South Africa, Syria, Togo, Tunisia and the United States of America.

Potassium fertilizers

6. Potassium is needed for the formation of fruits and coffee beans. Potassium fertilizers, or potash, include potassium chlorate, potassium sulphate, potassium carbonate, etc. Potassium fertilizers account for 17% of world fertilizer production. They are produced mainly on the basis of natural potassium deposits. The leading producers are Canada, Belarus and the Russian Federation which together supply over 70% of world production. Brazil, China, Germany, Israel, Jordan and the United States of America are also significant producers.

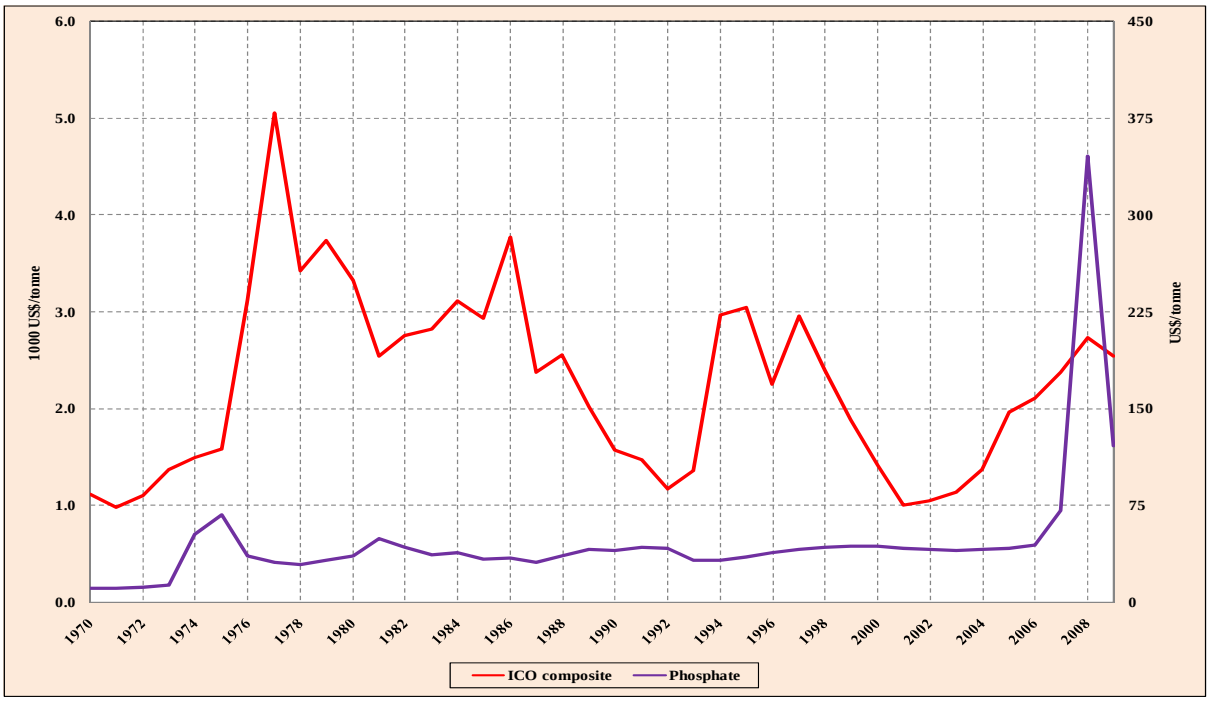
B. Evolution of prices

7. Annex Table 1 shows the evolution the ICO composite indicator and fertilizer prices. The ICO composite indicator price is expressed in United States dollars per tonne in order to facilitate comparison with fertilizer prices. Graphs 1 to 3 show the evolution of the ICO composite indicator and the prices for the three fertilizers (in current terms), whereas Graph 4 shows the theoretical ratios[1] between the composite price and phosphate, potash and urea prices, separately.

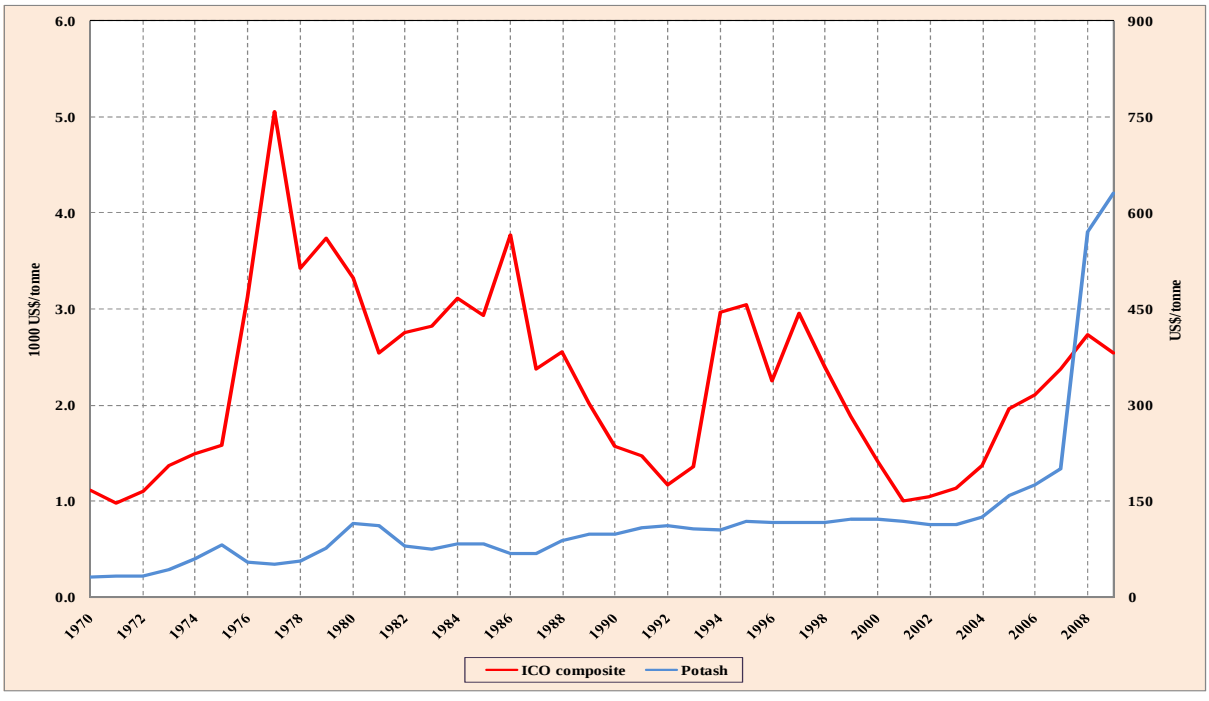
[1] *The ratios between the ICO composite price and fertilizer prices are considered to be purely theoretical since they are not based on the amount of fertilizer required to produce a tonne of coffee.*

8. The prices of both phosphate and potash remained stable for most of the period under study, although both rose sharply in 2007 (Graphs 1 and 2). The price of urea shows greater volatility and also rose sharply between 2006 and 2008 (Graph 3)

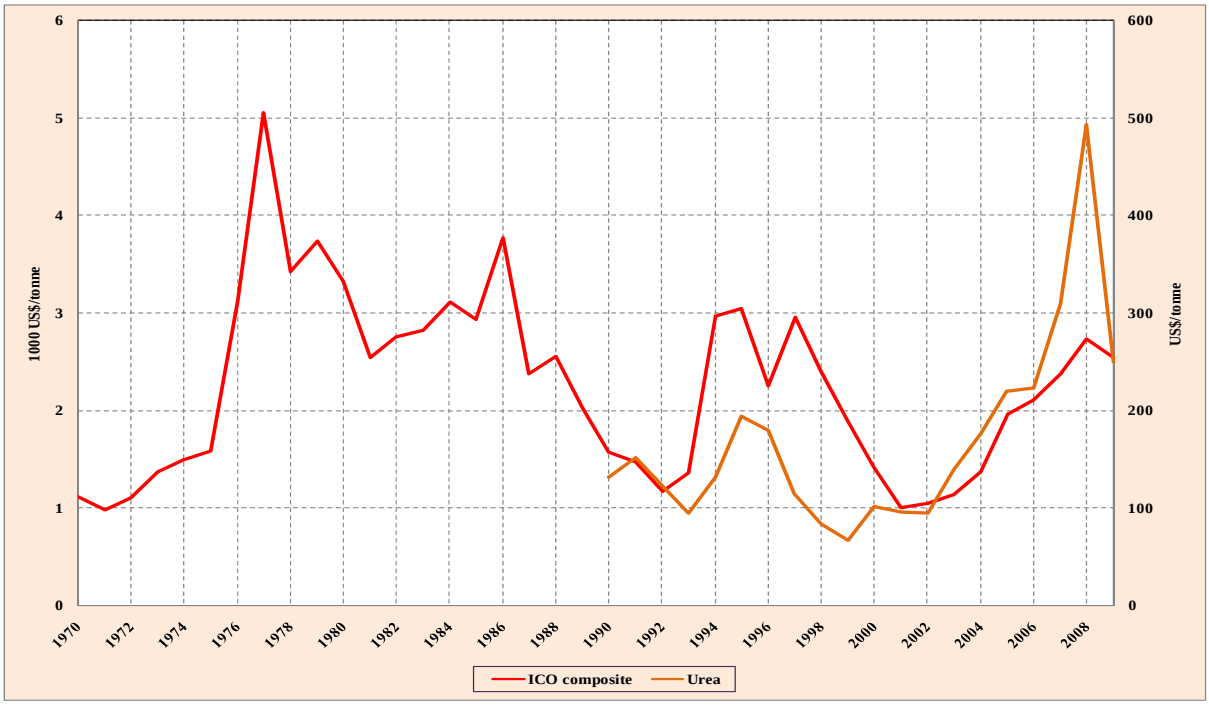
Graph 1: ICO composite indicator and phosphate prices
Calendar years 1970 to 2009



Graph 2: ICO composite indicator and potash prices
Calendar years 1970 to 2009

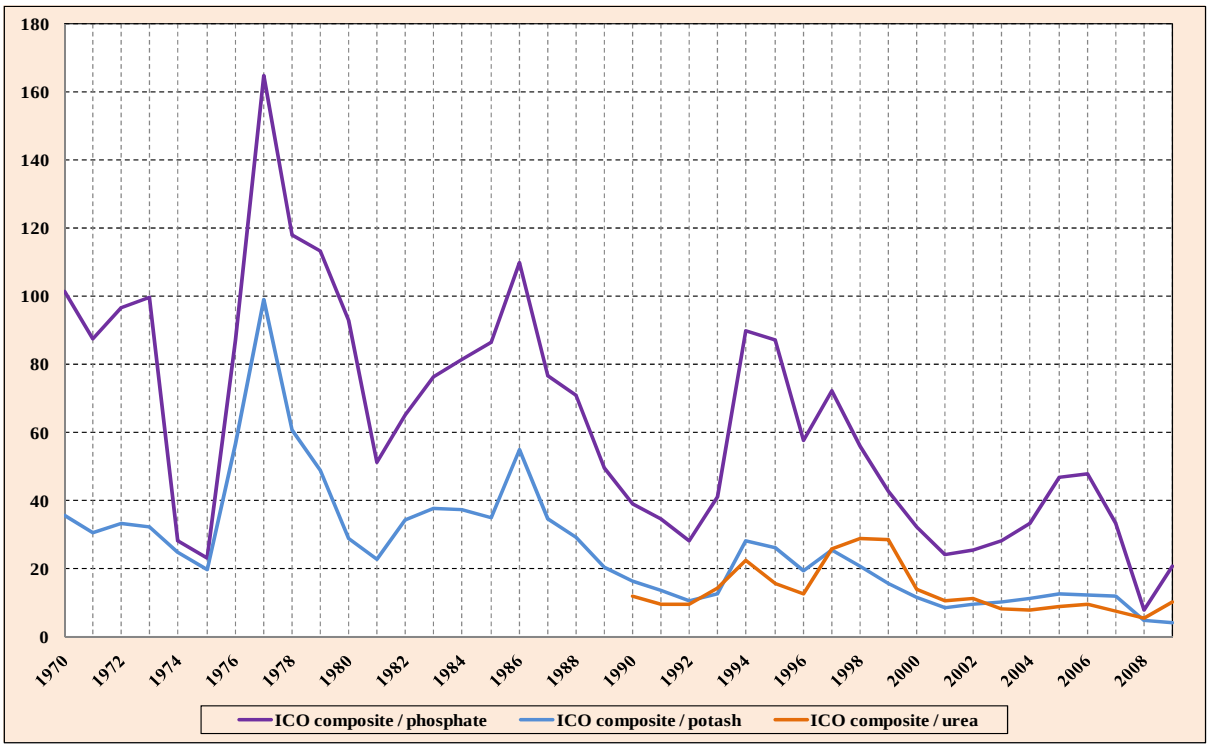


Graph 3: **ICO composite indicator and urea prices**
Calendar years 1970 to 2009



9. Graph 4 shows the ratios between the ICO composite price and the prices of fertilizers. The behaviour of the ratios until around 2005 is dominated by swings in coffee prices, which were much more volatile than fertilizer prices during the same period. Since then, the prices of fertilizers have suffered large oscillations, and the ratios have fallen.

Graph 4: **Ratio between the ICO composite indicator and fertilizers prices**
Calendar years 1970 to 2009



10. It can be seen that the purchasing power of those coffee farmers who make intensive use of fertilizers has been falling during the last three years despite the recovery in coffee prices, mainly as a result of the increased costs of these production factors.

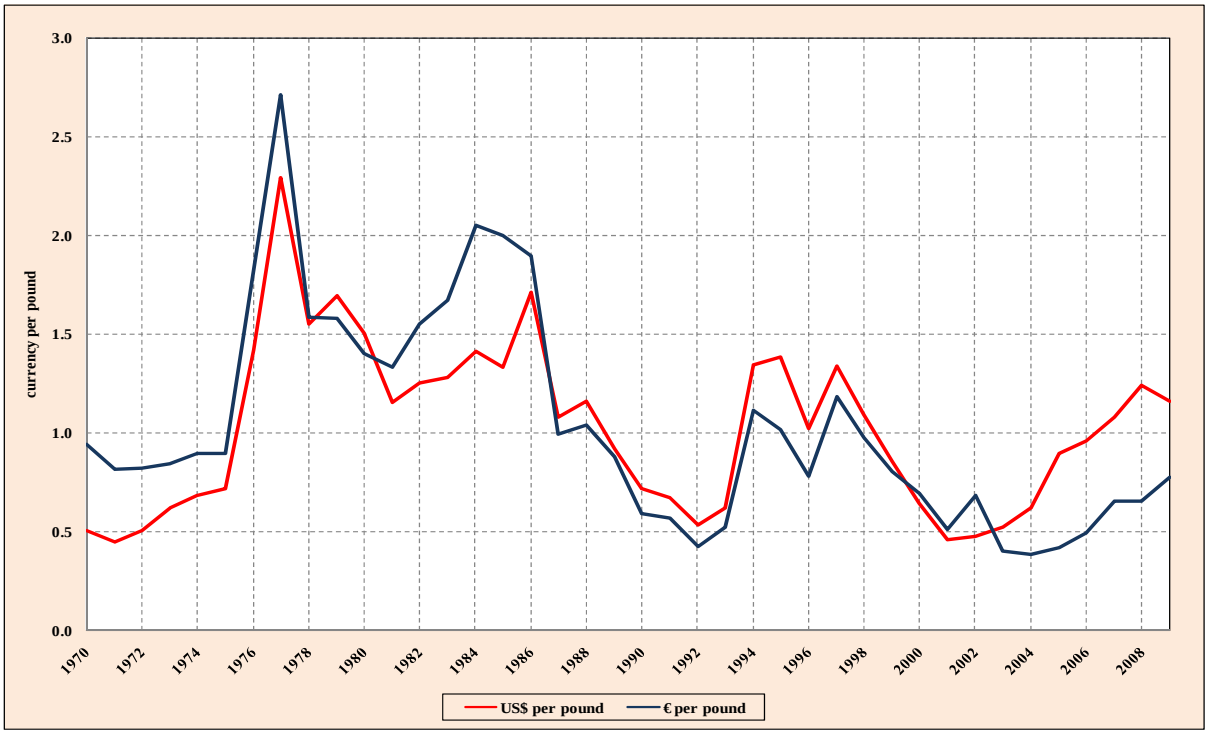
II. IMPACT OF MOVEMENTS IN THE EXCHANGE RATES AGAINST THE UNITED STATES DOLLAR ON THE ICO COMPOSITE INDICATOR PRICE

11. The extent to which fluctuations in US dollar exchange rates affect coffee prices expressed in the national currencies of selected importing countries must be established. Annex Table 2 shows average annual exchange rates in selected importing countries (national currency per US dollar) for the euro (€), the pound sterling (£), the Swiss franc (CHF) and the yen (¥). Annex Table 3 shows the composite indicator price expressed in these selected currencies.

Evolution of composite indicator price expressed in euro (€)

12. Conversion of the composite indicator price into euro before 2002 is based on the Deutsch mark. Graph 5 shows the composite indicator price expressed in euro per lb and in US dollars per lb. It can be seen that the evolution was very similar until 2002 although the variation amplitude was not the same. Since 2003, however, there are inverse movements as well as time lags in the two variables. In euro per lb the composite indicator price fell by 40.8% in 2003 while in US dollar per lb it increased by 8.7%.

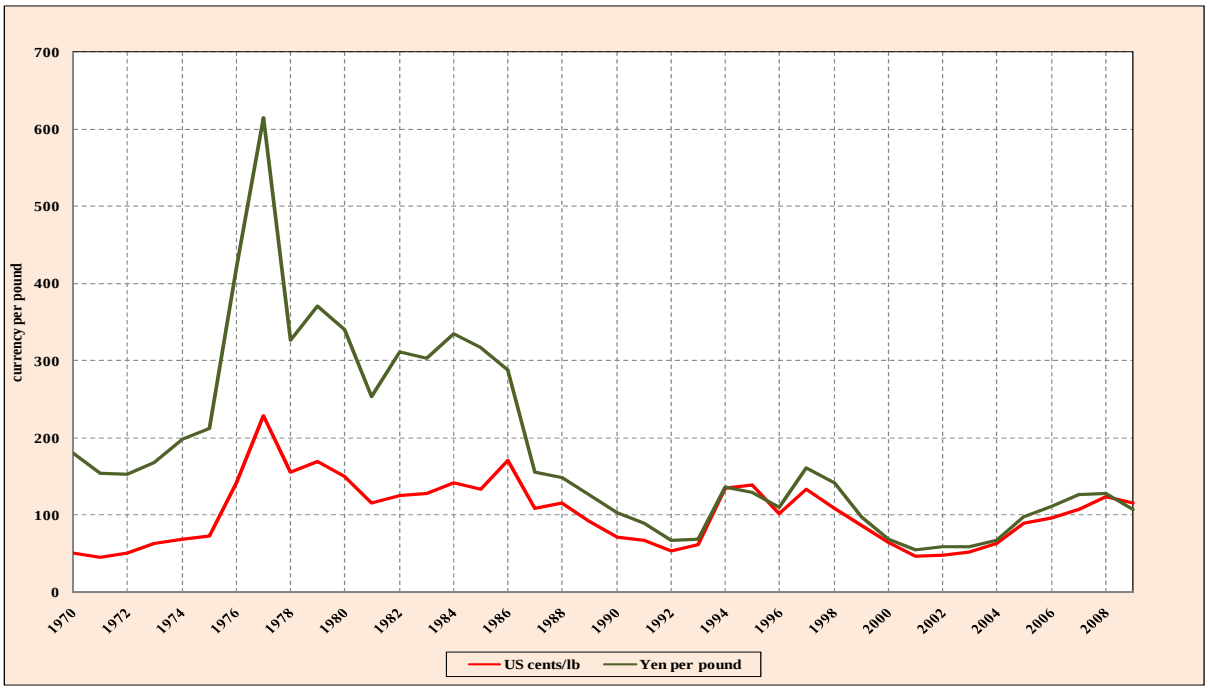
Graph 5: ICO composite indicator price expressed in US$ per lb and € per lb



Evolution of composite indicator price expressed in Yen (¥)

13. The evolution of the composite indicator price expressed in yen per lb followed virtually the same movement as that of the price in US cents per lb although the variation amplitude differed in some cases (Graph 6). During the last two years, however, the price increase in US cents per lb in 2008 (+15.4%) was much less steep in yen per lb (+1.3%), while the fall in prices in 2009 (-6.9%) had strong repercussions on prices expressed in yen (-15.7%).

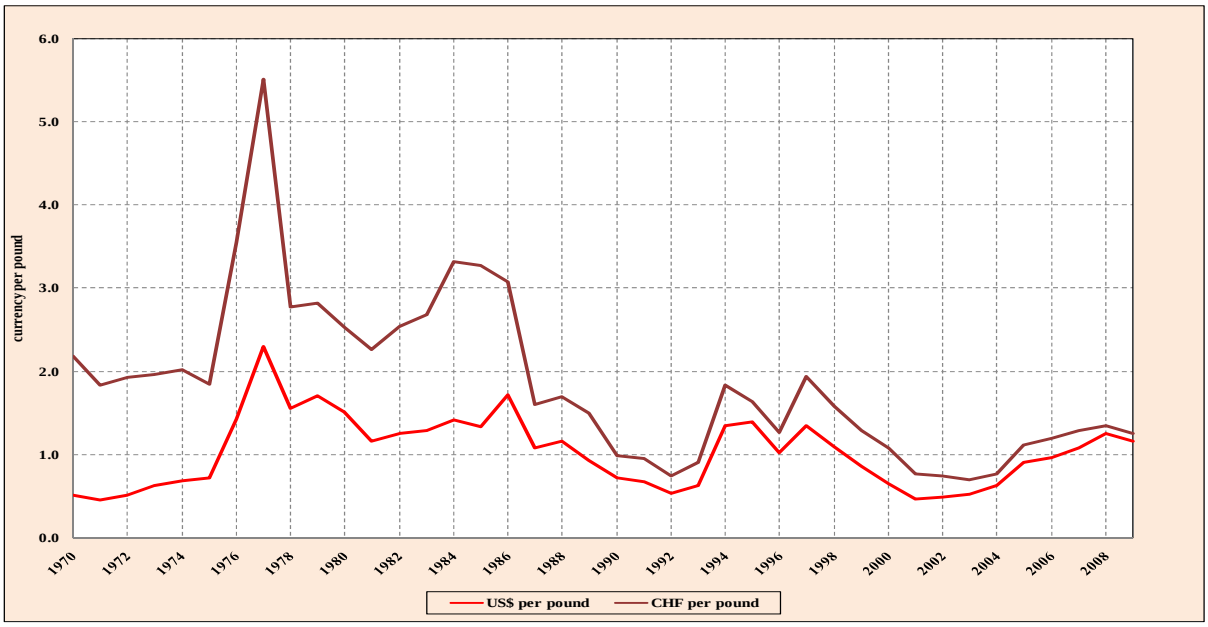
Graph 6: ICO composite indicator price expressed n US cents per lb and in ¥ per lb



Evolution of ICO composite indicator price expressed in Swiss franc (CHF)

14. Graph 7 shows the evolution of the composite indicator price expressed in Swiss francs (CHF) per lb. The same movements were observed for both variables, sometimes with significant differences in variation amplitudes. From 1970 to 2009, the two variables moved in the opposite direction only five times: in 1975, 1986, 1995, 2002 and 2003. During the other years, price increases expressed in US$ per lb had less impact than prices expressed in CHF per lb.

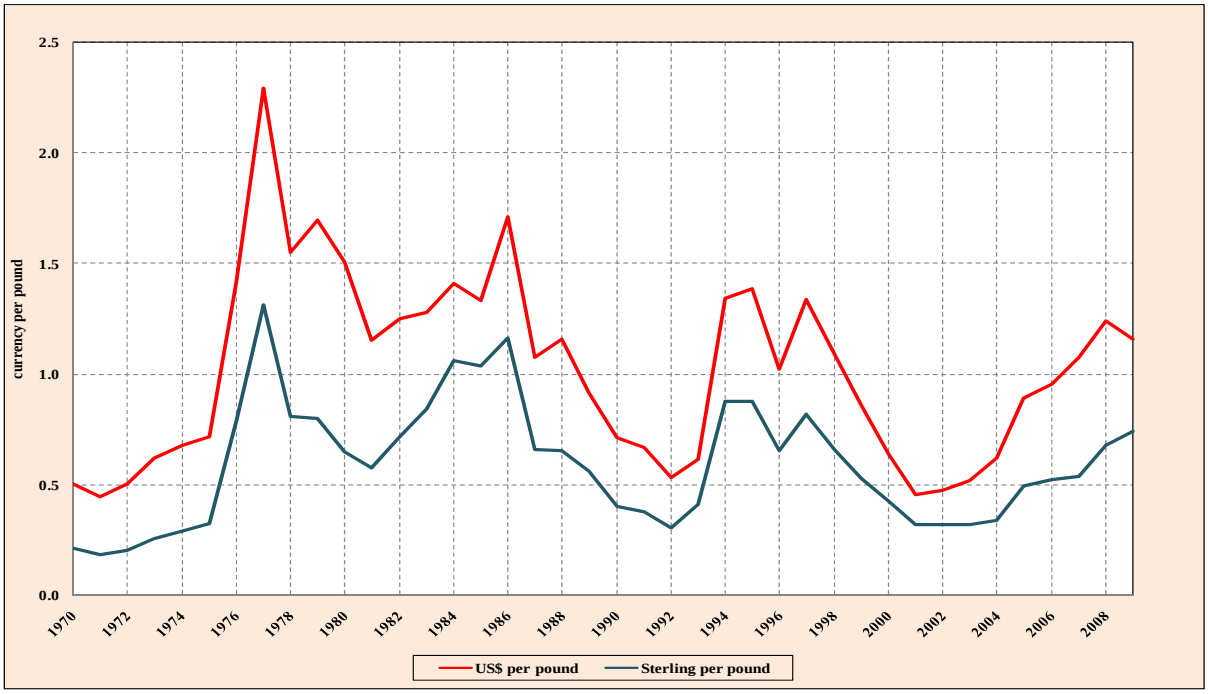
Graph 7: ICO composite indicator price expressed in US$ per lb and in CHF per lb



ICO composite indicator price expressed in pound sterling (£)

15. With a few exceptions, there was very little difference between the evolution of the composite price expressed in pounds sterling and in US$ per lb (Graph 8). A marked disparity appeared in 2009 when the composite price expressed in pounds sterling increased by 9.6% while expressed in US$ per lb it fell by 6.9%.

Graph 8: ICO composite indicator price expressed in US$ per lb and in £ per lb



CONCLUSION

16. Comparative analysis of the evolution of the ICO composite indicator price and selected economic variables has made it possible both to determine the purchasing power of coffee producers and to highlight the real impact of coffee price movements in importing countries.

17. In regard to prices of the main fertilizers used in coffee farming, we note that the purchasing power of coffee farmers who make intensive use of fertilizers has fallen during the last three years despite the recovery in coffee prices. In fact, the increase in prices of these agricultural inputs and labour costs has counteracted much of the positive effects of the recovery in coffee prices in exporting countries.

18. In the case of the US dollar, which is the reference currency used for international coffee transactions, fluctuations in exchange rates against selected national currencies have contributed to weakening or strengthening the impact of movements in coffee import prices in the countries concerned. In many cases an increase in the ICO composite indicator price has led to a fall of coffee prices in the local currency as a result of fluctuations in exchange rates of national currencies against the US dollar. In other words, the behaviour of the composite indicator price is similar in all currencies.

ICO composite indicator, Phosphate, Potash and Urea prices
Calendar years 1970 to 2009
(US dollars per tonne)

					Ratio		
Calemdar year	ICO Composite imdicator (1)	Phosphate (2)	Potash (3)	Urea (4)	(1) / (2)	(1) / (3)	(1) / (4)
1970	1 113.84	11.00	31.50		101.26	35.36	
1971	984.59	11.25	32.50		87.52	30.30	
1972	1 111.23	11.50	33.50		96.63	33.17	
1973	1 370.45	13.75	42.50		99.67	32.25	
1974	1 497.97	52.77	60.50		28.39	24.76	
1975	1 581.34	68.00	81.33		23.26	19.44	
1976	3 129.56	35.83	55.50		87.34	56.39	
1977	5 053.22	30.67	51.17		164.76	98.75	
1978	3 420.40	29.00	56.38		117.94	60.67	
1979	3 736.85	33.00	76.48		113.24	48.86	
1980	3 321.74	35.71	115.71		93.02	28.71	
1981	2 544.62	49.50	112.35		51.41	22.65	
1982	2 755.64	42.38	80.75		65.02	34.13	
1983	2 821.48	36.92	75.35		76.42	37.45	
1984	3 112.71	38.25	83.71		81.38	37.18	
1985	2 934.23	33.92	83.96		86.50	34.95	
1986	3 768.29	34.26	68.79		109.99	54.78	
1987	2 376.72	31.00	69.04		76.67	34.43	
1988	2 556.47	36.00	87.54		71.01	29.20	
1989	2 021.01	40.83	98.88		49.50	20.44	
1990	1 577.01	40.50	98.13	130.74	38.94	16.07	12.06
1991	1 472.69	42.50	108.85	150.95	34.65	13.53	9.76
1992	1 176.19	41.75	112.08	123.49	28.17	10.49	9.52
1993	1 358.71	33.00	107.42	94.40	41.17	12.65	14.39
1994	2 964.14	33.00	105.72	131.39	89.82	28.04	22.56
1995	3 051.55	35.00	117.76	193.93	87.19	25.91	15.74
1996	2 250.16	39.00	116.93	179.00	57.70	19.24	12.57
1997	2 952.07	40.80	116.50	114.00	72.35	25.34	25.90
1998	2 401.99	43.00	116.90	83.10	55.86	20.55	28.90
1999	1 889.64	44.00	121.60	66.40	42.95	15.54	28.46
2000	1 416.25	43.80	122.50	101.10	32.33	11.56	14.01
2001	1 005.11	41.84	118.10	95.30	24.02	8.51	10.55
2002	1 052.55	41.00	113.30	94.40	25.67	9.29	11.15
2003	1 144.28	40.50	113.30	138.90	28.25	10.10	8.24
2004	1 370.18	40.98	124.60	175.30	33.44	11.00	7.82
2005	1 970.12	42.00	158.20	219.00	46.91	12.45	9.00
2006	2 110.79	44.20	174.50	223.00	47.76	12.10	9.47
2007	2 373.95	70.90	200.20	309.40	33.48	11.86	7.67
2008	2 739.22	345.60	570.10	492.70	7.93	4.80	5.56
2009	2 550.06	121.66	630.10	249.60	20.96	4.05	10.22

*** Theorical margin of ICO composite price over fertilizer prices**

Exchange rate
National currency per US$
Annual averages 1970 to 2009

Currency	Euro (€)	Sterling (£)	Swiss Franc (CHF)	Yen (¥)
1970	**1.8605**	0.4174	4.3098	358.0692
1971	**1.8207**	0.4092	4.1113	347.8592
1972	**1.6278**	0.4004	3.8193	303.1725
1973	**1.3576**	0.4082	3.1648	271.7017
1974	**1.3180**	0.4278	2.9793	292.0825
1975	**1.2530**	0.4520	2.5813	296.7875
1976	**1.2828**	0.5564	2.4996	296.5525
1977	**1.1833**	0.5733	2.4035	268.5100
1978	**1.0234**	0.5214	1.7880	210.4417
1979	**0.9328**	0.4721	1.6627	219.1400
1980	**0.9290**	0.4302	1.6757	226.7408
1981	**1.1552**	0.4975	1.9642	220.5358
1982	**1.2398**	0.5724	2.0303	249.0767
1983	**1.3044**	0.6596	2.0991	237.5117
1984	**1.4541**	0.7517	2.3497	237.5225
1985	**1.5042**	0.7789	2.4571	238.5358
1986	**1.1106**	0.6819	1.7989	168.5200
1987	**0.9196**	0.6117	1.4912	144.6375
1988	**0.8984**	0.5621	1.4633	128.1517
1989	**0.9609**	0.6113	1.6359	137.9642
1990	**0.8265**	0.5631	1.3892	144.7925
1991	**0.8486**	0.5640	1.4340	134.7067
1992	**0.7981**	0.5697	1.4062	126.6517
1993	**0.8457**	0.6664	1.4776	111.1975
1994	**0.8295**	0.6532	1.3677	102.2083
1995	**0.7330**	0.6336	1.1825	94.0600
1996	**0.7678**	0.6409	1.2360	108.7800
1997	**0.8847**	0.6108	1.4513	120.9908
1998	**0.8978**	0.6038	1.4498	130.9042
1999	**0.9366**	0.6181	1.5022	113.9067
2000	**1.0831**	0.6609	1.6888	107.7650
2001	**1.1152**	0.6946	1.6876	121.5300
2002	1.0626	0.6672	1.5586	125.3892
2003	0.8860	0.6124	1.3467	115.9333
2004	0.8054	0.5461	1.2435	108.1925
2005	0.8041	0.5499	1.2452	110.2183
2006	0.7972	0.5434	1.2539	116.3000
2007	0.7306	0.4997	1.2004	117.7550
2008	0.6827	0.5451	1.0831	103.3592
2009	0.7198	0.6415	1.0881	93.5700

ICO composite indicator prices
expressed in selected currencies per pound
Calendar years 1970 to 2009

	€/lb	£/lb	CHF/lb	¥/lb
1970	**0.94**	0.21	2.18	180.91
1971	**0.81**	0.18	1.84	155.36
1972	**0.82**	0.20	1.93	152.81
1973	**0.84**	0.25	1.97	168.90
1974	**0.90**	0.29	2.02	198.46
1975	**0.90**	0.32	1.85	212.88
1976	**1.82**	0.79	3.55	420.97
1977	**2.71**	1.31	5.51	615.46
1978	**1.59**	0.81	2.77	326.50
1979	**1.58**	0.80	2.82	371.45
1980	**1.40**	0.65	2.52	341.64
1981	**1.33**	0.57	2.27	254.55
1982	**1.55**	0.72	2.54	311.33
1983	**1.67**	0.84	2.69	303.97
1984	**2.05**	1.06	3.32	335.36
1985	**2.00**	1.04	3.27	317.48
1986	**1.90**	1.17	3.07	288.05
1987	**0.99**	0.66	1.61	155.93
1988	**1.04**	0.65	1.70	148.61
1989	**0.88**	0.56	1.50	126.48
1990	**0.59**	0.40	0.99	103.57
1991	**0.57**	0.38	0.96	89.99
1992	**0.43**	0.30	0.75	67.57
1993	**0.52**	0.41	0.91	68.53
1994	**1.12**	0.88	1.84	137.42
1995	**1.01**	0.88	1.64	130.20
1996	**0.78**	0.65	1.26	111.03
1997	**1.18**	0.82	1.94	162.01
1998	**0.98**	0.66	1.58	142.62
1999	**0.80**	0.53	1.29	97.63
2000	**0.70**	0.42	1.08	69.23
2001	**0.51**	0.32	0.77	55.41
2002	0.68	0.32	0.74	59.86
2003	0.40	0.32	0.70	60.17
2004	0.38	0.34	0.77	67.24
2005	0.42	0.49	1.11	98.50
2006	0.50	0.52	1.20	111.35
2007	0.65	0.54	1.29	126.80
2008	0.65	0.68	1.35	128.42
2009	0.78	0.74	1.26	108.23