

Comparative Advantage of the European Rapeseed Industry vis-à-vis Other Oils and Fats Producers

Mohd Arif Simeh*

ABSTRACT

Rapeseed production in Europe currently constitutes to nearly one-third of the world output of about 28 million tonnes although its area is three times smaller than that in China. This paper attempts to assess its competitiveness vis-à-vis 26 other oils and fats producing countries [with special reference to other rapeseed oil producers, the least cost producer of vegetable oil and Malaysia (in the production of palm oil)]. Three economic comparisons will be used, i.e.; economic advantage, comparative advantage and structural competitiveness.

INTRODUCTION

Rapeseed crop (*B. napus* and *B. rapa*) has been cultivated in India as early as 2000 BC and later introduced to Japan from China in 35 BC (Hui, undated). In the 1500s, rape was planted in Netherlands for land reclamation. A century later, the crop was grown in England and other parts of Europe for lamp oil (Downey and Robbelen, 1989). During those days, rapeseed meal was already used as cattle feed. By 1850, mineral oil had largely replaced rapeseed oil for lighting. When imports were blocked during World War I, Europe's rape planting was initiated in Germany as a source of edible oil. Later in the 1920s and 1930s, rapeseed production slowed down since imports of oilseeds were available

from their colonies in Africa and Asia. Europe developed an extensive crushing industry during this period, heavily reliant on imported oilseeds (Bunting, 1986).

Europe presently continues to be the world's key producer of rapeseed (*Table 1*). Total European rape planted area in 2003 was estimated at nearly 2.1 million hectares, highly supported through the common agricultural policy. Rape is mainly found in France (1 million hectares), Germany (1.3 million hectares), Poland (0.4 million hectares) and United Kingdom (0.43 million hectares). Europe is the fourth largest, in terms of area, after Canada (3 million hectares). China has the largest rape area (7.7 million hectares) followed by India (5.1 million hectares).

* Malaysian Palm Oil Board,
P. O. Box 10620,
50720 Kuala Lumpur,
Malaysia.

With a production of 10.5 million tonnes, China is currently the largest producer of rapeseed, contributing one-third of the world output. Canada and India also contributed quite substantially to world output with production levels of 4 million tonnes and 3.7 million tonnes, respectively. Due to population reasons, the accelerated production in China and India through self-sufficiency programmes caters mainly for domestic consumption. Rape in Europe contributes to nearly one-third of the world rapeseed output although its planted area is three times smaller than that in China.

This paper attempts to assess the international competitiveness of the European rapeseed industry. Specifically, it aims to benchmark the competitiveness of the main European countries (Germany, France and United Kingdom) in the production of rapeseed oil (RSO) vis-à-vis 26 other oils and fats producing countries, in particular, against other RSO producers, the least cost vegetable oil producer and Malaysian palm oil (PO).

TRADE COMPETITIVENESS

A country's trade competitiveness determines whether it has specialization in the production of

a good (Tam, 2001). A country has a comparative advantage when it can produce the good more cheaply. As indicated by Kannapiran and Fleming (1999), the country has a comparative advantage over another if in producing the good it can do so at a lower opportunity cost. The country therefore may gain from exporting the good so long as it has a *margin* over the world price (Leishman *et al.*, undated).

Indices on the revealed comparative advantage (RCA) are commonly utilized as proxies to measure trade competitiveness. RCA assumes that the comparative advantage of a country is reflected or revealed in a market over others or at home over a selection of prospective commodities (Tam, 2001). RCA, as developed by Balassa in 1965 (Kannapiran and Fleming, 1999), provides a rough indicator of the strength of a product in terms of its comparative advantage in the world market relative to others (Fatimah and Alias, 1997). In summary, the whole concept of competitiveness can thus be viewed from three economic aspects, *i.e.*, economic advantage (cost of producing the product), comparative advantage (cost-price differential) and structural competitiveness (revealed competitive advantage -

RCA). The list of all the oils and fats producers included in this paper is shown in *Appendix 1* and the data on their production costs drawn from LMC (2001) (*Appendix 2*). *Appendix 3* shows the yield performances of the various producers. RCA is detailed in *Appendix 4*.

ECONOMIC ADVANTAGE

The economic competitiveness (ranked by production cost) of the 27 world vegetable oil producers is shown in *Figure 1*. With the respective production cost of USD 400.60, USD 409.80 and USD 415.80 in Germany, United Kingdom and France, the cost to produce RSO in Europe is extremely high at an average USD 400 t⁻¹ compared to other world producers of RSO such as Australia and Canada. From the economic advantage ranking, Europe is not in the world top 10 cost-efficient oils and fats producers. On a worldwide basis, Germany's RSO is 14th and the United Kingdom 16th. French RSO is 17th.

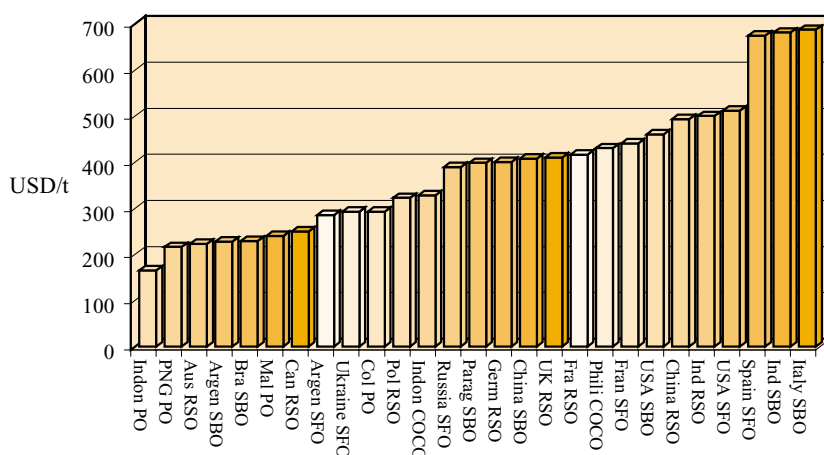
In general, Indonesia is the world's least cost producer (of PO) with a production cost of USD 165.20. When European RSO is compared to Indonesian PO, on average, its cost ratio is higher by 147%. The cost ratio is 1:2.42 for Germany and 1:2.52 for France. On the other hand, United Kingdom has a cost ratio of 1:2.48 against Indonesian PO. Malaysian CPO production, with a production cost of USD 239.40, is ranked sixth within the overall oils and fats cost complex.

Generally speaking, European RSO is not a competitor to Malaysia. Europe's cost of producing RSO is 67% higher than that for Malaysian PO (*Table 2*). On the contrary, with a cost difference between Malaysia and Indonesia of USD 74.20, Indonesia, which is still in an expansionary

TABLE 1. WORLD MAJOR RAPESEED PRODUCERS, 2003

Country	Area ('000 ha)	Production ('000 t)
Australia	740	790
Canada	2 950	3 950
China	7 700	10 530
France	1 036	3 317
Germany	1 297	3 870
India	5 120	3 700
Poland	435	995
UK	432	1 468
Others	91	45
Total	19 801	28 665

Source: Oil World (various issues).



Notes: SBO - soyabean oil, RSO - rapeseed oil, PO - palm oil, COCO - coconut oil, SFO - sunflower oil.

Source: Appendix 2.

Figure 1. Production cost of oils and fats (USD nett).

TABLE 2. ECONOMIC ADVANTAGE OF EUROPEAN UNION RAPESEED OIL (EU RSO) PRODUCERS vis-à-vis OTHER RSO PRODUCERS AND THE LEAST COST PRODUCER

Country	Other RSO producers			Least cost producer (Indonesia PO)	Malaysia PO
	Canada	Australia	China		
Germany	1.61	1.80	0.98	2.42	1.67
France	1.67	1.87	1.02	2.52	1.74
UK	1.64	1.84	1.01	2.48	1.71
EU Average	1.64	1.84	1.00	2.47	1.71

Note: PO - palm oil.

phase, will continue to be the closest competitor to Malaysia. Argentina and Brazil, the world's lowest cost producers of soyabean oil (SBO) (USD 227.60 and USD 228.30), and ranked fourth and fifth, respectively, in world economic advantage, are equally competitive in the overall oils and fats complex.

Figure 2 shows the cost and yield relationship for each of the 27 oil and fats producers. The relationship is further compressed in Figure 3 where there are four quadrants for producers in the high-cost low-yield, low-cost low-yield, high-cost high-yield and high-cost high-yield categories. It is shown that RSO in India and China is high-cost and low-yield. On the other hand, there are two low-cost RSO producers, i.e., Canada and Australia, also in the low-cost low-yield quadrant. With

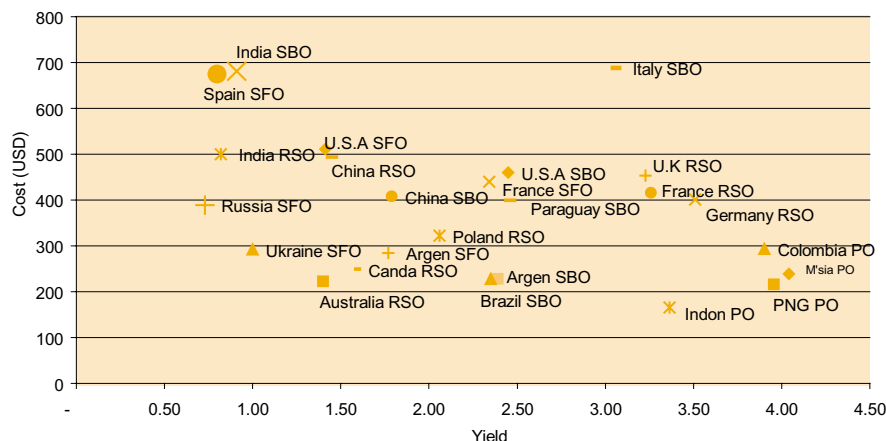
increased emphasis on R&D, these two countries can be expected to move from their present quadrant to the next prospective quadrant, the low-cost high-yield quadrant (Figure 3). The high-cost high-yield category, comprises France, Germany and France in the

production of RSO along with US, Italy and Paraguay in the production of SBO. Thus, in general, despite the high cost to produce RSO in Europe, the industry shows a good performance stimulated by incentives from the governments.

The key feature of this cost-yield categorization is the competitive position of the world PO producers. Malaysia, Indonesia and other PO producing countries are categorized as high-yield low-cost producers, making PO the world's most cost-efficient vegetable oil. Figures 2 and 3 also show that Argentina and Brazil are in this high-yield low-cost segment, making them the most cost efficient soft oil producers.

COMPARATIVE ADVANTAGE

As mentioned earlier, comparative advantage entails the concept of opportunity cost either in producing or exporting a particular good. The extent to which the domestic cost differs from the world price reflects the competitiveness of that particular country against others. The higher the cost-price differential, the higher is the advantage for that country in producing the good. The relative performances of the various producers are shown in



Notes: SBO - soyabean oil, RSO - rapeseed oil, PO - palm oil, SFO - sunflower oil.

Sources: Appendices 2 and 3.

Figure 2. Cost and yield relationship.

High-Cost	Indian SBO Spanish SFO US SFO Indian RSO China RSO	Italian SBO USSBO UK RSO French RSO German RSO French SFO Paraguay SBO
	Russian SFO Ukraine SFO Australian RSO Canadian RSO Poland RSO Argentinean SFO	Argentinean SBO Brazilian SBO Indonesian PO Malaysian PO Colombian PO PNG PO
Low-Cost	Low-Yield	High-Yield

Figure 3. Cost-yield quadrant.

Table 3 and the percentage gain from cost-price differential over the production cost is depicted in

Figure 4. The comparative advantage of European RSO production is moderately high with

TABLE 3. COST-PRICE DIFFERENTIAL RANKING

Product	Cost (USD/t)	Price (USD/t)	Differential (USD)
Aus RSO	222.6	600	377.4
Indon PO	165.2	443	277.8
Argen SBO	227.6	554	326.4
Bra SBO	228.3	554	325.7
Can RSO	249.3	600	350.7
Argen SFO	285.0	593	308.0
PNG PO	215.8	443	227.2
Ukraine SFO	292.2	593	300.8
Pol RSO	322.4	600	277.6
Mal PO	239.4	443	203.6
Russia SFO	389.0	593	204.0
Col PO	292.8	443	150.2
Germ RSO	400.6	600	199.4
UK RSO	409.8	600	190.2
Fra RSO	415.8	600	184.2
Indon COCO	328.1	467	138.9
Parag SBO	398.5	554	155.5
China SBO	407.7	554	146.3
Fran SFO	440.4	593	152.6
China RSO	493.3	600	106.7
USA SBO	459.9	554	94.1
Ind RSO	500.1	600	99.9
USA SFO	511.6	593	81.4
Phili COCO	430.2	467	36.8
Spain SFO	674.5	593	-81.5
Ind SBO	681.2	554	-127.2
Italy SBO	687.4	554	-133.4

Notes:

for PO, cif N.W. Eur (h).

for SBO, Dutch, fob ex-mill.

for SFO, EU fob N.W. Eur. ports.

for RSO, Dutch, fob ex-mill.

for COCO, Phil, cif rott.

Sources: LMC (2001) and Oil World (2 January 2004).

Germany, United Kingdom and France, respectively, ranked eighth, ninth and 10th. These three countries showed cost-price differentials of USD 199, USD 190 and USD 184, respectively, per tonne of oil exported.

As far as the world ranking for RSO is concerned, Australia has the highest comparative advantage with a cost-price differential of USD 377.40. Canadian RSO, on the other hand, is second (RSO) with a differential of USD 350.70. When these two countries are used as benchmarks against the European RSO producers, the competitive ratios are 1:0.53 and 1:0.49 for Germany and France, respectively (against Australia). As for United Kingdom, the ratio is 1:0.50 against Australia and 1:0.54 against Canada (Table 4). This benchmarking implies that, in general, RSO producers in Europe have attained only about 50% of the comparative advantage (cost-price differential) enjoyed by both Canada and Australia. It also shows that Australia and Canada have twice the advantage in producing and exporting RSO compared to their European counterparts. Nevertheless, the European producers are 80% more competitive than China's producers.

Indonesia is essentially competitive, having attained the second highest cost-price differential of USD 277.80 or 168% advantage over its production cost. This level of cost-price differential is comfortable vis-à-vis other producers such as Malaysia (USD 203.60, or 85%). It is also worthwhile to note that all the low-cost high-yield producers identified earlier had higher cost-price differentials. They are Argentina (SBO), Brazil (SBO) and PNG (PO), which recorded cost-price differentials of more than 100%.

STRUCTURAL COMPETITIVENESS

Table 5 shows the RCA index of European RSO vis-à-vis the various producers/exporters (of oilseeds/oils/meals) in a market (China) in 1990, 1995, 2000 and 2002. When the index is ranked (Table 6), the RSO producers in Europe, Germany and France, were 11th and 12th, respectively, in 1990. In 1990, RSO from Germany and France showed a RCA of 3.03 and 2.81, respectively, compared to Canadian RSO (4.831). Five years later, the RCA of the German RSO had improved substantially to

6.232 compared to French RSO (1.05) and Canadian RSO (2.81). By 2002, Canadian RSO was the most competitive in the RSO market. In 1995, German RSO climbed to fourth, implying improvement in its structural competitiveness. Canadian RSO performed quite remarkably in this market, ranking seventh and close to the least cost producer (Indonesia - eighth). By 2000, while Malaysian PO progressively improved its RCA, there was also a tendency for SBO and oilseeds (in particular rapeseed and soybean) to exhibit high RCAs.

CONCLUSION

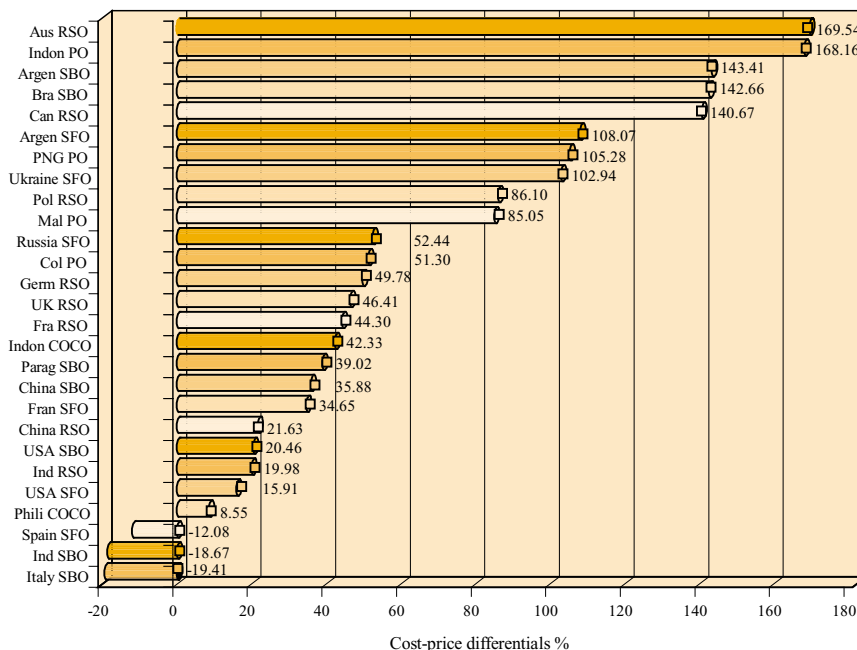
In this study, the competitiveness of the European RSO was assessed against other RSO producers as well as the producers of SBO, SFO, PO and CO. In general, except for Australia and Canada, world RSO production is high cost vis-à-vis other competing oils. It costs USD 400-USD 500 to produce 1 t of RSO in Europe, China and India. In economic advantage, the rapeseed industry in Europe is not within the 10 most cost-efficient industries worldwide. European RSO is ranked 14th, 16th and 17th (for Germany, United Kingdom and France, respectively) in global cost perspective despite its high yields.

The rapeseed industry in Europe has a production cost structure which is about two and a half times higher than that of the least cost (PO) producer, Indonesia (USD 165/t). On average, their cost is also 64% higher than the least cost producers of RSO, *i.e.*, Canada and Australia. The cost of RSO production in Europe is 164% higher than Indonesian and 67% higher than Malaysian PO. In general, Europe's rapeseed industry is less competitive than all PO producers and Brazilian and Argentinean SBO which are low-cost high-yield suppliers. The study also found that the comparative advantage of Europe's rapeseed industry is moderately high. Germany, United Kingdom and France are ranked eighth, ninth and 10th worldwide with their cost-price differentials ranging from USD 184 to USD 199. But its comparative advantage is, on average, only half that of Australia or Canada and 69% lower than that by Indonesia. It implies that in the present world price scenario and with the incentives provided by their governments, it is still cheaper for Europe to produce RSO than import but its ability to do so is only half compared to that of efficient

TABLE 4. COMPARATIVE ADVANTAGE OF EUROPEAN UNION RAPESEED OIL (EU RSO) PRODUCERS vis-à-vis OTHER RSO PRODUCERS AND THE LEAST COST PRODUCERS

Country	Other RSO producers			Least cost producer	Malaysia PO
	Canada	Australia	China	(Indonesia PO)	
Germany	0.57	0.53	1.87	0.72	0.98
France	0.52	0.49	1.73	0.66	0.90
UK	0.54	0.50	1.78	0.68	0.93
European average	0.54	0.51	1.79	0.69	0.94

Note: PO - palm oil.



Notes: RSO - rapeseed oil, PO - palm oil, SBO - soyabean oil, SFO - sunflower oil, COCO - coconut oil.

Figure 4. The extent to which world prices are above production cost.

TABLE 5. REVEALED COMPARATIVE ADVANTAGE

	1990	1995	2000	2002
Rapeseed Oil:				
Germany	3.030	6.232	1.954	NA
Canada	4.831	2.810	1.181	3.047
France	2.810	1.05	NA	NA
Netherlands	1.081	7.955	7.203	NA
USA	NA	3.83	5.151	NA
Hong Kong	6.840	1.885	3.800	NA
Singapore	3.480	3.662	NA	NA
Belgium	5.624	1.049	NA	NA
Soyabean Oil:				
Germany	5.255	4.894	8.745	NA
Brazil	5.190	4.611	1.087	4.236
Argentina	5.189	1.561	1.673	2.963
USA	NA	2.911	2.517	4.184
Hong Kong	2.137	1.111	1.937	5.593
Netherlands	2.178	2.871	2.659	NA
France	1.059	NA	NA	NA
Singapore	3.642	1.681	NA	NA
Palm Oil:				
Malaysia	4.957	4.832	9.467	9.099
Indonesia	3.705	4.004	2.405	2.474
Hong Kong	1.306	4.086	3.825	2.043
Singapore	1.050	2.098	5.079	NA
Sunflower Oil:				
Argentina	NA	5.642	6.647	NA
Rapeseed Meal:				
India	NA	2.692	6.964	NA
Soyabean Meal:				
USA	1.996	8.413	3.182	NA
India	NA	NA	2.122	NA
Brazil	NA	1.013	1.369	NA
Argentina	NA	2.520	2.009	NA
Indonesia	NA	NA	5.598	NA
Rapeseed:				
Germany	NA	NA	2.014	6.529
Denmark	NA	NA	5.971	NA
France	NA	NA	4.923	NA
Australia	NA	NA	4.923	1.775
Canada	NA	6.564	1.519	1.835
Hungary	NA	NA	4.923	NA
Soyabean:				
Denmark	NA	NA	3.752	NA
Netherlands	NA	NA	6.483	NA
Brazil	NA	NA	4.766	1.687
Argentina	NA	5.222	1.177	2.962
USA	NA	1.918	2.110	1.046
Canada	NA	3.655	3.236	5.926
Russia	NA	5.336	1.257	NA

Notes: NA – not available.

Higher RCA index reflects better advantage/performance in the market.

RSO producers such as Australia and Canada, the two low-cost RSO producers in the low-cost low-yield quadrant. Canada and Australia are *higher margin countries* and, with increased emphasis on R&D, both would migrate from the present low-cost low-yield quadrant to the next low-cost high-yield category. They may therefore pose more competition to the overall oils and fats complex as they plant more areas, improve their efficiency and reduce their cost. In measuring the performance of all oil producers using the RCA method, it was found that Malaysia is the most competitive.

TABLE 6. RANKINGS OF THE VARIOUS PRODUCERS AND EXPORTERS

Rank	1990	1995	2000	2002
1	HK (RSO)	USA (SBM)	Mal (PO)	Mal (PO)
2	Bel (RSO)	Net (RSO)	Germ (SBO)	Germ (RS)
3	Germ (SBO)	Can (RPS)	Neth (RSO)	Can (SB)
4	Bra (SBO)	Germ (RSO)	India (RSM)	HK (SBO)
5	Arg (SBO)	Arg (SFO)	Arg (SFO)	Bra (SBO)
6	Mal (PO)	Rus (SBO)	Neth (SB)	USA (SBO)
7	Can (RSO)	Arg (SBO)	Den (RS)	Can (RSO)
8	Indo (PO)	Germ (SBO)	Indo (SBM)	Arg (SBO)
9	S'pore (SBO)	Mal (PO)	USA.(RSO)	Arg (SB)
10	S'pore (RSO)	Bra (SBO)	S'pore (PO)	Indo (PO)
11	Germ (RSO)	HK (PO)	Hungary (RS)	HK (PO)
12	Fra (RSO)	Indo ((PO)	Fra (RS)	Can (RS)
13	Neth (SBO)	USA (RSO)	Aus (RS)	Aus (RS)
14	USA.(SBM)	S'pore (RSO)	Bra (SB)	Bra (SB)
15	Bel (SBO)	USA (SBO)	C Europe (RSO)	USA (SB)
16	HK (PO)	Neth (SBO)	HK (PO)	
17	Neth (RSO)	Can (RSO)	HK (RSO)	
18	Fra (SBO)	India (RSM)	Den (SB)	
19	S'pore (PO)	Arg (SBM)	Can (SB)	
20		S'pore (PO)	USA (SBM)	
21		USA (SB)	Neth (SBO)	
22		HK (RSO)	USA (SBO)	
23		S'pore (SBO)	Indo (PO)	
24		Arg (SBO)	India (SBM)	
25		HK (SBO)	Germ (RS)	
26		Fra (RSO)	Arg (SBM)	
27		Bel (RSO)	USA (SB)	
28		Bra (SBM)	Germ (RSO)	
29			HK (SBO)	
30			Arg (SBO)	
31			Hungary (SB)	
32			Bra (SBM)	
33			Rus (SB)	
34			Can (RSO)	
35			Arg (SB)	
36			Bra (SBO)	

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APPENDIX 1. SELECTED WORLD PRODUCERS OF VEGETABLE OILS

RSO	SBO	SFO	PO	CO
Australia	Argentina	Argentina	Indonesia	Indonesia
Canada	Brazil	Ukraine	Malaysia	Philippines
Poland	Paraguay	France	PNG	
France	USA	Spain	Colombia	
Germany	India	USA		
China	Italy	Russia		
India	China			
UK				
8	7	6	4	2

APPENDIX 2. COST ESTIMATES (less meal/kernel)

USD 100-USD 200	USD 201-USD 300	USD 301-USD 400	USD 401-USD 500	> USD 501
Ind PO (165.2)	PNG PO (512.8)	Pol RSO (322.4)	Germ RSO (400.6)	Spain SFO (511.6)
	Aus RSO (222.6)	Ind CO (328.1)	China SBO (407.7)	USA SFO (674.5)
	Arg SBO (227.6)	Rus SFO (389.0)	UK RSO (409.8)	India SBO (681.2)
	Bra SBO (228.3)	Parag SBO (398.5)	Fra RSO (415.8)	Italy SBO (687.4)
	Mal PO (239.4)		Phil CO (430.2)	
	Can RSO (249.3)		Fra SFO (440.4)	
	Arg SFO (285.0)		USA SBO (459.9)	
	Ukr SFO (292.2)		China RSO (493.3)	
	Col PO (292.8)		India RSO (500.1)	

Source: LMC (2001).

APPENDIX 3. YIELD PERFORMANCE

Country	Yield (t/ha)
Malaysia PO	4.04
Papua New Guinea PO	3.96
Colombia PO	3.90
Germany RSO	3.51
Indonesia PO	3.36
France RSO	3.26
U.K. RSO	3.23
Italy SBO	3.04
Paraguay SBO	2.46
U.S.A. SBO	2.45
Brazil SBO	2.39
Argentina SBO	2.35
France SFO	2.34
Poland RSO	2.06
China SBO	1.79
Argentina SFO	1.77
Canada RSO	1.58
China RSO	1.45
U.S.A. SFO	1.41
Australia RSO	1.40
Ukraine SFO	1.00
India SBO	0.91
India RSO	0.82
Spain SFO	0.80
Russia SFO	0.73

Source: LMC (2001).

APPENDIX 4. REVEALED COMPETITIVE ADVANTAGE

$$RCA = \frac{X_{cij} / X_{cj}}{M_{ci} / M_c}$$

where

X_{cij} = export value of good from country j to c;

X_{cj} = export value of all oils and fats from country j to c;

M_{ci} = import value of good from all country of country c;

M_c = total value of imports of all oils and fats all country of country c; and

good = oilseeds, vegetable oils or meals; where appropriate.