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THE "ENERGY CRISIS" AND AGRICULTURE:
A BACKGROUND ASSESSMENT

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This paper attempts to bring together some of the basic facts about and major issues raised by the petroleum crisis. It concentrates on estimating the possible orders of magnitude of these problems on the basis of the assumption that the price of crude will stay constant at the January 1974 levels (taking the Persian Gulf prices as the point of reference). This paper is divided into four sections: (1) the historical background, (2) the macro-economic situation, (3) the effects on the agricultural sector and (4) the competitive position of agricultural raw materials vis à vis synthetics.

The background to the crisis

World consumption of petroleum has risen at 6 percent per annum since 1929, slower at first and gradually accelerating - 7 percent in the fifties and 8 percent in the sixties. Moreover, the world has become more dependent on petroleum for its energy requirements: In 1929, 15 percent of world energy requirements derived from petroleum. This rose to 25 percent in 1950, 31 percent in 1960, and 42 percent in 1970 ^{1/}.

Nearly three quarters of world consumption is accounted for by the developed countries and their main sources of imports in 1972 were the Middle East 62 percent, North Africa 13 percent, Nigeria 7 percent, Venequela 5 percent, and Far Eastern countries 4 percent. Saudi Arabia alone accounted for 20 percent and Iran for 16 percent of crude oil imports.

The consumption of petroleum by end use in 1970 for Western Europe was 40 fuel oil, 48 for transport, and 12 percent other uses; for North America the figures were 18, 60 and 22 percent; and for Japan the shares were 32, 57 and 11 percent respectively.

Prices had been remarkably stable over the fifties and sixties. For example Saudi Arabian (ex Ras Tanura 34.0°) posted price was 1.75 US dollars a barrel in 1950 and 1.80 dollars in 1970. The United Kingdom import price c.i.f. (Kuwait crude 31.0°) was 2.77 US dollars a barrel in 1950 and 2.51 dollars in 1970. In real terms, therefore, the import price had fallen steadily over the last two decades. Nevertheless, due to the increased volume of world trade, the revenues to oil exporting countries ^{2/} rose from an estimated 0.5 billion US dollars in 1950 to 2.3 billion US dollars in 1960, 7.6 billion US dollars in 1970, and 12.9 billion US dollars in 1972. The net import cost of developed countries in 1970 were 15 billion US dollars whereas in 1972 they amounted to about 23 billion US dollars.

^{1/} See UN, Statistical Papers, Series J "World Energy Supplies".

^{2/} OPEC members only.

The sequence of events which led the present crisis can be traced back to the end of 1970 when producing countries started to raise posted prices. Between 1970 and 1 October 1973 the posted prices of the most representative grades of crude had risen by between 60 and over 100 percent. After the outbreak of hostilities in the Middle East some major producers declared their intention of progressively cutting back supplies to the world market and certain countries were to receive no crude from these sources. Secondly, most important producers raised their posted prices by at least 70 percent on 16 October 1973. Indonesia and Venezuela followed on 1 November 1973. At the end of December a further massive increase in posted prices was announced, in effect more than doubling the posted prices. As a result, posted prices now are over four times the April 1973 level and about six and one half times the 1970 level.

Table 1 gives an estimate of the impact on import prices of the sequence of events over the last four years. The figures for 1974 have been estimated from a range of sources and are, therefore, illustrative only, but the order of magnitude is probably representative of the market. It should be borne in mind that petroleum prices vary considerably: for example, Libyan, Nigerian and Venezuelan crude sells at a considerable premium due to a mixture of quality factors and nearness to markets (particularly with the Suez Canal closed) and these three countries enjoy nearly a dollar a barrel freight advantage in their main markets over the Gulf producers. However, percentage increases are likely to have been much the same. Some of the more alarming price quotations at the start of 1974 referred to spot sales which were eagerly taken up due to the supply restriction on the part of Arab producers and are not thought to be representative of 1974 prices as a whole.

For the purpose of tracing the effects of petroleum price increases, it is assumed throughout that c.i.f. Rotterdam is the basic price and that this has increased 2.8 times between 1973 (taken to be April) and 1974.

The macro-economic situation and outlook

Prior to the oil crisis the world economy, especially the economies of the OECD member countries, was growing rapidly. The business upswing had begun in the early months of 1972 gathered momentum in the second half of the year, and continued to accelerate during 1973. This business cycle gave rise to the strongest boom in economic activity witnessed in the OECD area as a whole since the early 1950's. The strength of the boom was mainly attributable to: (i) the existence of larger than usual margins of spare capacity and levels of employment in the OECD area as a whole, (ii) very expansionary economic policies followed during 1972 and 1973, and (iii) the simultaneity of economic expansion in all major countries, especially in the United States, Japan and Germany, which became very widespread through international transmission.

The vigour of the boom can be seen from the following figures of GNP growth for the major developed countries together with forecasts prepared by the OECD before the oil crisis.

Table 1: Structure of Prices of Crude Oil^{a/} in U.S. Dollars per Barrel

	1970	1971 Feb.	1972 Jan.	1973		Estimated	% increase to 1974 from:		
				Jan.	April	1974 Jan.	1970	1972 (Jan.)	1973 (April)
1. Posted price	1.800	2.180	2.479	2.591	2.73	11.651	547	370	327
2. Production cost	0.130	0.130	0.130	0.130	0.13	0.130			
3. Royalty	0.225	0.273	0.310	0.324	0.34	1.456			
4. Tax	0.673	0.978	1.121	1.175	1.24	5.535			
5. Total Government Revenue (3+4)	0.989	1.251	1.431	1.499	1.58	6.991	679	389	342
6. Tax Paid Cost (5+2)	1.028	1.381	1.561	1.629	1.71	7.121 ^{b/}			
7. Estimated cost of participation	-	-	-	0.104	0.11	0.11			
8. Oil Company Margin	0.222	0.279	0.279	0.327	0.43	0.43			
9. Selling price f.o.b.	1.25	1.66	1.84	2.06	2.25	7.66			
10. Freight Ras Tanura/Rotterdam	0.90	1.06	0.92	0.95	0.98	1.37			
11. C.i.f. Rotterdam	2.15	2.72	2.76	3.01	3.23	9.03	320	227	180

Source: "Chemical Feedstock Supply in the Light of the World Oil Position" by W.L. Newton in Chemistry and Industry, No.13, July 1973, p.607-609.

Notes:

a/ 34°API Arabian light at Ras Tanura.

b/ This has been estimated at 7.108 dollars by Petroleum Weekly Intelligence Vol.XII, No.53, December 31, 1973,p.3.

Table 2: Growth of Real GNP in Major Industrialized Countries

(Percentages)

	Average 1952-60 to 1970-71	From Previous Years			From Previous		Half Year
		1971	1972	1973	1973 I	1972 II	1974 I
Canada	4.9	5.8	5.8	7.25	9.4	4.75	6.0
U.S.A.	3.9	2.7	6.1	6.00	6.9	3.0	2.0
Japan	11.1	6.4	9.6	11.00	11.6	7.0	7.0
France	5.8	5.5	5.5	6.25	6.5	6.0	5.5
Germany, F.R.	4.9	2.7	3.0	6.25	11.2	1.5	3.5
Italy	5.5	1.6	3.5	5.25	3.0	10.0	6.5
U.K.	2.9	1.7	3.0	6.75	8.4	3.0	3.25
TOTAL	4.8	3.3	5.8	6.75	8.0	4.0	3.5

Source: OECD Economic Outlook.

As a result of the exceptionally strong boom in industrial activity, demand pressures were building up in virtually all the countries thus accentuating the price inflation which had already become more serious due to widespread supply difficulties in many commodity markets.

Wholesale prices rose even more dramatically in 1973 up 29 percent in Japan and 18 percent in the United States to give but two examples. Interest rates also rose to exceptionally high levels. In most countries, anti-inflationary policies were generally confined to monetary measures which sought to restrict the expansion of money supply through credit restrictions. But the time lag in the effects of these policies tended to be longer, and their efficiency in curtailing demand appeared to be much less than in earlier comparable periods. On the contrary, fiscal policies in overall terms were still broadly geared either to stimulate the economy or to permit above-capacity growth rates to continue, either because unemployment had reached very high rates in the economic slowdown of 1970-71, or because fiscal policies had tended to become less flexible for the management of demand, and the effectiveness of monetary policies for domestic demand management was constrained by the uncertainty of currency exchange rates.

The overall pre-crisis outlook could thus be characterized as a slowdown in real economic growth coupled with continuing inflation. Developments in the petroleum sector have changed this outlook for the worse. First, the physical limitations on supplies of oil and disruption to production in user industries at the end of 1973 and in early 1974 cut into energy supplies and hence industrial production, and secondly, the higher costs of imported oil have augmented inflationary tendencies. However, whilst the costs of oil will force the majority of oil importing countries to restrict consumption as far as possible for balance of payments reasons, the macro-economic impact of the energy crisis country by country is difficult to assess due to uncertainties as to the range of possible reactions on the part of importing countries.

For example, although the industrialized countries depend for about 50 percent of their total energy requirements on petroleum, the position varies widely from country to country. The dependence on imported oil also varies greatly with 68 percent of Japan's energy requirements being set by imported oil and at the other extreme the United States relying on imported petroleum for 12 percent of its energy use. Moreover, the overall balance of payments situation for individual countries will differ according to the way in which surplus revenues of oil exporting countries are re-cycled. At the same time, governments in industrialized countries are studying means of cutting consumption in view of the high prices that they have to pay for petroleum, and it may be assumed the balance of payments and inflationary problems that are going to arise in most developed countries may lead some governments into deflationary policies which, through the multiplier effect, could further erode the growth of industrial production. On balance, therefore, predictions made in the early months of 1974 pointed to very slow economic growth in the main industrial countries 1/, but greater than usual degrees of uncertainty attach to such calculations.

To estimate the impact of petroleum price rises on the general price level, the simplest approach is to multiply the share of the petroleum input in the total cost of production by the increase in petroleum prices. The share of petroleum consumption in GNP for the major industrialized countries is between 1 and 2 percent (see Table 3). Therefore, the direct impact is likely to add between 2 and 4 percent to the ongoing general rate of inflation in industrialized countries. This calculation ignores the effect on inflation of the cut in industrial output occasioned by the reduction in supply of oil and the repercussions of possible policy changes as a result of the severe strain on the balance of payments which most industrialized countries will experience.

Table 3: Share of Petroleum Consumption in GDP in Selected Developed Countries

Country	Oil Consumption million m.t.	Oil Consumption million U.S.\$	1972 GDP billion U.S.\$	Percentage value Oil Consumption over GDP
Belgium	24.6	615	35.6	1.7
France	99.3	2 482	196.1	1.3
Germany, F.R.	128.0	3 200	257.6	1.2
Italy	87.2	2 180	117.6	1.9
Netherlands	24.8	620	46.3	1.3
Spain	29.4	735	47.5*	1.5
Sweden	27.2	680	45.7*	1.5
U.K.	97.7	2 442	154.2	1.6
U.S.A.	761.5	19 038	1178.0	1.6
Canada	80.2	2 005	106.0	1.9
Japan	202.6	5 065	294.3	1.7

* estimate

Source: OECD Oil Statistics 1972, Table 11.

Price assumed \$25 a ton finished products.

1/ E.g. the Chase Manhattan Bank in International Finance, December 3, 1973, pp 1-3, estimated the growth of the U.S. economy at zero or very slow for 1974; growth in Canada to decline from 5 to 3 percent; Japan to have zero growth or even a decline; and the Federal Republic of Germany to experience a 2 percent growth.

The possible effects on agriculture

Considering that the last two years (1972-73) have witnessed sharp increases in GNP, which was a major contributing factor to the boom in commodity markets, the stagnation at the beginning of 1974 will trim the growth in demand for agricultural products. The amount will depend on the demand elasticities for the individual products.

At the same time, part of the massive increase in prices of most commodities during 1972-73 has been attributed to a movement of liquid funds into commodities as a hedge against inflation, and to pressure of commercial demand for stocks to sustain accelerating industrial activity. The new prospects, of relative stagnation in business activity, of high interest rates and of possible deflationary policies, may further curtail demand for many commodities. But, other factors may be expected to counteract these tendencies. Firstly, increases in money incomes will to some extent moderate any decreases in prices of agricultural commodities expressed in current terms. Secondly, the substantial increases in costs of agricultural production, due *inter alia* to the fertilizer and fuel situation, combined with recent decreases in commodity prices - which in many instances peaked in late 1973 or early 1974 - could have dampening effects on the rate of expansion of future production. Moreover, special factors apply in the case of agricultural raw materials, particularly fibres and natural rubber, which compete with synthetic materials produced by the petro-chemical sector.

Concerning costs of agricultural production, the main impact of the energy crisis arises from the transmission of price increases of crude petroleum through feedstock prices to fertilizer, pesticide and other input prices. In this connection, basic feedstock prices in the short run have not risen directly in proportion to the rise in petroleum costs since pricing structures also reflect the varying demand situations of user industries. In the slightly longer run, however, it is not unreasonable to expect feedstock costs to rise in much the same proportion as crude petroleum prices.

For fertilizers, the share in total costs of feedstocks is hard to estimate. Based on cost structures for Western Europe published by OECD in 1968 ^{1/}, naphtha and fuel oil accounted for about 13 percent of the unsubsidized farmgate price, and 17 percent of the ex-factory price, of nitrogen fertilizer. The factory to farmgate transport and distribution cost comprised about 20 percent of farmgate price. By 1973 petroleum prices had risen by 50 percent above the levels prevalent in the mid-sixties and it is, therefore, likely that these cost elements had increased in importance before the latest series of oil price increases. On reasonable assumptions, the increases in petroleum prices since mid-1973 could have a long-run effect of pushing up farm-gate nitrogen fertilizer prices by some 40 to 50 percent. However, a very tight supply situation already existed due to insufficient capacity at a time when demand for fertilizers had been stimulated by exceptionally large price increases of most agricultural commodities. As a consequence, current price increases over-shadow this underlying increase in costs. At the same time, the three-fold increase in phosphate rock prices, announced by Morocco in December 1973, and increased demand for potash fertilizer mean that price increases for all fertilizers will remain much above the levels of mid-1973 even after new plants, currently on order or under construction, come on stream. The incidence of these cost increases on individual products will vary according to the pattern of input use. Thus, fertilizer intensive crops such as wheat, maize, rice, sugar and cotton will be relatively more affected than legumes such as soybeans and groundnuts which are less dependent on chemical fertilizers.

^{1/} OECD: Supply and demand prospects for fertilizers in developing countries, Paris 1968.

Similarly, shortages and high prices of feedstocks have given rise to a serious supply/demand situation for pesticides although, again, the petroleum crisis is only one of the contributory factors. Whilst total demand for pesticides in 1973/74 is estimated, on the basis of firm orders, to have risen by about 25 percent, production has shown a slight decline. Consequently, current demand is being met by drawing on production which would normally have been available for the 1974/75 season. The most critical current shortages relate to herbicides for use on wheat and other cereal crops, but major insecticides and fungicides are also in short supply. Crop protection typically comprises a relatively large component in the total production costs of such crops as cotton, maize and bananas: but the impact of increased pesticide costs is especially pronounced for bananas, a commodity which has not shared in the widespread price boom of 1972-1973.

Transport costs depend significantly on fuel prices, but to calculate the effect on transport costs, it is necessary to look at government policy in this sector. In most countries, governments tax petrol and fuel oil so that the effect on prices can be greatly reduced by government decisions on the tax level. But two other aspects of national policies enter into the equation. First, the tax yields are extremely important to government finances in most countries and secondly, transport is one of the main sectors where fuel economies are practised to conserve energy or to protect the balance of payments. Balancing these considerations it might be envisaged that fuel prices to the transport sector will reflect a substantial proportion of the increase in petroleum prices, as has already been witnessed in several countries. Moreover, it would be difficult to insulate the agricultural and food sectors of the economy from this burden. Although fuel costs also play an important role in determining the trend of international shipping costs, year to year variations in freight rates depend very much on the supply and demand situation in the freight market. Between the first quarter of 1972 and the third quarter of 1973, world scale rates rose from about 50 to about 300 having fallen from about 170 in the first quarter of 1971.

The resulting increases in farming costs and effects on agricultural production depend upon the proportion of total costs accounted for by fertilizers, pesticides, fuel and transport, the response of output to fertilizer (and fuels) and the response of product price to reductions in output. Here we are concerned with purely synthetic indicators of the overall effects within the agricultural sector, and stress that the effects on individual commodities - themselves interrelated - may be very diverse.

For developed countries, the structure of farm costs in the late 1960s is given in Table 4. Fertilizer and fuel costs together account for about 10 percent of the value of total production and, taking the shares of fertilizers and fuel each as 5 percent, the rise in production costs as a consequence of the oil price increases from mid-1973 is estimated at about 10 percent. To assess the broad impact on the agricultural sector, the elasticity of farm output to fertilizer input is assumed to be 0.05, 1/ the price elasticity of demand for farm products is assumed to be -0.2 and the price increase for fertilizers is taken as 50 percent. Under these conditions, it is estimated that production ceteris paribus would be 2 percent lower, and the general level of farm prices some 10 percent higher. This excludes the repercussions of possible increases in fuel costs and does not, of course, take into account other demand and supply factors. While demand increases will

1/ For U.S. agriculture, the elasticity of output with respect to input prices has been estimated at -0.06 which is extremely close to the (implicit) elasticity of -0.053 used here. See "Searching the Seventies" Fertilizer Production and Marketing Conference 1971, p.26.

Table 4: Shares of Petroleum Based Inputs in Value of Agricultural Production - Selected Countries

	Fertilizers	Fuel and Power	Total	Total Inputs	GDP in Agriculture	Total Value	Fertilizers	Fuel and Power	Total
	National Currencies						..% of Value of Production ..		
<u>DEVELOPED COUNTRIES</u>									
Belgium (1971) ^P	5897	(4385)	10282	45527	50662	96189	6.1	4.6	10.7
Denmark (1968)	603	222	825	3358	6719	10077	6.0	2.2	8.2
Finland (1968)	333.0	94.2	427.2	831.2	2682.1	3513.3	9.5	2.7	12.2
France (1971) ^P	5169	2215	7384	25327	50151	75478	6.8	2.9	9.7
Germany F.R. (1971) ^P	2638	2274	4912	18021	21774	39795	6.6	5.7	12.3
Italy (1971) ^P	178982	67853	246835	1650585	5249503	6900088	2.6	1.0	3.6
Luxembourg (1971) ^P	190	83	273	1375	1939	3314	5.7	2.5	8.2
Netherlands (1971) ^P	470	180	650	5920	6350	12270	3.8	1.5	5.3
Norway (1968)	205.4	176.6	382.0	2061.2	2727.1	4788.3	4.3	3.7	8.0
Portugal (1968)	123	-	123	5580	20097	25677	0.5	-	-
Sweden (1968)	460.0	209.0	669.0	2747.7	3367.4	6115.1	7.5	3.4	10.9
Switzerland (1968)	127.7	105.4	233.1	1409.9	2507.3	3917.2	3.3	2.7	6.0
U.K. (1968)	150	77	227	1161	1016	1177	12.7	6.5	19.2
U.S.A. (1968)	2125	1796	3921	19462	26428	45890	4.6	3.9	8.5

p = provisional.

Source: EEC Agricultural Statistics - 1972. No.4.

probably be limited due to depressed growth in real incomes, population growth will give some boost to demand. Supply has been stimulated by the 1972-73 commodity price boom and, given the precarious existing supply/demand situation for basic food commodities, these price incentives should be sufficient to offset the negative effects of fertilizer and fuel cost increases on production.

For developing countries, the situation is more serious. Although fertilizer and fuel costs account for a comparatively small fraction of the value of agricultural production (Table 5), almost one-half of their total consumption of nitrogen is imported, almost entirely from developed countries. Given the shortage of fertilizers, and pesticides, elsewhere in the world, part of the increased needs of many developing countries is likely to go unsatisfied at the very high current price levels. However, estimates of the size of this "fertilizer gap" in the short-run differ according to the assumptions which are made about desired requirements.

One such estimate 1/ is that fertilizer consumption in India will fall by 1 million tons (29 percent) in 1974 with a consequent drop in output of grains of 10 million tons (10 percent), indicating an output-to-fertilizer elasticity of about 0.35. This may be an appropriate elasticity for high-yielding varieties but the average figure for India would be much lower. To derive realistic elasticities would involve detailed country studies, but some idea of the magnitudes involved can be arrived at by comparing the historical increase in cereal yields with fertilizer consumption. Over the period 1961-1972, cereal yields in the developing countries as a group rose by 20 percent whereas their consumption of nitrogen fertilizer in 1972 was 3.5 times that in 1961: on admittedly oversimplified assumptions, this would imply an output-to-fertilizer elasticity of 0.14. Even if it is assumed that fertilizer usage in the coming year falls short of requirements by a less dramatic amount than is supposed by Professor Ewell (by, say, 10 to 20 percent) and using this lower elasticity, cereal yields in developing countries would be 1.4 to 2.8 percent less than otherwise. By comparison, cereal production in the developing countries had been increasing by 3.1 percent per year during 1961 to 1971, just keeping ahead of population growth.

In the longer run, even if supplies of fertilizers and pesticides become more readily available, their prices, together with those of fuel, will be considerably higher than before mid-1973. The impact, however, would depend partly on movements in the prices of agricultural commodities, both at the farm level and in international markets, on progress which can be made to accelerate the production of agricultural inputs - especially fertilizers - in developing countries, and on the priorities attaching to the allocation of foreign exchange earnings. In this latter connection, the problem of finding the foreign exchange for urgently needed fertilizers has been made vastly more difficult by the rise in import prices of petroleum and basic foodstuffs, including freight rates. For example, it has been estimated that the cost to developing countries of commercial imports of cereals rose from \$4000 millions in 1972/73 to around \$9000-10000 millions in 1973/74, whilst the additional cost of oil imports in 1974 might be in the neighbourhood of \$8000 millions compared with 1973, and that their current account deficit could be double the 1973 level of \$10000 millions. This is notwithstanding the benefits which many developing countries have derived from higher prices for many of their main export commodities.

1/ 'Energy and Food' by Anthony Lewis, reporting the findings of Professor R. Ewell in International Herald Tribune, 8 January 1974.

Table 5: Shares of Petroleum Based Inputs in Value of Agricultural Production - Selected Countries

	Fertilizers	Fuel and Power	Total	Total Inputs	GDP in Agriculture	Total Value	Fertilizers	Fuel and Power	Total
	National Currencies						..% of Value of Production ...		
<u>DEVELOPING COUNTRIES</u>									
Ceylon (1970)	203 <u>1/</u>	122	324	585	3660	4246	4.8	2.9	7.7
Costa Rica (1969)	96	23	120	437	1099	1537	6.3	1.5	7.8
Cyprus (1969)	2082	913	2995	13509	37685 <u>2/</u>	51194	4.1	1.8	5.9
Egypt (1968)	35	15	50	284	694 <u>2/</u>	978	3.6	1.5	5.1
Guatemala (1964)	5	4	9	34	348 <u>2/</u>	382	1.3	1.1	2.4
India (1967)	1847	651	2498	30161	117843 <u>2/</u>	148004	1.2	0.4	1.6
Indonesia (1968)	13561	-	13561 <u>3/</u>	87835	930560 <u>2/</u>	1018395	1.3	-	-
Jordan (1969)	0.3	0.2	0.5	5	37 <u>2/</u>	42	0.7	0.6	1.3
Korea, Rep. (1970)	51020	-	51020 <u>3/</u>	170346	622374	793720	6.4	-	-
Libya (1969)	865	1263	2128	8362	36248	44610	1.9	2.8	4.7
Mexico (1967)	1188	880	2068	5939	32362	38301	3.1	2.3	5.4
Morocco (1970)	(28)	(16)	(44)	551	3586 <u>2/</u>	4137	0.7	0.4	1.1
Philippines (1965)	136	0.5	137	912	4327 <u>2/</u>	5239	2.6	-	2.6
Uruguay (1969)	2699	1707	4406	20994	52571 <u>2/</u>	73565	3.7	2.3	6.0

1/ Including pesticides.

2/ GDP at market prices.

3/ Fertilizers only.

Source: FAO Economic Accounts for Agriculture (Production Account) 1961-1970.

The possible effects on agricultural raw materials 1/

Markets formerly dominated by agricultural raw materials, including rubber, fibres, hides and skins, have since the second world war been faced with intensive competition from synthetic substitutes developed by the rapidly expanding petroleum industries of high-income countries. For example, synthetics currently account for almost 30 percent of the world's supply of apparel fibres, two thirds of the world elastomer market, and have substantially displaced jute, hard fibres and natural leather in many end-uses.

It is estimated that in late 1972 naphtha represented some 55-60 percent of the total cost of making most of the base chemicals used as feedstocks for the production of synthetic fibres and rubber. A further 15-20 percent could be attributed to the costs of energy used in extracting the base chemicals. With these assumptions, it is estimated that the cost of the main base chemicals is now some two to three times the level of late 1972, and rather more than three times that level in the case of butadiene and isoprene.

For synthetic fibres, however, base chemicals accounted for only 10-15 percent of the final cost of the fibres in 1972, the exact proportion varying according to the type of fibre and the complexity of its manufacturing processes. Direct energy costs accounted for a further 15 percent of production costs in the case of polyester fibres and up to 30 percent in the case of acrylics. Consequently the impact of the energy crisis on costs of producing synthetic fibres is likely to be moderate compared to its effect on the base chemicals from which they are made. Thus, as is shown in Table 6, the competitive position of cotton in the short run seems to have improved only slightly vis à vis polyester due to the large increase in prices of cotton fibre. Conversely, wool appears to have become much more competitive, although it should be borne in mind that its prices in late 1972 were considerably higher than those of its synthetic substitutes.

Table 6: Comparative prices of natural and synthetic apparel fibres

	<u>end-1972</u>	<u>mid-1974</u>
	U.S. cents per kg.	
Cotton	85 - 95	160 - 170
Polyester	140 - 150	260 - 290
Ratio	1 : 1.6	1 : 1.6 - 1.7
Wool	360 - 430	480 - 600
Acrylic fibre	170 - 190	290 - 300
Ratio	2.1 - 2.3 : 1	1.6 - 2.0 : 1

In comparison with fibres, the production of synthetic rubber involves a smaller number of processing operations. Hence, the direct impact of the energy crisis on the cost of producing synthetic rubber is likely to be considerably greater. In the short run, however, the extent of price increases will probably be moderated by the general dampening of demand for elastomers, especially due to the effects of the energy crisis on the tyre sector, and by relatively abundant supplies of natural rubber. In the longer run it is estimated that there is likely to be a two to three fold rise in the cost of production of synthetic rubber which can be directly attributed to the energy crisis, whilst increases in the cost of producing natural rubber will be considerably smaller despite rises in prices of fertilizers and chemical yield stimulants.

1/ For a more detailed analysis see FAO Commodity Review and Outlook, 1973-1974, Chapter 2, Rome 1974 (forthcoming).

In summary, and with reference to Latin America, the implications vary widely from country to country within the Region. Firstly, the impact of the energy crisis at the country level - as far as balance of payments prospects are concerned - depends in a large measure on the broad pattern of merchandise imports and exports. At one extreme Venezuela is a substantial exporter of petroleum but at the same time a sizeable net importer of food and other agricultural products. At the other extreme most of the countries in Central America are dependent upon imports for the bulk of their energy requirements and upon their agricultural sectors for a high proportion of their foreign exchange earnings. Within the agricultural sector, as well, the impact on individual countries will vary according to the commodity composition of their agricultural production and trade and their dependence on imports of agricultural requisites, especially fertilizers and pesticides (see Table 7).

For the main agricultural commodities traded by countries of the Region, the implications of the energy crisis are of three types. Firstly, as has been implied in the discussion earlier, market prospects in the industrial, importing countries will be adversely affected by the expectation of a slow-down in economic growth at least in the short-term. This problem may be particularly acute for those commodities with relatively high elasticities of demand, such as meats. Secondly, as has been indicated, the impact on production costs would be more severe in the case of those commodities which are comparatively heavily dependent upon energy-based inputs, including maize, bananas, cotton and sugar. But, finally, where the energy crisis also affects commodities, such as synthetic fibres, which compete with those of agricultural origin, the latter would tend to gain a competitive edge, although this would not be very substantial.

Table 7. Net exports of main agricultural commodities of selected Latin American Countries

(1969-71 Averages, million U.S. dollars)

Commodity: S.I.T.C.	Meat (01)	Cereals (04)	Bananas (051.3)	Coffee (071.1)	Sugar (06)	Fibres (Ex26)	Total Agric. Products (net)	Fertilizers and Pesticides (271 56 599,2)
	(net imports + net imports -)							
Costa Rica	17.3	- 9.3	60.8	62.7	10.3	0.1	131.6	-10.2
Dominican Republic	3.1	- 9.9	0.5	23.1	115.1	....	147.5	- 4.2
El Salvador	- 0.7	- 4.1	....	96.9	7.3	23.1	110.5	-15.1
Guatemala	15.2	- 6.3	12.7	92.8	11.3	30.2	161.0	- 9.8
Honduras	9.9	- 5.8	80.4	22.5	0.9	1.7	107.8	- 6.4
Mexico	40.2	4.2	0.1	71.7	105.5	87.5	389.0	-10.2
Nicaragua	25.0	- 0.4	0.8	27.3	9.4	41.2	111.5	- 5.6
Panama	- 2.1	- 7.3	61.8	1.2	5.2		41.5	- 5.7
Argentina	432.7	493.2	- 9.5	- 32.7	15.6	81.0	1317.3	-11.2
Brazil	114.2	- 94.6	10.3	841.6	139.1	204.9	1580.6	-91.8
Chile	- 14.2	- 48.2	- 7.5	- 8.4	- 10.8	- 21.6	- 160.9	-23.4
Colombia	6.6	- 23.9	17.4	402.5	16.2	20.8	450.5	- 4.4
Ecuador	....	- 8.1	101.5	37.9	11.6	- 0.9	160.3	- 6.4
Peru	- 11.4	- 57.1		36.8	58.7	58.0	30.1	- 9.3
Venezuela	- 2.8	- 66.6	1.3	13.9	4.6	- 5.1	- 166.6	- 9.3

Source: FAO Trade Yearbook, 1972.

