

EUROPEAN PARLIAMENT

# Working Documents

1981 - 1982

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8 January 1982

DOCUMENT 1-873/81

REPORT

drawn up on behalf of the Committee on External  
Economic Relations

on supplies of mineral and vegetable raw materials  
in the European Community - survey and further  
outlook

Rapporteur: Mrs L. MOREAU

PE 72.820/fin



By letter of 21 January 1981 the Committee on External Economic Relations requested authorization to draw up a report on supplies of mineral and vegetable raw materials in the European Community - survey and further outlook.

By letter of 15 April 1981 the President of the European Parliament authorized the Committee on External Economic Relations to draw up a report on this subject. The Committee on Economic and Monetary Affairs, the Committee on Energy and Research and the Committee on Development and Cooperation were asked for their opinions.

On 13 April 1981 the Committee on External Economic Relations appointed Mrs MOREAU rapporteur.

The committee considered the draft report at its meetings of 19 January, 27 January, 13 April, 20 September, 20 October and 2-3 December 1981. It adopted the motion for a resolution and the explanatory statement on 3 December 1981 by 20 votes to 0 with 5 abstentions.

Present: Sir Frederick Catherwood, chairman; Mrs Wieczorek-Zeul, first vice-chairman; Mr Van Aerssen, second vice-chairman; Dr Seal, third vice-chairman; Mrs Moreau, rapporteur; Mr Almirante, Mr Filippi, Mr Jonker, Mr Lemmer, Mrs Lenz, Lord O'Hagan, Mr Nikolaou, Mr Pasmazoglou, Mr Radoux, Mr Rieger, Mr Sayn-Wittgenstein, Mr Berleburg, Mr Seeler, Sir John Stewart-Clark, Mr Welsh, Mr Cohen (deputizing for Mr Hänsch), Mr G. Fuchs (deputizing for Mr Pelikan), Mr Lagakos, Mrs Pruvot (deputizing for Mr Irmer), Mr Vandewiele (deputizing for Mr Deschamps) and Mr von Wogau (deputizing for Mr Giummarra).

The opinions of the Committee on Economic and Monetary Affairs, the Committee on Energy and Research and the Committee on Development and Cooperation are attached.

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The Committee on External Economic Relations hereby submits to the European Parliament the following motion for a resolution together with explanatory statement:

MOTION FOR A RESOLUTION

on the European Community's supplies of mineral and vegetable raw materials

The European Parliament,

- considering that pursuant to Article 2 of the Treaty establishing the European Economic Community the Community has the task of promoting the harmonious development of economic activities, continued and balanced expansion and closer relations between its Member States,
  - having regard to the conclusions of the United Nations Conference on new and renewable energy sources held in Nairobi in August 1981,
  - having regard to the resolution tabled by Mr DE CLERCQ and Mr DE GUCHT (Doc. 1-582/81),
  - having regard to the report by the Committee on External Economic Relations and the opinions of the Committee on Economic and Monetary Affairs, the Committee on Energy and Research and the Committee on Development and Cooperation,
1. Recalls that, in view of the Community's high level of industrialization, supplies of mineral and vegetable raw materials are an essential factor for maintaining a prosperous economy based on international commitments, for economic growth and hence for the employment prospects of its people;
  2. Considers, however, on the basis of experience, that reserves of mineral raw materials from new deposits will guarantee adequate supplies for the moment, as the problem is not so serious in this area as it is in the field of energy;
  3. Notes that the European Community as a whole is dependent on external sources of supply, which means that a careful assessment should be made at regular intervals of long-term prospects for imports in order to avoid an impasse in the future, which, in the light of the statistics available at present, would threaten certain vulnerable sectors;
  4. Notes, however, that the Community must take account of the fact that many countries which produce raw materials, notably the developing countries whose economies are based on exports of a small number of

primary commodities, are dependent on the industrialized countries, particularly the European Community, for their markets;

5. Recognizes, therefore, that, as far as the developing countries are concerned, relations between countries producing and thus consuming raw materials must be considered in terms of interdependence;
6. Notes that an examination of statistics on the degree of self-sufficiency does little to explain a phenomenon as complex as the situation of the market in raw materials which depends more on:
  - whether or not there are reserves and resources in the Community,
  - the location of deposits and production or processing sites in the world,
  - the degree of concentration of producers and consumers and the current macro-economic need to integrate raw materials into international trade,
  - mastery of technological developments,
  - replacement procedures available given the current level of technology;
7. Points out that there is a risk of supply shortages caused by imbalances between supply and demand or sudden disruptions of supplies as a result of external events;
8. Recognizes that the majority of European governments feel that, in view of these imponderable factors, they are not in a position to take measures relating to supplies or at company level;
9. Nevertheless draws the attention of the governments of the Member States, the Council and the Commission to the disastrous consequences of disruptions of supplies, in particular for employment;
10. Stresses therefore the urgent need for concerted action to obtain advance information at Community level on possible shortages;
11. Considers it essential that efforts to improve the Community's degree of self-sufficiency should be continued:
  - by improved information on its own potential and better use of its deposits,
  - by promoting new technologies which will make it possible to exploit hitherto inaccessible deposits or those of insufficient size or yield,
  - by making more rational use of resources in the industrial process as a whole, including the useful life of products,
  - by more efficient recovery and recycling of waste,
  - by research into further substitution possibilities;

12. Confirms :

- the need to multiply and diversify our external supply sources and to this end to give new impetus to mining investment as a matter of priority;
- the need for the Community to undertake studies and research relating to the mineral resources of the sea bed, which will be one of the main sources of supply in the future; in so doing the Community will merely be complying with the declarations made in January 1981 at the Bogota conference;
- the need to promote studies and research aimed at finding substitutes for resources which are being exhausted and at recycling rare or pollutant metals;
- the need for certain Community Member States to carry out basic mining research involving geochemical and geophysical surveys which could lead to the discovery of underground deposits which cannot be detected on the surface;

13. Draws attention to the fact that research and investment expenditure in mining has been unevenly spread geographically and that major investors are beginning to lose interest in mining operations;

14. Considers that this situation is mainly the result of a combination of two phenomena:

- a sharp rise in investment costs,
- non-commercial risks which have become prohibitive;

Urgently requests the Commission, therefore, to propose to the Council a series of measures designed to give a fresh boost to investment, for example by extending to a wider framework the provisions contained in the Lomé Conventions for repayable loans in the event of successful exploration, the partial financing of feasibility studies, increased financial participation by the Community's financial institutions in investment, and improvements to non-commercial risk guarantee arrangements;

15. Recognizes that a fair income for producers is necessary to maintain a regular supplies of raw materials and therefore stresses that it is important for the European Community to support and participate in international agreements on primary commodities and in the common fund;

16. Stresses at a more general level the need to give some form of practical expression to the interdependence referred to in paragraph 5 by means of international agreements such as the Lomé II Convention and recognizes the need for closer cooperation with the non-associated developing countries, many of which are major producers of raw materials;

17. Hopes that a detailed study of raw material production and processing systems will be carried out without delay, thus allowing a serious evaluation of the disruption or upheaval which would result from a break in supplies, and, in particular, the effects on employment;

hopes that joint consultative committees will be set up composed of members of the Council, the Commission and the European Parliament and international experts;

18. Considers it necessary to conduct a detailed investigation of the effects of industrialization in raw material producing countries on the industrial structure of the Community;
19. Also considers that it is extremely urgent for the European Community to prepare the way for a genuinely European initiative in developing international law in general, compiling forecasts or provisional or definitive data which will undoubtedly have an effect on the raw materials market, and preparing international conferences devoted primarily to raw materials problems (UNCTAD, UNCLOS, Antarctic Treaty, Space Treaty, etc);
20. Calls on the governments of the Member States, the Council and the Commission to devise a coordinated policy and consider setting up a flexible Community structure designed to give partial cover in the event of a temporary shortfall in a Member State's raw material supplies;
21. Considering that the various raw materials require specific short-, medium- and long-term strategies, taking account of supply and demand, known reserves and their location, the prospects for increased demand broken down by consumption sector, and recycling and substitution possibilities, requests the Commission to submit for each raw material a report on the Community's supply prospects in mineral and vegetable raw materials together with recommendations on the implementation of an appropriate Community policy and asks it to consider setting up joint consultative committees composed of representatives of the Council, the Commission, the Parliament and international experts;
22. Instructs its President to forward this resolution and the committee's report to the governments of the Member States and to the Council and Commission of the European Communities.



EXPLANATORY STATEMENTFOREWORD

The development of the industrial society would not have been possible were it not for the intensive exploitation of the earth's resources for use either as fuels or as components in the manufacture of machines and products. This exploitation of nature has been one of the mainsprings of industrial progress, which in turn may be measured by the quantities of materials extracted. Discounting foodstuffs, the relevant figures for the United States amounted to 15.6 tonnes per inhabitant in 1950 as compared with 19.3 tonnes in 1972 (an increase of almost 25%)<sup>1</sup>.

The dependence of our economies on supplies of basic materials became an issue of major concern at the beginning of the 50's when the US intervention in the Korean War seemed likely to trigger off a general conflict and the problem of raw materials generated so much panic that President Truman finally called for a detailed study of supply policies (Paley Report, 1952).

The Korean War was simply an early warning of what was to come and the 50's and 60's were finally characterized by exceptionally high economic growth without any real cutbacks in supplies. On the other hand, the sudden rise in the price of oil and the collapse, after 1973, of the world system set up and controlled by the industrialized countries, coupled with the rise of the Third World countries with power based on their wealth of natural resources, are likely to compromise seriously the development of those societies which are greedy for materials which they themselves possess only in very small quantities.

Because it is relatively poor in mineral resources, Europe is very dependent on its supplies of raw materials and is therefore vulnerable to the dangers inherent in physical and economic shortages.

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<sup>1</sup>Paley Report, 1952, and Final Report of the National Commission on Materials policy 1973, US. Government Printing Office.

A brief survey of world resources, a comparison of reserves and consumption and, above all, an analysis of regional distribution together with certain data on the structure of market oligopolies will be sufficient to demonstrate that the raw materials essential to our development have become factors in a world economic and political situation in which Europe is at present in a position of extreme weakness. Certain to remain a major consumer for several more decades, Europe, whose own resources are decidedly inadequate, is at the mercy of the producing countries (often few in number and increasingly well organized) and of competition between consumers (rising in numbers and totally disorganized).

44% of the reserves of the 20 most important minerals are held by the developed countries (OECD and South Africa) but almost 90% of these reserves are located in the United States, Canada, Australia and South Africa. For their part, Europe and Japan are dependent on other countries for a total of 75% and 90% of their supplies.

This dependence is particularly serious in the light of the fact that 75% of the reserves of 15 of these minerals are held by 5 countries which very often conclude agreements between themselves based as much on political considerations as on market rules.

Given these extremely unfavourable circumstances, Europe must take stock of the situation and adopt a concerted strategy. To this end, detailed consideration should be given to the trends in her raw materials requirements and the different ways of meeting these requirements and reducing her dependence on an outside world increasingly characterized by instability and conflict.

## INTRODUCTION

Europe's exceptional development since the industrial revolution and her unprecedented economic growth since the Second World War would not have been possible without intensive exploitation of natural resources acquired at low prices.

Like the wastage involved in their exploitation, resources in which there was no trade could not be measured in monetary terms and therefore did not appear in GNP statistics, which are generally recognized as a yardstick for progress. Thus, the destruction of certain resources went unnoticed. Because of their abundance, their accessibility and their price, those resources in which there was trade gave the illusion of a planet with unlimited means, the exploitation of which depended only on technical capabilities which, it was thought, were bound to improve.

The pollution of the environment, the doubts about growth and, above all, the sudden increase in oil prices brought our countries to the realization that:

- natural resources were not available in unlimited quantities and the rate of regeneration was slower than the rate of consumption, thus giving rise to the danger of shortages;
- such resources were unevenly distributed through the world and the industrialized countries, which consumed most, had scarcely any of their own;
- the countries which had resources, being no longer colonies, intended to profit from them either by giving free rein to market forces or by using them to strengthen their position in international negotiations.

Europe, the victim of a system of growth avid for raw materials which are scarce on her own territory, is therefore in a position of extreme weakness.

Overall, the EEC is dependent on the outside world for 75% of its supplies of basic products (100% in the case of certain substances such as manganese, chromium and cobalt).

This dependence is particularly worrying inasmuch as:

- the EEC's requirements are tending to grow but cannot be met by domestic production;

- the tensions on the world commodities market will very probably increase even more markedly in the years to come because of the increase in demand at world level and because of the increasing lack of stability in the international order, giving rise to a type of competition and to conflicts encouraging the producing countries to use prices as a political bargaining counter.

Thus, the EEC's dependence is likely to increase because of the relative scarcity of raw materials as compared with the foreseeable growth in requirements and because prices will probably be subject to particularly marked fluctuations and particularly steep rises since they will depend not only on the free play of competition but also on the political factors involved (certain producing countries - those which hold quasi-monopolies - are able to indulge in political blackmail through the medium of prices).

Leaving this aspect aside for the moment - although it is one which must increasingly be taken seriously - and concentrating on the economic factors of market equilibrium, it is clear that considerable tension is bound to develop simply because of the increasing needs of today's less developed countries. At present a small privileged proportion of the world's population uses almost all of the world's production.

For example, on the basis of the 1970 figures for the consumption (in terms of value) of mineral products other than quarried products:

- countries with market economies (USA, Canada, Western Europe, Japan, Australia, and South Africa) consume 58% of world production but represent only 19% of the world's population;
- 47% of the world's population, belonging to the countries of the Third World, consume only 16% of mineral production (A. Sutulov 'Minerals in World Affairs').

Taking things a stage further, per capita expenditure in the USA is 2.3 times higher than in Western Europe, 2.1 times higher than in the USSR, 25 times higher than in China, and 16 times higher than in the Third World. Taking account of the population growth in the countries of the Third World and of the natural desire and ability of many of them to carry through development programmes, this inequality could well give rise to very serious tensions.

Studies carried out by the International Iron and Steel Institute led to the following conclusions as regards steel: there is no significant growth in per capita consumption below an annual income level of \$300 (1963); on the other hand, progress in industrialization brings with it a very marked growth in consumption, but over and above income levels of \$2,500 the steel utilization rate tends to decline. A recent American study ('Materials Requirements in the US and Abroad in the year 2000', National Materials Commission, 1973) analysed, as a function of GDP, the rate of utilization of energy and certain metals, including steel, aluminium and copper, over the period 1966 to 1969 and on this basis made forecasts for the year 2000. Although the increase in consumption is very marked in the developing countries, in particular in Asia and Africa, the use of these metals, with the exception of aluminium, is declining very noticeably in the United States and, to a lesser extent, in the other advanced countries.

Various phenomena may speed up this process - for example the reduction of wastage, quality improvements, the life expectancy of manufactured products, and the recycling and re-use of materials. Significant savings may be made by such measures. Thus, the Saint-Geours report ('pour une croissance économe en énergie', EEC) indicates that substantial energy savings could be made in Europe without cutting back on economic growth in the years to come. Although until the beginning of the 70's it was generally thought that there was a definite correlation between economic growth and the consumption of energy the Saint-Geours report says that the interdependence of these two factors could be reduced and between now and the year 2000 energy savings could be made of between 20 and 30% in the transport sector, 15 and 35% in industry and agriculture and anything up to 50% in the domestic and tertiary sectors.

The objectives of energy efficiency cannot however be attained unless an immediate start is made on the exploitation of technological potential.

Systematic analyses of the potential for savings in raw materials - i.e. studies of the type carried out for the EEC by the Saint-Geours Commission - should be made for all raw materials, taking account of possible substitutes, recycling capacities, and the technological scope for reducing material inputs.

However, a preparatory stage is necessary before we work out the details of these analyses, which will have to cover the whole cycle - from extraction to final disposal - of each raw material and which will have to take account of technologies and manufacturing processes which are likely to be developed and could be encouraged in the coming decades.

This initial stage should involve the preparation of an inventory of the mineral and vegetable raw materials available in the Community; consideration should be given to the economic and technological conditions in which these raw materials are exploited. However, a simple analysis of the present situation will not serve our purposes; the study should cover all raw material assets ( regardless of whether they are already being exploited ) and it must take account of possible medium and long-term trends - from the point of view of both costs and technology - in the conditions of exploitation.

After this, an analysis will have to be made of Europe's present and future needs as regards essential mineral and vegetable raw materials. Unlike most of those made so far, this analysis will have to specify as accurately as possible not only the volume but also the nature of the requirements.

It is striking to note that, in the field of energy for example, it has almost always been assumed that all forms of energy are similar and that requirements can therefore lumped together. A recent study carried out in Quebec, however, would appear to show that if the diversity of requirements is taken into account needs can generally be met from different sources whose conditions of exploitation vary considerably (on a simple level, a distinction can be made between high-temperature and low-temperature energy requirements). This example, taken from a paper on Quebec's self-sufficiency in energy supplies, applies fully to requirements for mineral and vegetable raw materials. It frequently happens that the potential of the latter is not exploited to the full, which is a form of wastage.

The second phase will therefore consist of an analysis of requirements and alternative ways of meeting these requirements at the least cost (a concept which must be clarified). Such an analysis will permit the rapid identification of Europe's 'deficiencies'; in the last place, consideration should be given to the best possible strategies either for living with these deficiencies (frugal development), or for bridging the gap with imports.

However, Europe cannot satisfy its needs on the international market without taking a minimum of precautions. Such precautions may amount simply to improving its negotiating position or they may involve the adoption of a policy of investing in foreign territories, of diversifying sources of supply in order to minimize the risks of such supplies being cut off, or of forming privileged exchange zones.

To this end, an analysis should first be made of the resources available and the requirements to be met in the short, medium and long term; at the same time consideration should be given to the various strategies which the Community could adopt.

In this preliminary document, we have tried to assess Europe's position as regards supplies of mineral and vegetable raw materials (excluding energy), first from the general point of view and then taking each country and each raw material separately.

The document ends with a series of practical proposals.

## I. EUROPE AND ITS RESOURCES

### 1. The general situation

Basic materials, which account for 40% of international trade, are an essential resource and represent the foundation for world economic activity.

However, the nature of the physical environment has resulted in a geographical concentration of agricultural and mining activities which, in its turn, has created extremely complex trade patterns between individual nations. An analysis of these patterns shows that, in the case of certain materials, supplies are concentrated in a small number of countries. For example, 75% of copper, lead, zinc, bauxite and coffee are produced by only about 10 countries; 75% of chromium, rice and iron are produced by only 6 countries; and 75% of jute and rubber are produced by only 2 countries. These examples show what close links have had to be established between producer and consumer countries, and how much imbalance there can be between the supply of and demand for basic materials. This imbalance has led the various partners to adopt and pursue conflicting strategies.

The producer countries have a twin aim in attempting to derive maximum benefit from the resources they possess. From the domestic point of view, they endeavour to control production on the basis of development objectives, which may vary. In this way they are able to aim at achieving self-sufficiency or at increasing even further the benefits they derive from on-the-spot production. They also attempt, therefore, to make arrangements for the marketing of their products, by granting various facilities or by imposing customs duties using the 'double pricing' system, or by entering into bilateral contracts with firms or consumer countries.

At the international level, the policies pursued by the producer countries and the various strategies which may be envisaged constitute a direct threat to the consumer countries. Indeed, by means of producer agreements, based partly on the OPEC system, these countries aim to swing the balance of power between producers and consumers even more in their favour. Cartels may be formed for every strategic product; a number are already in operation. In this way a large amount of information is exchanged on the quantity and quality of products placed on the market, the level of stocks available and even future projects.



This gives the countries concerned the opportunity to regulate commodity prices by manipulating supply to their own maximum benefit. They set up buffer stocks and are in a position to impose quotas, when the time is right, on production or exports, which of course has repercussions on international price levels for basic materials.

In the face of the threat posed by the determination of the producer countries to preserve their assets and their incomes, consumers, trying to acquire permanent access to basic materials at the minimum cost, affirm their resolve to reduce their dependence on the one hand and to safeguard their security of supplies on the other. In order to attain this objective, they claim to be taking steps to revive certain national products hitherto neglected for economic reasons, to economize on raw materials by rationalizing their use, and above all to achieve greater geographical diversification in their sources of supply.

However, there can be no denying that, generally speaking, efforts to find substitutes have been meagre especially since the consumer countries are responding to the increasingly large producer cartels or 'clubs' in an uncoordinated manner and often opt for an attitude leaving much to be desired in the way of consistency.

This attitude is, without doubt, fraught with danger, especially since the serious problem mentioned above is exacerbated by the fluctuations in the prices of both mineral and vegetable raw materials.

These fluctuations were particularly spectacular in 1973-1974. For example, in London the price of zinc rose from £250 per tonne in June 1973 to more than £650 per tonne in December of the same year and to more than £700 in May 1974, but fell to less than £400 four months later. Similarly, between 1973 and 1975, the ratio of fluctuation was 1 : 8.1 for sugar; 1 : 5.7 for zinc; 1 : 3.7 for cocoa; 1 : 3.1 for scrap iron; 1 : 2.9 for wheat and soya; 1 : 2.8 for rubber, copper and tin; 1 : 2.4 for lead and 1 : 2.1 for platinum.

The reasons for these fluctuations vary considerably and may be either conjunctural or structural. However, the basic cause lies in the organization of the markets. Producer groups may manage to dictate their own conditions (oil), institutions may be capable of manufacturing crises (tin), and stock markets may be subject to speculation, but every market obeys its own mechanisms.

In the midst of this disorder, the prices of resources are becoming a geopolitical weapon. In many cases the market system no longer governs the terms of trade between producers and consumers and hence long-term trends in the price of basic materials. Consumers, with their ever-increasing demands, have failed to adopt a coordinated attitude vis-à-vis the producers, who are becoming increasingly well-organized. This explains why, physical shortage or no, the prices of basic materials are increasing in a generalized fashion and exacerbating the effects of unpredictable fluctuations in buying rates.

## 2. Mineral raw materials

Having described the general trends in the previous section, we shall now look more closely at mineral raw materials, not only because of their strategic importance but also because, from the point of view of security of supplies, the problems posed by minerals are different from those posed by other types of resources.

The industrialized countries hold 40% of mineral raw materials reserves, the remainder being divided between the countries of the Eastern bloc and the developing countries. However, four-fifths of these reserves are in the United States, Canada, Australia and South Africa. Certain countries enjoy quasi-monopolies in materials such as platinum and chromium. Moreover, five countries hold more than 75% of the reserves of 16 minerals.

It should be pointed out that proven reserves and resources should, according to estimates, last for many years. This seems to eliminate any danger of physical shortages. Nevertheless, production costs increase and before the necessary potential resources can be exploited they must be identified and extracted. In other words, prospecting work must be carried out in good time and considerable investments are needed.

At present, investments in mining are inadequate. The increase in production costs combines with the non-commercial risks associated with many developing countries to make western undertakings fall back on areas which are less profitable but safer.

Thus, as regards security of mineral raw materials supplies, physical shortages are less likely to be a problem for the industrialized countries in the coming years than economic crises, which are almost bound to occur. The situation in Europe should be seen against this background.

### 3. A Europe dependent on its imports

With the exception of certain raw materials (manganese, chromium, phosphates for example), Europe seems to possess considerable potential. Indeed, in mineral resources it compares favourably with the rest of the world. However, it represents only 3% of the world's land area and at present produces only 7.6% of the world's non-energy bearing ore. Thus, Western Europe, although highly industrialized and a major consumer, is dependent on other countries for 75% of its supplies of basic materials. By way of comparison, Japan imports 90% and North America only 15%.

As the following table shows, the main non-ferrous metals produced in the Europe of the Nine account for only a very modest proportion of overall consumption.

EEC PRODUCTION IN 1977 (millions of tonnes metal content)			
Substances	Consumption	Production	Percentage
. Copper	2239.2	7.4	0.3
. Lead	1052.8	176.6	16.7
. Zinc	1199.4	463.1	38.6
. Tin	53.4	3.9	7.3
. Antimony	8	0.8	10

Moreover, an assessment of trends over the last ten years shows that the percentage share of Europe's own sources of supply has tended to decrease, with the exception of zinc ore, which has recently been discovered in Ireland and has taken over from other sources. In the case of certain raw materials, such as manganese, phosphates and diamonds, Europe is almost wholly dependent on its imports and must therefore build up stocks and make sure that supplies are available from non-member countries.

SITUATION IN WESTERN EUROPE <sup>1</sup>					
IN 1977					
Substance	Reserves <sup>2</sup>	Mineral production	Metallurgical production	Consumption	Autonomy <sup>3</sup>
Aluminium	1.3 Gt	7.7 Mt bauxite	3.5 Mt Al	3.6 Mt Al	30%
Copper	6.3 Mt Cu	0.33 Mt Cu	1.36 Mt Cu	2.74 Mt Cu	12%
Tin	300 kt Sn	5.1 kt Sn	29.8 kt Sn	64.8 kt Sn	8%
Iron ore	7 Gt Fe	91.1 Mt	-	176.8 Mt	52%
Lead	18 Mt Pb	0.49 Mt Pb	1.27 Mt Pb	1.39 Mt Pb	35%
Zinc	28 Mt Zn	0.98 Mt Zn	1.69 Mt Zn	1.56 Mt Zn	63%
Phosphates	very low	0.15 Mt	-	22.77 Mt	1%
Potash	300 Mt K <sub>2</sub> O	4.79 Mt K <sub>2</sub> O	-	5.4 Mt K <sub>2</sub> O	93%

<sup>1</sup>Including Turkey and Yugoslavia

<sup>2</sup>The definition of reserves and the degree of precision with which they are calculated differ from country to country.

<sup>3</sup>In view of the lack of accurate information, no account has been taken of recovery and autonomy has been defined as the ratio between mineral production and consumption.

A large proportion of the imports of raw materials into the nine countries of the European Community come from other Western industrialized countries (49%). However, the developing countries also play a very important role in supplying the Community (45%) in view of the fact that more than half the raw materials available on the world markets - in particular the concentrates - are produced in these countries.

STRUCTURE OF IMPORTS OF MINERAL RAW MATERIALS INTO THE EEC (%)		
	Total imports	Net imports <sup>1</sup>
Industrialized countries outside the EEC	53	49
Developing countries	40	45
Eastern bloc countries	7	6

<sup>1</sup> Imports - re-exports plus adjustment for strategic stock-piling

It will be realized, therefore, that despite the efforts already made, and the efforts to be made, to increase supplies and optimize utilization (recycling, substitute products, new technologies etc.), the mineral resources produced by the European Community will never satisfy more than a small proportion of its demand. This in no way detracts from the importance of such efforts; on the contrary, it shows that they are urgently necessary. Europe, which is more dependent on the outside world for its supplies of basic materials than the other groups of industrialized countries, must improve its position or prepare for a bleak future.

EEC DEPENDENCE ON IMPORTS OF A NUMBER OF RAW MATERIALS (% OF TOTAL CONSUMPTION)			
	EEC	JAPAN	USA
Copper.....	96	83	15
Lead .....	70	70	15
Zinc .....	60	68	59
Tin .....	99	93	85
Aluminium .....	60	100	87
Iron ore .....	59	99	27
Nickel .....	100	100	71
Tungsten .....	100	100	59
Phosphate .....	100	100	-

Admittedly, the problems posed by basic materials will find a lasting solution only at international level. However, as we have already seen, the decline in prospecting for minerals and the rise in the costs of production make an increase in the price of mineral raw materials more than likely. This will be bound to have repercussions on any solution to the economic crisis affecting most European countries.

In these circumstances, the Europe of the Nine must draw up, as soon as possible, an inventory of all its reserves and potential resources with a view to accurately defining and implementing a common policy in this field.

The collection of data for this report revealed that an overall inventory of this type did not exist. However, the evidence would seem to suggest that such a document could make a useful contribution to the clarification of the two courses of action which could improve the situation, namely: measures to boost investments in the mineral sector and to step up exploration for traditional and non-traditional sources at national and international level; and the possibility of acting as a prime mover in international cooperation and in the efforts to find an overall solution.

Finally, it should be borne in mind that the geopolitical stability of countries which mainly export basic materials will be open to doubt for many years to come. As long as this state of affairs persists, it will be necessary to build up strategic stocks at European level. The relevance of such stocks, in our view, will depend directly on a comprehensive evaluation of Europe's own resources.

This hypothesis can be verified by analysing the situation on the world markets for each of the commodities concerned. In order to keep this report down to a reasonable size, the following section deals with only a small number of major mineral and vegetable raw materials. However, it should be noted that even if we had wanted to draw up a comprehensive document we could not have done so because there are at present no data on Europe's own resources as a whole.

EUROPE'S RESERVES

Substance	Unit	North America		South America		Europe		Africa		Asia		Oceania	
		Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Aluminum	Mt	254	7.3	707	20.4	272	7.8	1 152	33.0	181	5.2	916	26.3
Antimony	kt	360	8.8	445	12.4	508	11.1	250	6.4	2 403	58.0	136	3.2
Arsenic	kt	1 180	34.2	907	26.3	453	13.1	453	13.1	272	7.9	181	5.2
Bismuth	Mt	36.3	40.0	5.4	5.9	22.7	24.9	9.1	10.0	14.5	15.9	2.7	3.0
Beryllium	kt	25.4	6.7	165	43.4	60.8	16.0	53.5	14.1	64.4	16.9	10.9	2.9
Biorth	kt	19.5	32.8	5.9	10.0	6.8	11.4	0.5	0.8	26.8	45.0	—	—
Chromium	Mt	—	—	—	—	11.8	2.3	508	97.0	3.6	0.7	—	—
Cobalt	kt	513	21.0	—	—	227	9.2	1 041	42.4	—	—	671	27.4
Columbium	kt	0.9	9.3	8.2	75.1	0.9	8.3	0.9	8.3	—	—	—	—
Copper	Mt	136	33.3	118	29.0	54.4	13.3	54.4	13.3	27.2	6.7	18.1	4.4
Fluorine	Mt	10.0	29.0	1.8	5.2	10.0	29.0	8.2	23.8	4.5	13.0	—	—
Gold	kt	5.6	13.7	0.6	1.5	6.4	15.6	26.4	64.3	1.1	2.7	0.9	2.2
Iron(ore)	Gt	14.5	16.0	18.1	20.0	36.3	40.0	2.7	3.0	10.0	11.0	9.1	10.0
Lead	Mt	76.2	51.0	5.4	3.6	22.7	15.1	4.5	3.0	24.5	16.3	16.3	11.0
Lithium	kt	387	57.3	9.1	1.3	182	27.0	91.0	13.5	2.7	0.4	2.7	0.4
Manganese	Mt	1.8	0.1	40.0	2.2	685	37.5	912	50.0	42.6	2.3	145	7.9
Mercury	kt	28.3	16.6	1.0	0.6	118	69.5	1.0	0.6	21.6	12.7	—	—
Molybdenum	Mt	3.6	61.0	0.9	15.2	0.9	15.2	—	—	0.5	8.6	—	—
Nickel	Mt	9.1	16.7	4.5	8.3	5.4	10.0	0.9	1.6	5.4	10.0	29.0	53.4
Palladium	t	124	2.1	—	—	—	—	3 110	51.5	2 800	46.4	—	—
Platinum	t	124	1.4	—	—	—	—	7 713	83.5	1 400	15.1	—	—
Rare earths + Yttrium	kt	4 813	69.3	320	4.5	464	6.6	63.5	0.9	1 018	14.5	368	5.2
Silver	kt	96.1	51.4	19.6	10.5	62.3	33.3	1.6	0.8	0.8	0.4	6.4	3.4
Sulphur	Mt	747	36.8	30.5	1.5	503	24.8	20.3	0.1	706	34.7	25.4	1.3
Tantalum	kt	3.2	4.7	3.6	5.3	5.0	7.5	45.3	67.0	8.2	12.1	2.3	3.4
Tin	kt	69.0	0.7	1 616	15.7	926	9.0	716	7.0	6 620	64.4	335	3.2
Titanium	Mt	80.1	23.5	62.6	18.5	39.0	11.4	20.9	6.1	120	35.2	18.1	5.3
Tungsten	kt	326	18.3	59.0	3.3	170	9.6	10.4	0.6	1 179	66.2	34.9	2.0
Vanadium	kt	104	1.1	227	2.3	7 234	75.6	1 814	18.7	91.0	0.9	136	1.4
Zinc	Mt	84.3	35.7	16.3	6.9	58.0	24.6	14.5	6.1	41.7	17.8	20.9	8.9
Zircon	Mt	6.3	31.5	0.9	4.5	2.7	13.5	1.8	9.0	1.8	9.0	6.3	31.5
Asbestos	Mt	59.0	40.7	4.5	3.1	47.2	32.5	20.0	13.8	6.3	4.3	8.2	5.6
Kyanite	Mt	36.3	40.0	—	—	22.7	25.0	9.1	10.0	22.7	25.0	—	—
Phosphate rocks	Mt	2 270	14.1	72.6	0.4	753	4.7	11 645	72.5	308	2.0	1 016	6.3
Potash	Mt	4 716	47.3	9.1	0.1	5 002	50.1	18.1	0.2	222	2.2	9.1	0.1
Talc	Mt	145	48.4	4.5	1.5	54.4	18.2	4.5	1.5	81.6	27.3	9.1	3.0
Uranium	kt	427	44.2	—	—	55.3	5.7	267	27.6	—	—	218	22.5

Source : CIAM Based on Mineral Facts and Problems: US Bureau of Mines, 1975



## II. SITUATION ON THE MAIN COMMODITIES MARKETS

### A. MINERAL RESOURCES

#### A.1 - METALS

##### 1 - ALUMINIUM

###### Production and exports

In 1977 world production of bauxite amounted to 84.6 Mt. The main ore producing countries are Australia (which accounts for 30.8% of world production and is by far the largest producer), Jamaica (13.5%), Guinea (12.8%), USSR (7.9%) and Surinam (5.7%). The aluminium mining industry is highly integrated and mining activities are partly controlled by the processing companies.

The production of aluminium (14.2 Mt in 1977) is concentrated in the Western industrialized countries. The United States is the largest producer (29.0%), followed by the USSR (15.5%), Japan, Canada and Norway.

Australia, Jamaica and Guinea are the main exporters of bauxite while exports of aluminium come principally from Canada, Norway and the USSR.

###### Projects and reserves

Following the crisis in the world economy in 1974, the aluminium market remained depressed for several years and investments were sluggish. The current upturn could result in a shortage of the metal in 1980, because of the low level and sluggish nature of investments.

Since the IBA (International Bauxite Association) was created in 1974, the main aluminium producing companies (among them Pechiney) have tried to develop the production of aluminium from materials other than bauxite (i.e. from clays and schists). Discounting the latter, reserves of bauxite amount to 25,000 million tons, i.e. enough to last 300 years at the present rate of consumption. Australia and Guinea between them hold more than half the reserves.

###### Scope for cooperation

The IBA was created in 1974. This association consists of seven bauxite producing countries: Australia, Jamaica, Surinam, Guyana, Guinea, Yugoslavia and Sierra Leone. These countries account for 70% of world bauxite production. Within the framework of IBA measures, the countries involved first increased the taxes and royalties paid by the mining companies and now hold participating interests in these companies.

## 2. ANTIMONY

### Production and exports

The world's antimony supplies (69.1 kt in 1977) come mainly from four countries: Bolivia (21.9% of world production in 1977), the South African Republic (18.7%), China (15.9%) and the USSR (11.1%).

There is an increasing tendency for the producer countries to process their ore into regulus or oxide. The South African Republic, Bolivia and Thailand are the main exporters of ore, while China principally exports the metal. The USSR no longer plays any part on the world market and even imports antimony.

### Projects and reserves

Several projects exist for increasing production but they are likely to be delayed because of the very depressed state of the market. The outlets for the metal could well shrink because of the replacement of antimony by calcium in batteries, but the consumption of antimony oxide is likely to grow as this product is being used more and more as a fireproofing agent. The reserves of antimony (4.1 mt) are sufficient to meet demand for 60 years. However, these reserves are very unevenly distributed, more than half of them being located in China.

## 3. SILVER

The world silver market is characterized by:

- a chronic imbalance between silver mining production and demand: 40% of the western world's requirements are covered by secondary sources (recovery, demonetization and release from reserves);
- the position of silver as a by-product in the production of lead, copper and zinc: 75% of primary silver is obtained in the form of by-products or co-products;
- the relative inelasticity of industrial demand: the unit value of industrial products is high by comparison with the silver content.

### Production and international trade

Silver mining production can be broken down as follows:

- 25% comes from silver ores proper;
- 45% comes from lead and zinc ores and 25% from copper ores; a high proportion of these sources are mixed Pb-Zn-Cu ores;
- 5% from other ores: antimony, tin, nickel etc.

In 1977 world production amounted to 10,515 tons, as compared with 9,890 tons in 1976.

The American continent is by far the largest silver producer; Mexico, Canada, Peru and the United States supply 49% of world production. Together with Australia (7% of mining production), these four countries account for 73% of the western world's silver mining production and 57% of world mining production.

The USSR supplies 15% of the total production, the socialist countries accounting for an estimated stable figure of 2,000- 2,200 tons per year. The remaining 28% of production comes from 38 countries.

The western world's mining production covers only 60% of demand. Only half of the shortfall is compensated for by recovery and the recycling of wastes. The rest of the supplies are subject to the availability of silver from demonetization, and the reduction of public or private stocks (including exports from India and Pakistan).

International trade in silver is very brisk, partly because of its value as a precious metal and its attractiveness to speculators. The main exporting countries (which do not also import) are Mexico, Peru, Canada and Australia. Although a certain amount of silver is exported in the form of silver-bearing ores, most is exported in the form of unworked, refined or semi-refined ingots.

The main importing countries are the USA (principal consumer) and the Member States of the European Community. Europe is a major transit area for metallic silver because of the London precious metal exchanges and the warehouses on the continent (Antwerp, Amsterdam).

### Projects and reserves

Mexico and Peru pursue a policy resolutely geared to expanding their silver production by increasing the production capacity of existing mines and implementing new projects (particularly in Mexico: Las Torres and 'la Encantada projects etc.). Mexico should retain its place as the largest producer in the western world.

However, the production of silver will remain largely dependent on the production of basic metals and although the production of ores of these metals is increasing, the silver content is tending to decrease. The total production of silver should remain more or less static.

The known world reserves are apparently limited ; they will last for only 19 years at current production rates. Most of these reserves are on the Latin American continent. In Mexico and Peru, where most silver-bearing deposits occur in veins and where known reserves will last for only a few years, actual reserves are probably higher than those specified.

#### 4. CHROMITE

##### Production and exports

World chromite production amounted to almost 10 Mt in 1977, with South Africa accounting for one-third of that figure. The latter country's products are used in the metallurgical, chemical and heat-resisting products sectors; South Africa is also a very large exporter of ferro-chrome, which represents the first stage in the processing of metallurgical chromite.

The USSR (22% of world output in 1977) mainly produces metallurgical chromite; half of its production is exported, mostly to the western countries.

Other major producers are Turkey (with 9.1% of world production), which exports all grades of chromite, Albania (8% of world production), which exports mainly to the socialist countries, Rhodesia, whose exports are once again theoretically subject to an embargo, Finland and the Philippines.

Thus, the main producers of metallurgical chromite are the South African Republic, the USSR and Rhodesia. The chromite used for refractory products comes mainly from the Philippines and Turkey. The South African Republic is the main producer of chemical chromite.

##### Projects and reserves

The principal projects concern mainly the expansion of production in South Africa, which should double in four years. Most of this country's output will be processed on the spot into ferro-chrome for export.

The expansion of the production of ferro-chrome in the chromite producing countries should result in a reduction of the relative proportion of chromite exported on the world market.

Chromite reserves amount to 1,700 million tons and will satisfy world requirements for more than 170 years at the current rate of production. However, these reserves are very unevenly distributed, 96% of them being held by two countries, South Africa and Rhodesia.

Most of these reserves consist of ore for chemical uses (Southern Africa); metallurgical chromite reserves are also large. Refractory ore reserves are the only ones which are low.

## 5. COBALT

### Situation on the world market

The world cobalt market (at the raw materials stage) is not an open market. The reasons for this are essentially technical:

- cobalt, with perhaps one exception, is a by-product of the processing of other ores (copper and nickel in particular) and is therefore controlled by the large companies producing and distributing these metals, i.e. Gecamines in Zaïre, Falconbridge and Inco in Canada, Anglo American in Zambia, Outokompy in Finland. Moroccan production is the one exception to this rule.

- cobalt ores combined with copper or nickel ores require treatment or equipment specifically tailored to their different characteristics and the costs of processing are very variable.

Thus, supplies are not diversified and world reserves, although abundant, are poorly exploited because of the lack of competitiveness of certain deposits.

### Production and exports

Cobalt mining production in the western world is concentrated mainly in Zaire, Zambia and Canada. However other countries such as the Philippines and Australia have expanded their output over the last few years. The world's metallurgical cobalt (output 19,900 tons in 1977) is produced in Zaïre (51.3%), the USSR (9.5%), Zambia (8.6%) and the western industrialized countries.

Some of Zaïre's mining output is refined in Belgium; Botswana's output is refined in the United States, the output of the Philippines and Australia in Japan, and that of Morocco in France and China; Canadian production is refined on the spot, or in the United Kingdom or in Norway. Almost all of the world's cobalt production is exported.

### Projects and reserves

The economic and political situation in Central Africa is likely to slow down the expansion of cobalt production in Zaïre and Zambia and the extraction of cobalt from nodules will probably not start until after 1985. Cobalt reserves (1.5 mt), however, are sufficient to cover demand.

## 6. COPPER

### Production and exports

Copper mining production amounted to 8.02 Mt in 1977. The main producers are the United States (17% of world output), the USSR (13.7%), Chile (13.2%), and Canada (9.7%).

The CIPEC countries (Chile, Indonesia, Peru, Zaïre and Zambia, which are members, together with Australia, Mauritania, Papua-New Guinea, and Yugoslavia, which are associate members) supply 38% of mining production.

The production of refined copper (9.1 Mt in 1977) is dominated by the United States (18.8%), the USSR (15.9%), Japan (10.3%), Chile (7.4%) and Zambia (7.1%).

The CIPEC countries supply 21% of the world's refined copper.

Exports of ore come mainly from four countries: Canada, the Philippines, Papua-New Guinea and Chile. Exports of blister come principally from Zaïre, Chile, Peru and South Africa.

Exports of refined copper are accounted for by Zambia (25.6%), Chile (24.5%), Belgium (12.7%), Canada (11.6%) and Peru (6.8%).

The socialist countries are in the process of becoming net exporters of copper as a result of the expansion of production in Poland.

### Projects and reserves

Of the many projects introduced in 1973 or early 1974, some have been abandoned or delayed because of the very depressed prices for copper. However, others should be implemented by 1980, in particular in Mexico and the Philippines and perhaps in Iran.

Copper reserves amount to 480 Mt of metal, i.e. they will last for almost 60 years at current production rates. Chile and the United States hold the largest reserves.

## 7. TIN

### Production and exports

After a fall over a period of four years, world tin mining production increased slightly in 1977 to reach a level of 225,000 t. The main producers are the countries of South-East Asia (Malaysia, Indonesia, Thailand) and South America (Bolivia). The developing countries account for 74% of world mining output, and the socialist countries for 17% (principally China and the USSR).

Metallurgical production amounted to 220,000 tons in 1977. Most of this was also accounted for by the developing countries and the socialist countries.

Exports are mainly in metal. They come principally from Malaysia, Thailand, Indonesia and Bolivia. China has considerably reduced its tin exports in recent years.

### Projects and reserves

Despite the considerable increase in the price of tin over the last few years, few projects have been put in hand because of the level of the taxes imposed on tin mines in the developing countries (these taxes often increase with prices).

Tin reserves (10 Mt) are sufficient to cover demand for about 50 years. They are divided mainly between Indonesia (24% of world reserves), China (15%), Thailand (12%) and Bolivia (10%).

## 8. MANGANESE

### Production and exports

World output in 1977 amounted to almost 22 Mt and exports reached more than 10 Mt. The largest producer is the USSR (38.9% of world output), but most of what it produces is used on the spot or in the socialist countries, with the result that little appears on the western market. The South African Republic is the second largest producer and the primary world exporter. Other major producers are Gabon, Australia and India.

### Projects and reserves

The mines at present in production largely meet world requirements and will probably easily cover the foreseeable growth in consumption.

Few projects are in hand for the exploitation of manganese (South Africa, Mexico and Upper Volta) and they will probably be delayed because of the very depressed state of the market. Manganese ore reserves amount to 2,000 million tonnes and will last for 90 years at the current rate of consumption, so there is no supply problem at present. (The fact that manganese dioxide can now be made synthetically will compensate for the low reserves of manganese for use in the manufacture of batteries).

Operations to extract the manganese from metallic nodules are unlikely because the cost price would probably be too high and the volume of production would result in marketing difficulties.

## 9. IRON ORE

### Production and exports

In 1977 mining production amounted to 851 Mt ore (containing roughly 543 Mt iron). More than 50 countries produce iron ore. The USSR leads the field (28.8% of world output in 1977) followed by Australia (10.8%), Brazil (10.1%), China (7.6%), Canada (6.6%) and the United States (6.5%). Production in the United States has been particularly low because of strikes.

Australia, Brazil and Canada dominate the export market (360 Mt of ore in 1977).

### Projects and reserves

Many ore mining projects exist but investments in ore mines are generally sluggish because of the poor market.

Iron ore reserves are very substantial (93,000 million tonnes Fe content) and will be sufficient to meet demand, at current production rates, for 170 years. These reserves are distributed throughout the world, but the USSR has most (30.1%), followed by Brazil (17.5%), Canada (11.7%) and Australia (11.5%).



## 10. MOLYBDENUM

### Production and Exports

World molybdenum production amounted to almost 95,000 tonnes in 1977. More than half comes from the United States (58.4% of world production); the next largest producers are Canada (17.3%), Chile (11.6%) and the USSR (10.2%).

These four countries control more than 97% of the world output. The United States is the primary exporter, followed by Canada and Chile.

### Projects and reserves

The Amax mine in Henderson, Colorado, started production in 1976 and will be operating at full capacity in 1980. Exploration is proceeding apace in the United States and Canada as a result of the substantial increase in prices.

Molybdenum reserves (6 Mt) will cover consumption for more than 60 years at present rates. The distribution of these reserves conforms to the production patterns: the United States comes first (49.5%) followed by the USSR, Canada and Chile.

## 11. NICKEL

### Production and exports

The western world's nickel production is dominated by Inco, which controls about 30% of the market. (However, this share of the market is rapidly declining.)

Mining production is concentrated mainly in Canada (30.2%), the USSR (17.3%) and New Caledonia (14.8%). The main other producing countries are Australia, Cuba, the Philippines and the South African Republic.

Canadian subsidiaries process part of Canada's mining output in Norway and the United Kingdom; New Caledonia exports ore to Japan and matte and ferro-nickel both to France and abroad.

The western world's exports of metallic nickel (no information is available on Eastern Bloc exports) come mainly from Canada, Norway, England, the Dominican Republic, the Philippines and Australia.

### Projects and reserves

The main projects to be implemented in the short term concern Cuba, Yugoslavia, Australia and Guatemala. Nickel reserves are estimated at

roughly 54 Mt; sulphide ores account for only a small proportion of this total. Thus, sulphide ores (from which more than half the world's output still derives) will become less and less important as a source of production.

Oceanic nodules are not included in the figures for nickel reserves. It would appear that the cost of exploitation and processing would be even higher than it is for lateritic oxide ores; however, provided certain problems are solved (legal issues and transport difficulties), one or more mining units may become operational in about 1985.

## 12. PLATINUM

### Production and exports

The USSR, the South African Republic and Canada account for 99% of the world's production of platinum and associated metals (palladium, osmium, iridium, rhodium and ruthenium).

South Africa mainly produces platinum and the USSR palladium; Canada produces both metals in roughly equal quantities.

Information on exports is very patchy but it seems likely that South Africa and the USSR share the market in platinum and associated metals roughly equally between them.

### Projects and reserves

Reserves of platinum and associated metals amount to 17,500 tonnes, which represents roughly 100 years consumption at current rates; these reserves are very unevenly distributed. South Africa holds 71% and the USSR 27%.

## 13. LEAD

### Production and exports

In 1977 lead mining production amounted to 3.6 Mt (lead content).

More than 50 countries produce lead; the largest producer is the USSR (17.3% of world output), followed by the United States (15.2%), Australia (12%) and Canada (9.1).

Mining production is concentrated mainly in the industrialized countries; the developing countries supply only a small proportion of the world's needs.

In 1977 metallurgical production amounted to 4.2 million tonnes, the

major part of which came from the United States (17.6%), and the USSR (14.6%). The developing countries produce only 10% of the world's metallic lead.

Exports of ore and concentrates come mainly from Canada, Australia, Peru and Morocco. Exports of the metal come principally from Canada, Australia, Mexico, Peru and the EEC countries (no details are available for exports of metallic lead from the socialist countries).

#### Projects and reserves

Many projects were announced in 1974 when lead prices rose, but a number of these seem to have been delayed.

Reserves of lead, which amount to 150 Mt, will last for 41 years at current production rates. They are distributed essentially between the United States, Canada, Australia and the USSR.

### 14. RARE EARTHS

#### Production and exports

About 70% of the world's output of rare earths comes from the United States, where Union Oil is working a deposit of bastnaesite.

The world market is small and dominated by three countries:

- Malaysia, which exports its monazite to the United States;
- Australia, which exports to the United States and, in particular, to France;
- the United States, which exports bastnaesite to the United Kingdom and Germany.

#### Projects and reserves

Reserves of rare earths amount to 7 Mt oxides contained in monazite and bastnaesite and will cover several hundred years of production at current rates.

### 15. TITANIUM

#### Production and exports

World production of rutile amounted in 1977 to 207 kt (Ti content) and the output of ilmenite amounted to 1369 kt (Ti content). Rutile is produced almost exclusively by Australia (90% of world output).

80% of ilmenite is produced by four countries: Australia, Canada (titanium slag), Norway and the United States.

Almost all of the world's rutile output is exported. The same applies to more than 60% of ilmenite. The main exporting countries are the major producers: except for the United States and the USSR, which process their mining production on the spot.

Ilmenite and rutile are used to make titanium dioxide or metallic titanium. Four countries dominate the market in the metal: the USSR, Japan, the United States and the United Kingdom. The main dioxide producing countries are the United States, Japan and the countries of Western Europe.

#### Projects and reserves

The main projects for rutile concern Sierra Leone (operational in 1979) and Italy; production started at the beginning of 1978 in South Africa.

Ilmenite deposits are being investigated in many countries.

Rutile and ilmenite reserves are sufficient to cover world requirements for many years. Work on the Brazilian anatase deposits (75% of the world's rutile reserves) is still at the investigation stage.

## 16. TUNGSTEN

#### Production and exports

In 1977 mining production amounted to 43 kt (W content).

The main producers are China (20.9% of world output), the USSR (19.1%), the United States (7.4%), Bolivia (6.8%), and South Korea (6.3%).

Thus, the socialist countries account for almost 50% of the world's tungsten output.

The General Services Administration (GSA) holds stocks of almost 50,000 tonnes of tungsten, corresponding to more than one year of world production; these stocks are gradually being sold on the market, with the aim of reducing them to 20,000 tonnes. In 1977, GSA sales amounted to 1540 tonnes.

Bolivia and China lead the export field, followed by South Korea, Thailand and Australia. The share of the socialist countries in world trade is declining because their consumption is increasing and production in China is static.

Only the United States and the USSR have large domestic supplies. International trade in intermediate products is modest, except in the case of ferro-tungsten. The tungsten semi-products industry, which calls for a

high level of technology and substantial investments, has not yet got off the ground in the producer countries.

#### Projects and reserves

Tungsten mining projects mainly concern increases in production in Canada and Australia.

Tungsten reserves amount to 1.8 Mt (W content), i.e. 43 years' output at the current rate. They are very unevenly distributed, China holding the most with almost 54%, followed by Canada (12%) and the USSR (9%).

### 17. VANADIUM

#### Production and exports

World production of vanadium reached 23,500 tonnes in 1976 and declined slightly in 1977.

The South African Republic is by far the world's largest producer (42% of output in 1976), followed by the United States (28.4%) and the USSR (13.6%).

The United States could increase its production but prefers to import vanadium, which is available on the world market.

Vanadium ore and concentrates are rarely exported, most exports taking the form of ferrovanadium and other vanadium-based alloys.

#### Projects and reserves

Production development projects are planned in Finland, the Philippines and Bolivia.

Reserves amount to almost 10 million tonnes, representing 400 years of production at current rates. However these reserves are very unevenly distributed, the USSR and the South African Republic holding more than 90% between them.

### 18. ZINC

#### Production and exports

In 1977 mining production amounted to 6.5 Mt (zinc content). Production is concentrated mainly in Canada (20%), the USSR (16%), Australia (7.6%), the United States (7%) and Peru (6%).

Metallurgical production is concentrated mainly in the USSR (17.2%), Japan (13.1%), Canada (8.3%) and the United States (7.6%). The developing countries play only a small part in the world zinc market (19.4% of mining production and 8.5% of metallurgical production).

Exports of concentrates come mostly from Canada and Peru. Exports of metallic zinc come mainly from Canada, Australia, Mexico and the USSR (which imports and exports metallic zinc), Belgium, Finland and West Germany.

#### Projects and reserves

Major projects have been postponed because of the very depressed state of the zinc market and the current over-production capacities.

Zinc reserves amount to 155 Mt, representing only 24 years of production at current rates. The distribution of these reserves basically follows the production pattern.

### A 2 NON-METALLIC SUBSTANCES

#### 1. ASBESTOS

##### Production and exports

The three main asbestos producing countries are the USSR (46.1% of world production in 1977), Canada (28.9%), and the South African Republic (7.1%). These countries account for more than 80% of asbestos output.

Exports are dominated by Canada, the South African Republic and the USSR, which mainly supplies its domestic market and the COMECON countries.

##### Projects and reserves

Production should expand in the course of the next few years, in particular in the USSR and Mexico.

Asbestos reserves amount to 145 Mt, representing 27 years of production at the current rate. The USSR and Canada lead the field, followed by the South African Republic.

#### 2. BORATES

##### Production and exports

Two countries account for more than 85% of world production: the United States, which produces sodium borate and Turkey, which produces

calcium borate. Other countries such as the USSR, Argentina, Chile, and China have small shares in world production.

Turkey is the world's largest exporter. The United States mainly supplies its own domestic market. Russian exports go to the countries of Eastern Europe.

#### Projects and reserves

Production development projects in the United States and Turkey will not become effective until 1980, with the result that the market in boric acid will be rather problematical until that time.

Borate reserves are very large and will cover several hundred years of consumption at current rates.

### 3. DIAMONDS

#### Production and exports

The main producer countries (industrial diamonds and gem diamonds) are Zaire (28.4% of world output), the USSR (26.1%) and the South African Republic (20.4%). Zaire alone accounts for more than 35% of the world production of industrial diamonds.

Other developing countries, mainly in Africa, account for a relatively large part of production (Botswana, Ghana and Namibia).

None of the main producer countries are consumers and almost all of their products are exported and channelled through certain commercial centres such as London or Antwerp. From here, uncut diamonds are sold in batches to consumers; some of them go to countries which specialize in cutting (Netherlands, BLEU, Ireland, Israel) and are later resold to consumers at substantially increased prices (added value).

In the case of natural industrial diamonds it is more or less irrelevant to talk of exporting countries. The market consists of buyers and a single vendor: De Beers.

#### Projects and reserves

A number of diamond mining projects are at present at the development stage in Lesotho, Botswana, the South African Republic and Angola. Reserves of industrial diamonds amount 680 million carats i.e. they are sufficient to cover only 22 years at the current rate of production. Moreover they are very unevenly distributed since Zaire alone holds more than 70%.

#### 4. FLUORINE

##### Production and exports

In 1977 world fluorine production amounted to 4.3 Mt. Mexican production was still falling at that time (660 kt as opposed to 1.2 Mt in 1971). However Mexico is still the world's largest producer (15.4% of output in 1977), followed by the USSR (11.7%), China, the South African Republic, Mongolia, Spain and France. Mongolia and South Africa have substantially increased production over the past few years.

Exports still come mainly from Mexico; the second largest exporter is Mongolia.

##### Projects and reserves

Few projects are at present being planned since world production capacity is substantially higher than demand.

Fluorine reserves will last for only 18 years at current rates of consumption. They are distributed between the main producer countries. However, the fluorine reserves contained in phosphate deposits are twice as large.

#### 5. MAGNESITE

##### Production and exports

In 1976 world magnesite production amounted to almost 10 Mt (not counting the United States whose output figures are unknown).

Most production is concentrated in the socialist countries (the USSR, North Korea and China) and Europe (Greece and Austria). These five countries account for more than 70% of world magnesite production. The production of magnesia from seawater is rapidly expanding (15 factories now exist in 7 countries) and is currently running at almost 2 Mt per year.

##### Projects and reserves

Current capacities and projects under way (Greece, Hungary, Yugoslavia etc) exceed requirements, particularly as regards refractory magnesia, and should satisfy demand in the coming years.

Magnesite reserves are very large (discounting the magnesia which can be extracted from seawater). They represent almost 900 years of production at current rates. However, these reserves are very unevenly distributed, 80% of them being held by the socialist countries.



## 6. PHOSPHATES

### Production and exports

In 1977 phosphate production amounted to 116 Mt. The United States leads the field with 40.8% of world output, followed by the USSR (21.1%) and Morocco (14.7%). The other producer countries are Tunisia, Togo, Senegal, South Africa and Algeria, in Africa, Jordan and Israel in the Middle East, Ocean Island, Nauru and Christmas Island, China and Australia.

The main exporter of crude phosphate is Morocco because a large proportion of the American output is processed on the spot into phosphoric acid and fertilizers intended either for the domestic market or for export. In 1977 Morocco accounted for 31.9% of world exports of crude phosphate, while the United States accounted for 28.2%. Almost 60% of the world's crude phosphate exports come from the developing countries.

In the producer countries (especially the United States) attention is increasingly being focused on the recovery of uranium from phosphates.

### Projects and reserves

Many projects were launched following the increase in the price of phosphates but a number have already been abandoned because of excessively high cost prices. Production has recently started in Australia, the South African Republic and Israel; new mines are due to be opened in the Middle East (Jordan, Egypt etc. ) and, in particular, in Brazil, which could become a relatively large producer.

Phosphate reserves (more than 25 thousand million tonnes) are very large and will cover several hundred years' consumption at current rates. However, they are very unevenly distributed, with Morocco holding 65% and the United States 12%.

## 7. POTASH

### Production and exports

Very few countries contribute to the world's potash production. In 1977 the USSR was the main producer, accounting for almost 34% of the world's potash, followed by Canada (23.7%). The other main producers are East Germany, West Germany, the United States and France.

In Canada the Saskatchewan government continued to buy mines operated by foreign groups in 1977 and now controls almost 40% of Canadian production.

Production ceased in the Congo in July 1977 following the floods at the Hollé mine operated by the CPC. The latter company was dissolved

by common accord between the Congolese Government and the French Government.

Thus, by the end of 1977 the developing countries were no longer producing any potash.

The main potash exporters are Canada, the USSR and East Germany.

#### Projects and reserves

In the short term, increases in potash production will come mainly from the USSR (three major projects); a mine could be opened in Canada at New Brunswick before the end of 1981 and the PCS (Potash Corporation of Saskatchewan), which controls most of Saskatchewan's mines, is planning to increase its production capacity. Finally, two other operations could be launched - one in Jordan (based on Dead Sea saltwater) and the other in the United Kingdom.

Potash reserves are very large and will cover almost 400 years of consumption at present rates. They are located mainly in Canada, East Germany, West Germany and the USSR. The developing countries now have virtually no potash reserves.

## 8. SULPHUR

#### Production and exports

Sulphur is obtained from a number of sources:

- volcanic and, in particular, sedimentary deposits, from which it is extracted in the form of native sulphur, mostly by the Frasch process;
- sulphurous products contained in light petroleum fractions;
- Frasch sulphur and sulphur obtained from the desulphuration of natural gases or petroleum products are collectively known as 'elementary sulphur'.
- pyrites;
- sulphuric acid produced from smelting gas and waste gases ('sulphur in other forms', SOF).

In 1977 world production of sulphur (from all sources) amounted to 53.3 million tonnes. Elementary sulphur represents 61% of world production (32% native sulphur and 29% sulphur from the desulphuration of natural gases or petroleum products), pyrites 21% and sulphur in other forms 18%.

The main producers are the United States, the USSR, Canada, Poland, Japan, France and Mexico.

In the United States, Poland and Mexico most of the output comes from native sulphur deposits worked by the Frasch process; in Canada and France the sulphur comes from sulphurous gas, while the USSR is the world's largest producer of pyrites. In Japan more than half the sulphur produced is in the form of sulphuric acid and comes from smelting gases; a further proportion comes from the desulphuration of petroleum products.

Most of the world's exports are in the form of elementary sulphur; pyrites tend more and more to be consumed in the producing countries.

In 1977 exports amounted to 13.9 million tonnes. Canada, Poland, Mexico, the United States and France account for almost 85% of world exports.

#### Projects and reserves

Few projects are planned in view of the current or expected decline in the production of elementary sulphur in Canada, the United States, Mexico and France. Elementary sulphur output may increase in Poland and Iraq and production may expand in the oil producing countries of the Middle East as a result of the construction of refineries and the recovery of natural gas. Sulphur recovery will increase in the industrialized countries as anti-pollution laws become stricter.

Tension will probably increase on the sulphur market before 1980 but the difficulties could be reduced if the Canadian stocks (about 20 Mt of sulphur) at present held up by transport problems were gradually sold on the world market.

Reserves of sulphur amount to roughly 2000 Mt, representing 40 years of production at current rates. Sulphur resources are much more substantial.

#### B. VEGETABLE RESOURCES

Primary food products (cereals, tropical beverages, oilseed, livestock products) and industrial raw materials (rubber, wood, hard fibers etc.) represent 17% of international trade. The industrialized regions account for 60% of exports. This figure admittedly hides a number of disparities since the European countries are totally dependent on other countries for tropical beverages, rubber, and certain oils. However, it accurately reflects a situation which tends to favour Europe.

Although demand is stable in this field, supply is subject to sudden fluctuations, causing spectacular movements in prices. Output is dependent on the vagaries of the weather, on other imponderables and on production cycles in which scarcity can follow hard on the heels of abundance.

## 1. AGRO-INDUSTRIAL RAW MATERIALS

The problems of agro-industrial raw materials are similar to those of mineral raw materials with one basic difference, namely the existence of substitutes which affect long-term price trends. Thus, during the 60s the low cost of oil derivatives favoured the use of synthetic products. For example between 1962 and 1974 cotton production increased by 1.6% a year as compared with 9.1% for synthetic fibers during the same period. It is probable that the increase in the price of petroleum products will modify this trend and the price of natural products will be implicitly 'indexed' to the price of synthetic substitutes.

## 2. CEREALS

In 1978 the production of cereals (116 Mt) increased by 12.2% following an increase of 8.3% in yields and 3.7% in area. However, it was forecast that production in 1979 would be down on 1978 owing to a reduction of 4.4% in yields and 1.1% in area.

The production of all cereals was expected to be less, with the exception of maize. In 1977/78 total gross human consumption of cereals increased by 1.8%; likewise cereals for use by industry. Animal consumption (67.7 Mt) increased slightly (0.8%) but was still down on 1973/74 (72.2 Mt) because of manioc imports.

In 1977/78 the EEC's self-supply rate was 92%. Imports for the same period amounted to 19.1 Mt (12.1 Mt maize), 0.4 Mt sorghum, 1.1 Mt barley, 3.5 Mt common wheat and 1.5 Mt durum wheat).

## 3. RICE

In 1978 Community rice production amounted to 793 thousand tonnes. In 1977/78 the use of rice in the Community (1.13 million tonnes) increased by 5.8%, giving a self-supply rate of 52.7%.

## 4. SUGAR AND ISOGLUCOSE

In 1978/79, sugar production reached 11,776,000 Mt following a 2.4% increase in yields. The Community's self-supply rate also reached a record level of 125.5% in 1978/79.

## 5. OILSEEDS AND PROTEIN SEEDS

In 1978 oilseed production was low, covering only 11% of the Community's oil requirements and 4.5% of its cake requirements. Colza production amounted to 1.2 Mt, i.e. 12.6% of world production, and sunflower production reached 129,100 Mt, i.e. 1.1% of world production. Imports of colza and sunflower seed increased considerably as a result while exports fell to zero. In 1979

soya production was expected to rise to 25,000 tonnes, but the Community's soya cake requirements were 17 million tonnes. In 1978, 8,000 tonnes of flax seed were produced, while total requirements stood at 470,000 tonnes.

#### 6. DEHYDRATED FODDER

Not counting dehydrated potatoes, the production of dried fodder (1,655 Mt in 1978) increased by 1.8%. The production of dehydrated potatoes (68,474 tonnes in 1978/79) fell by 1.3%.

#### 7. FIBRE FLAX AND HEMP

In 1978 the production of fibre flax amounted to 92,400 tonnes of flax fibres (14% of world production). The area under paper hemp (178,000 hectares) yielded 65,000 tonnes of straw. There was an increase in internal demand for flax fibres and imports rose sharply. The Community's rate of self-supply in flax fibres was 118% (189% for long fibres and 60% for short fibres).

#### 8. SEEDS

In 1978 the Community, with a production of 1.8 million quintals, i.e. one quarter of world production, was able to meet its own requirements.

#### 9. RAW TOBACCO

In 1978 the Community's production of raw tobacco amounted to 171,493 tonnes, i.e. 3% of world production. However consumption stabilized and there were indications of a decline. The Community's rate of self-supply is about 26%.

#### 10. FRUIT AND VEGETABLES

In 1979 EEC production of fruit amounted to 17.8 Mt, and production of vegetables can be estimated at 24.4 Mt (certain data are not yet available). In 1978 total imports of fresh fruit amounted to 4.4 Mt (including 3.1 Mt citrus fruit) while imports of vegetables amounted to 1.1 Mt. Exports of fruit (0.6 Mt) fell, while exports of vegetables (390,000 tonnes) increased.

Thus, in the above fields the main problem is to restore or maintain a balance between supply and demand on the agricultural markets. It will be necessary to stimulate production for markets with shortages (timber, oil-seeds) and to stimulate consumption and contain production on markets with permanent surpluses.

As the Commission points out in its report on the agricultural situation in the Community (January 1980), from which the above information has been gleaned, the achievement of market balance presupposes that solutions will have to be found, particularly as regards substitute products, in international agreements.

### III. CONCLUSIONS

TOWARDS A EUROPEAN REPORT ON SUPPLY PROSPECTS FOR MINERAL AND VEGETABLE RAW MATERIALS
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Because of its level and pattern of development - and regardless of what substantial changes may occur in the coming decades - Europe must adopt a strict policy with a view to ensuring that it can satisfy its mineral and vegetable raw materials requirements and reduce its vulnerability vis-à-vis the outside world.

The first requirement for such a policy is an accurate analysis of the current situation and of foreseeable medium and long-term trends from the point of view of the Community's resources and requirements.

Consideration will then have to be given to what strategies will make it possible to meet these requirements, strategies which would involve the more rational use of raw materials and a policy of investment with a view to boosting production.

Finally, since certain exports will be inevitable, some thought should be given to how Europe could strengthen its position in international negotiations on raw materials and improve its balance of trade by developing new export capacities.

Before such a policy can be pursued, current and future raw materials resources and requirements must be analysed as accurately as possible. The Commission of the European Communities has, of course, done a certain amount of work in this field. For example, it has drawn up a report on supplies of 22 materials and carried out a number of other studies on individual subjects. However, these documents for the most part simply describe the present or past situation and do not deal with possible supply strategies designed to cover future needs. A number of national studies have also been carried out but these are so inadequate that it is impossible to work out where a large proportion of the materials produced 'disappears' to, and if the consumption forecasts for individual countries are added up for a given period of time, it turns out that three or four countries will alone account for the consumption of quantities in excess of those available for the whole world ...

Moreover, adequation strategies - regardless of whether they relate to measures to combat wastage, recycling, prospecting for minerals or research and development - cannot today be really effective unless they are the fruit of joint efforts by the Europe of the Nine. This is particularly true of any attempts to strengthen our position in international negotiations.

The proposed study should include:

- . a report on the current situation;
- . a forecast of production quantities and requirements over the next two or four decades;
- . an analysis of the various adequation strategies; and
- . an investigation of possible import and export policies.

## 1. REPORT ON CURRENT SITUATION

The first step should be to prepare a report on the Community's current consumption of essential vegetable and mineral raw materials (excluding energy sources), drawing attention to the relative shares of European production and imports (Community surpluses and deficits of basic materials).

This report should be drawn up in real terms for individual materials, taking account, where appropriate, of the volume of recycled, recovered or abandoned materials.

## 2. SUPPLY AND CONSUMPTION PROSPECTS

### 2.1. Resources

Steps should be taken to draw up estimates of Europe's reserves and resources available and exploitable between now and the end of the century, and to investigate the economic and technological conditions for their exploitation. Indeed, logically such a study should include estimates based on different hypothesis relating, in particular, to foreseeable technological innovations, the degree of acceptability as regards impact on the environment, and the amount of effort put into prospecting for minerals and soil improvement etc.

### 2.2. Requirements

The available statistics should be used to draw up a report on future trends in requirements. On the basis of this reference document, consideration should be given to different hypotheses ranging from the enactment of legislation restricting access to - or even prohibiting the use of - certain raw materials, the development of new techniques likely to reduce or increase requirements (computerization), the emergence of new human behaviour patterns and of new industrial processes. However, there is clearly no certain way of systematically measuring the impact of such changes.

## 3. STRATEGY FOR INCREASING RESOURCES AND REDUCING REQUIREMENTS

### 3.1. Prospecting for minerals

In the last twenty years renewed interest in prospecting for minerals in Europe has resulted in a number of important finds although the efforts

made by European mining concerns on other continents remain inadequate. However, a number of important industrial groups are established in the European countries (PUK, Rio Tinto, Shell-Billiton, Metall Gessellschaft, SLN Penarroya, Union Minière, etc.). Unfortunately these interests are all too often in competition with each other.

Massive long-term efforts are therefore necessary to maintain, even if only partially, secure supplies of all the earth's products which are essential to the basic industries. Measures should be taken to promote a vigorous expansion of the research work undertaken by mining concerns not only in Europe itself but also in any other geologically favourable zones.

At present, mining concerns are somewhat reluctant to embark on new exploratory work in the countries involved because of the attendant risks. Thus, ten years ago the expenditure of the main European companies on mining research in the developing countries represented roughly half the total expenditure. Today it accounts for no more than one-fifth. In certain areas, particularly Africa, research has come to an almost complete standstill.

This situation is prejudicial to all the parties concerned and destroys the chances of discovering new deposits. For this reason, any agreements which the EEC might decide to conclude with the above countries should provide for balanced reciprocal advantages with guarantees against political risks. The negotiations on the Second Lomé Convention between the EEC and more than 40 African, Caribbean and Pacific countries, provided an opportunity to create a framework of this kind.

### 3.2. Development of vegetable raw materials potential

In this field, there would appear to be considerable scope for increased production in Europe as a result of the popularization of tried and tested techniques, even in those countries where such techniques are already in widespread use.

Little progress can be expected in new technology because there is often a very long time-lapse between the laboratory phase and the operational phase. However, it is possible for Europe to become more independent in the agricultural sphere by reducing its level of imports, in particular where animal feedingstuffs are concerned.

The abandonment of extreme forms of specialization, although not without its own difficulties, would go some way towards solving environmental problems such as soil depletion and the preservation of the earth's fertility.



### 3.3. Research and development

Technological prospects in this field are promising. New techniques such as satellite reconnaissance and progress in the exploration of the seabed could be developed in many ways and put to the service of prospecting for resources.

The detailed inventory of Europe's native resources and the development of techniques suitable for the exploitation of small or low-density deposits could help to increase Europe's independence as regards supplies of raw materials.

Research and development could also play a part in the search for substitute raw materials. Moreover, in many cases there is still a long way to go before the potential for recycling is fully realized. This is not always due to technological shortcomings and in fact can often be attributed to economic factors. However, at a rough estimate, 30% of all non-ferrous metals are recycled, 40% are lost as a result of dispersal but could, technically, be covered, while the remaining 30% are technically irrecoverable. This, therefore, is a field in which research and development could yield substantial results.

'In this connection it is worth noting the works published by DG XII, which include useful surveys on copper, lead, zinc, aluminium and phosphates and, as regards the scope for substitution, the results of its studies on chrome, silver, tungsten and tin.

The value of the multiannual research and development programme of the European Communities (1982-1985) in the raw materials sector, which was the subject of a proposal for a decision submitted to the Council (COM(81) 281 final of 17 June 1981) must also be stressed.

The implementation of this programme would make it possible, inter alia, to conduct more detailed research into metals and mineral substances, in particular with regard to extraction, ore processing and mining technology. The problems connected with the production, gathering, storage and transport of wood, and its use as a material and as a chemical feedstock would also be studied. As regards the recycling of domestic and industrial waste, the programme would cover sorting of household refuse, waste incineration, recovery of rubber waste and collection of non-ferrous scrap and waste by physical and metallurgical processes. Lastly, further research would be conducted into the possibilities of substitution in the electrical and electronics industry, surfacing and coating, cutting and machining technology, stainless steel and alloys and leather tanning.'

Finally, the optimum utilization of raw materials is a matter for very specific research. Natural phosphates are a good example. Europe imports 100% of its phosphates from the United States and Morocco and European agriculture consumes enormous quantities in the form of phosphate fertilizers. Serious agronomic research should show how considerable reductions could be made in the consumption of these products, which is now regarded as excessive.

### 3.4. More rational use of resources

#### Improved recovery

An increase in the recovery of raw materials from scrapped finished products would contribute to the preservation of current consumption and production patterns but it would also have the advantage of reducing waste in our industrial society.

These problems have begun to attract attention and the authorities responsible for economic policy in the various Member States have taken measures to remedy the situation.

#### Reduced consumption

Any attempt to reduce consumption will involve anti-wastage measures on all fronts.

There are links between reduced consumption and the recovery of raw materials. If we use less we automatically recover less. Conversely, however, recovery can only be improved if improved manufacturing techniques are used, i.e. the possibilities for recycling the various components of a product must be taken into account when the product is first planned. These links show that, contrary to certain impressions, the over-consumption of raw materials is not irrevocably bound up with 'progress'.

Moreover, it is perfectly possible to increase the life of products by simple measures which do not necessitate increased costs: better maintenance, for example, could produce the desired effect.

Finally, reductions in the use of raw materials also call for the adoption of better manufacturing techniques: less wastage at the manufacturing stage, better scheduling of public works, revision of certain safety standards, more economic assembly procedures etc.

A policy of this type must be selective. In the context of savings of raw materials, increasing the life of products is a major objective, which calls into question certain production and consumption patterns. The following questions must be considered: what products should such a policy affect? and by how much should the life of these products be increased? There is, of course, no single answer; like the solution to the problem of substitution, it must be worked out for individual cases.

## Interchange of raw materials

Expensive imported raw materials should be replaced by national raw materials or less expensive imported raw materials.

In general, industrialists are more open to the notion of substitution because it can be described in economic terms. Moreover, economic theory has for many years taken into account the concept of elasticity of substitution. Despite this, the problem of substitution is extremely complex since the advantages of a replacement product are difficult to evaluate. Although in certain cases they are obvious, in others a detailed and complex, technical and economic analysis is necessary before a decision can be taken. Nevertheless, calculations can be made for many products. These would make it possible to avoid duplication of work and would be beneficial to substitution operations.

### 4. IMPORT REQUIREMENTS

Whatever Europe does, certain raw materials will still present a problem. This applies, for example, to manganese, phosphates and diamonds. Stocks of these materials should be built up and measures should be taken to guarantee supplies from non-European countries.

A number of measures, recommended moreover by the EEC, will help to guarantee security of supplies: the conclusion of bilateral or regional agreements, a system providing guarantees against political risks, and various incentives such as aid to prospecting for minerals or scientific research contracts. Moreover, transfers of technology could be facilitated in return for long-term contracts. In the eyes of the developing countries, this could compensate for the disadvantage of having to deal with a Europe united in its support for mining concerns.

Finally, Europe should accept the processing of raw materials at the site of extraction in cases where such operations are justified in terms of practical feasibility and production costs.

This implies that:

- measures providing aid for European products should be gradually abolished in cases where such products could be manufactured more economically in the countries supplying the raw materials;
- the public authorities should, where appropriate, provide the necessary funds and technical assistance.

Finally, because security of supplies can never be absolute, Europe must build up contingency stocks. This applies particularly to strategic raw materials.

Such a policy clearly calls for complete cooperation between the nine Member States of the Community; it is equally clear that a united front, both in negotiations with third countries and in day to day dealings, is the best way of ensuring that the future is secure.

MINERALS AND NON-FERROUS METALS

Concentration of reserves: estimate 1974

Raw material	Country share	Country share	Countries and percentage share
Iron	59.4	75.8	URSS (13.7), Brésil (16.6), Canada (11.7), Australie (10.2), Inde (6.4)
Copper	44.7	58.0	USA (18.4), Chili (18.4), URSS (7.9), Canada (6.8), Pérou (5.5), Zambie (6.3), Zaïre (5.6)
Lead	52.0	71.9	USA (35.6), Canada (11.5), URSS (10.9), Australie (10.9), Mexique (3.0)
Tin	50.8	69.0	Chine (23.6), Thaïlande (15.0), Malaisie (12.2), Bolivie (9.9), Indonésie (8.3), Brésil (6.0)
Zinc	55.0	68.5	Canada (22.8), USA (20.1), Australie (12.1), URSS (8.1), Grande-Bretagne (5.4)
Aluminium	67.6	78.1	Australie (25.0), Guinée (26.0), Brésil (15.6), Jamaïque (6.1), Grèce (4.4), Cameroun (3.9), Surinam (3.4)
Titanium	33.0	92.2	Brésil (65.9), Inde (21.7), Australie (5.4), USA (3.5), Serre Leone (1.7), Canada (1.5)
Chromite	36.5	98.2	Afrique du Sud (73.9), Rhodésie (19.7), URSS (2.9), France (1.2), Inde (0.5), Madagascar (0.4), Philippines (0.4), Turquie (0.4), Brésil (0.3)
Cobalt	69.0	91.1	Zaïre (27.7), Nouvelle-Calédonie (27.1), Zambie (14.2), Cuba (13.8), URSS (8.3)
Nimbiolum	39.7	96.4	Brésil (75.8), Canada (7.6), URSS (6.3), Zaïre (3.8), Ouganda (2.9), Nigéria (2.7)
Manganèse	30.5	97.7	Afrique du Sud (45.0), URSS (37.5), Australie (8.0), Gabon (5.0), Brésil (2.2)

Raw material	Country share	Country share	Countries and percentage share
Molybdène	79.1	96.5	USA (49.5), URSS (15.2), Canada (14.4), Chili (13.6), Chine (3.8)
Nickel	68.4	87.0	Nouvelle-Calédonie (43.7), Canada (16.1), URSS (9.6), Australie (9.2), Indonésie (8.6), Cuba (5.7)
Tantalum	72.7	84.9	Zaïre (55.0), Nigéria (11.0), URSS (5.7), Thaïlande (6.7), Malaisie (5.4), Canada (4.5), Brésil (4.4)
Tungstène	74.6	87.1	Chine (52.5), Canada (12.1), URSS (12.5), Corée du Nord (6.4), USA (6.1)
Vanadium	94.8	97.3	URSS (74.7), Afrique du Sud (18.7), Australie (11.4), Chili (11.4), USA (1.1)
Bismuth	58.4	69.7	Japon (25.6), Australie (19.5), USA (13.3), Mexique (5.2), Pérou (5.1)
Mercury	60.9	90.0	Espagne (40.6), URSS (10.1), Yougoslavie (3.1), Chine (10.1), USA (9.1), Italie (8.1)
Silver	65.0	86.7	URSS (26.7), USA (25.0), Mexique (13.3), Canada (11.7), Pérou (10.0), Australie (3.3)
Platinum	95.7	100.0	Afrique du Sud (71.3), URSS (26.7), Canada (11.8), USA (0.2), Colombie (0.2)
Asbestos	76.9	92.5	Canada (45.2), URSS (24.8), Afrique du Sud (6.9), Australie (3.6), USA (3.0)

(Source: Interfuturs - OECD 1977)

INDIVIDUAL PRODUCTION

Percentage of world production tonnage achieved  
by the top three and the top five producer countries for substances to  
a value of more than \$400 m  
(in the case of diamonds the distinction has been made between distribution  
by tonnage (T) and by value (V))

Substance	Classification by value in table	Number of pro- ducer coun- tries	Percentage of production			Names of top five producer countries
			Top 1	Top 3	Top 5	
<b>Energy products</b>						
Crude oil	1	66	18,7	46,9	58,4	URSS - USA - Arabie Iran Iraq
Natural gas	3	68	36,9	68,8	77,4	USA URSS Pays Bas - Canada Chine
Condensable products	5	41	49,6	72,0	85,1	USA URSS Canada Arabie Mexique
Coal	7	52	24,0	65,4	77,6	Chine - USA - URSS Pologne Royaume Uni
Lignite	8	26	27,9	59,4	78,3	Allemagne orientale - URSS Allemagne fédé- rale Tchécoslovaquie Pologne
Uranium	10	15	31,2	71,4	86,0	USA - URSS - Canada - Afrique du Sud Namibie
<b>Metallic minerals</b>						
Silver	18	52	14,9	40,2	63,4	Mexique - URSS - Canada - Pérou - USA
Alumina	19	24	28,9	57,2	70,9	Australie Guinée Jamaïque - URSS - Suède
Chromium	27	21	32,4	66,3	79,2	Afrique du Sud - URSS Albanie - Rhodésie - Turquie
Copper	6	60	17,2	44,5	61,4	USA - URSS - Chili - Canada - Zambie
Tin	12	34	27,7	53,6	71,2	Malaisie - Bolivie - Thaïlande - Indonésie - Chine
Iron	4	53	29,3	51,2	68,4	URSS - Brésil Australie - USA - Chine
Manganese	24	28	34,4	64,8	81,5	URSS - Afrique du Sud - Gabon - Australie - Inde
Molybdenum	21	11	59,9	87,2	98,6	USA - Canada - Chili - URSS - Chine
Nickel	22	23	22,0	54,8	71,0	URSS - Canada - Australie - Nouvelle-Calédo- nie - Cuba
Gold	7	54	58,1	83,1	87,6	Afrique du Sud - URSS - Canada - USA - Nou- velle-Guinée
Platinum	22	9	49,5	98,9	99,7	URSS - Afrique du Sud - Canada - Japon - Colombie
Lead	15	50	16,7	42,5	57,8	URSS - USA - Australie - Canada - Pérou
Tungsten	26	32	19,5	44,9	58,5	Chine - URSS - Thaïlande - Bolivie - USA
Zinc	16	50	19,6	43,3	55,2	Canada - URSS - Australie - Pérou - USA
<b>Non-metallic substances</b>						
Asbestos	17	21	46,4	79,5	88,2	URSS - Canada - Afrique du Sud - Rhodésie - Chine
Borates	28	6	45,8	96,0	99,0	USA - Turquie - URSS - Argentine - Chili
Diamonds	14	17	34,1	76,6	87,5	Zaire - URSS - Afrique du Sud - Botswana - Namibie
			V	26,8	69,3	Afrique du Sud - URSS - Namibie - Zaire Angola
Kaolin	25	49	38,0	72,9	79,7	USA - Royaume Uni - URSS - Tchécoslovaquie Allemagne fédérale
Phosphates	9	31	32,3	74,4	80,5	USA - URSS - Maroc - Chine - Tunisie
Potash	13	11	33,2	68,4	86,0	URSS - Canada - Allemagne orientale - Allema- gne fédérale - USA
Salt	11	67	22,5	48,2	59,7	USA - Chine - URSS - Allemagne fédérale Royaume-Uni
Sulphur	21	51	28,6	62,7	81,3	USA - Canada - Pologne - URSS - France
Lure	29	36	20,9	52,5	65,5	Japon - USA - Corée du Sud - URSS - Chine

Products whose prices have advanced strongly	% Variation	average annual rate %
<u>Compared with 1973</u>		
Cobalt .....	+ 179	+ 22,8
Natural gas .....	+ 178	+ 22,7
Mangésite .....	+ 176	+ 22,5
Tungsten .....	+ 124	+ 17,5
Pétroleum .....	+ 122	+ 17,3
Uranium .....	+ 114	+ 16,5
Chromite .....	+ 113	+ 16,3
<u>Price indices</u>		
Energy products .....	+ 109	+ 15,9
Non-metallic substances .....	+ 40	+ 7,0
Metallic minerals .....	+ 1,7	+ 0,3
All products .....	+ 86	+ 13,3
<u>Compared with 1950</u>		
Natural gas .....	+ 521	+ 6,7
Vanadium .....	+ 328	+ 5,3
Silver .....	+ 187	+ 3,8
Lignite .....	+ 174	+ 3,7
Cobalt .....	+ 137	+ 3,1
Tin .....	+ 133	+ 3,1
Mangésite .....	+ 114	+ 2,8
Gold .....	+ 112	+ 2,7
Pétroleum .....	+ 101	+ 2,5
<u>Price indices</u>		
Energy products .....	+ 108	+ 2,7
Non-metallic substances .....	+ 36	+ 1,1
Metallic minerals .....	+ 36	+ 1,1
All products .....	+ 93	+ 2,4

Products whose prices have fallen	% Variation	average annual rate %
<u>Compared with 1973</u>		
Mercury .....	- 64	- 18,3
Copper .....	- 44	- 10,9
Zinc .....	- 23	- 5,1
Rutile .....	- 16	- 3,5
Ilmenite .....	- 13	- 2,8
Nickel .....	- 7,4	- 1,5
Nitrates .....	- 5,3	- 1,1
<u>Compared with 1950</u>		
Cryolite .....	- 74	- 4,7
Manganèse .....	- 34	- 1,5
Mercury .....	- 34	- 1,5
Zinc .....	- 32	- 1,4
Ilmenite .....	- 28	- 1,1
Fluorspar .....	- 27	- 1,1
Nitrates .....	- 22	- 0,9
Sulphur .....	- 22	- 0,9
Rutile .....	- 14	- 0,5
Graphite .....	- 13	- 0,5
Lead .....	- 9,3	- 0,3
Iron .....	- 8,7	- 0,3
Sodium carbonate .....	- 4,9	- 0,2
Antimony .....	- 1,8	- 0,1

Substances produced by the greater number of countries

	Number of producer countries			Classification by value in table
	1978	1973	1968	
1 - Salt	87	81	78	11
2 - Natural gas	68	62	44	3
3 - Petroleum	66	65	61	1
4 - Copper	60	57	50	6
5 - Gold	54	50	48	7
6 - Iron	53	57	58	4
7 - Sulphur	53	35	24	21
8 - Coal	52	54	52	2
9 - Silver	52	48	47	18
10 - Lead	50	49	46	15
11 - Zinc	50	50	45	16
12 - Kaolin	49	37	31	25
13 - Condensable products	41	35	25	5
14 - Barytes	39	33	32	37
15 - Feldspar	37	24	22	41
16 - Calc & streatite	36	31	23	29
17 - Tin	34	35	36	12
18 - Tungsten	32	27	24	26
19 - Phosphates	31	31	29	9
20 - Pyrite	31	31	29	32
21 - Manganese	28	28	39	24
22 - Bentonite	27	24	14	36
23 - Lignite	26	25	27	8
24 - Fluorspar	26	28	19	33
25 - Antimony	25	25	18	39
26 - Bauxite	24	23	22	19
27 - Nickel	23	18	15	20
28 - Chrome	21	19	15	27
29 - Asbestos	21	20	20	17
31 - Diamonds	17	17	18	14
33 - Uranium	15	11	11	10
37 - Potash	11	11	9	13
42 - Platinum	9	9	6	22
50 - Cryolite	1	—	1	51
- Nitrate	1	1	1	47

PRODUCTS OF MINERAL SUBSTANCES IN THE EEC IN 1978

Substances	Unit	Germany	Belgium/ Luxembourg	Denmark Greenland	France	Ireland	Italy	Greece	Nether- lands	United Kingdom	TOTAL EEC	world	EEC world <sup>a</sup>
<b>I - ENERGY PRODUCTS</b>													
Petroleum	:10 <sup>6</sup> Mt	5,1	-	0,4	1,1	-	1,5	-	-	-	-	-	-
Natural gas	:10 <sup>9</sup> m <sup>3</sup>	20,6	-	-	7,9	-	13,7	-	1,4	54,5	95,4	2 927	2,1
Condensates	:10 <sup>6</sup> t	-	-	-	0,8	0,1	-	-	95	30,5	175,9	1 456	1,5
Coal	:10 <sup>6</sup> t	84	6,6	-	19,7	-	-	-	0,2	1,1	2,1	108	1,5
Lignite	:10 <sup>6</sup> t	123,6	-	-	2,7	-	1,9	21,8	-	123,5	233,9	2 596	9
Uranium	:10 <sup>3</sup> tU	-	-	-	2,2	-	-	-	-	-	150	909	16,5
											2,2	46	4,6
<b>II - METALLIC MINERALS</b>													
Antimony	:10 <sup>3</sup> tSb	-	-	-	-	-	-	-	-	-	-	-	-
Chromite	:10 <sup>3</sup> t	-	-	-	-	-	0,9	-	-	-	-	-	-
Silver	:10 <sup>6</sup> tAg	25	-	17	86	20	33	-	-	-	0,9	66	1,4
Bauxite	:10 <sup>6</sup> t	-	-	-	2	-	31	-	-	-	33	9 700	0,3
Copper	:10 <sup>3</sup> tCu	0,8	-	-	0,6	5	0,5	2,8	10	-	189	10 609	1,8
Tin	:10 <sup>3</sup> tSn	-	-	-	-	-	0,5	0,3	-	-	4,8	64	5,7
Iron	:10 <sup>6</sup> tFe	0,5	0,2	-	-	-	-	-	-	0,2	7,4	7 850	0,1
Manganese	:10 <sup>3</sup> t	-	-	-	10,3	-	0,1	0,7	-	2,6	2,8	231	1,2
Mercury	:10 <sup>3</sup> t	84	-	-	-	-	9,7	7	-	1,2	13	495	2,6
Nickel	:10 <sup>3</sup> tNi	-	-	-	-	-	-	-	-	-	10,4	22 420	0,05
Gold	:10 <sup>3</sup> t	0,1	-	-	-	-	-	-	-	-	6	6 070	1,4
Lead	:10 <sup>3</sup> tPb	23,2	-	30,6	1,9	-	-	18,5	-	-	18,5	636	2,9
Tungsten	:10 <sup>3</sup> tW	-	-	-	32,5	47,8	29,9	20,3	-	-	2	1 212	0,2
Zinc	:10 <sup>3</sup> tZn	97	-	82	0,6	-	-	-	-	1,8	186,1	3 592	5,2
					40	176	73	26	-	0,1	0,7	46	1,5
										1,5	495,5	6 365	7,6



III - NON-METALLIC

SUBSTANCES

Asbestos	:10 <sup>3</sup>	-	-	-	-	-	135	-	-	-	135	5 070	2,7
Asphalt	:10 <sup>3</sup>	51	-	-	69	-	115	-	-	-	215	2 350	3,1
Bentonite	:10 <sup>3</sup>	-	-	-	-	-	229	343	-	215	795	7 550	10,5
Baryte	:10 <sup>3</sup>	271	-	-	225	314	237	45	-	54	176	6 680	17,6
Cryolite	:10 <sup>3</sup>	-	-	53	-	-	-	-	-	-	53	53	1,00
Cyanite, Andalusite	:10 <sup>3</sup>	-	-	-	33	-	-	-	-	-	33	292	11,3
Feldspar	:10 <sup>3</sup>	386	-	-	190	-	251	-	-	50	877	3 100	28,3
Graphite	:10 <sup>3</sup>	13	-	-	-	-	4	-	-	-	17	505	3,4
Kaolin	:10 <sup>3</sup>	521	15	20	260	-	74	50	-	3400	4 340	16 630	26,1
Magnesite	:10 <sup>3</sup>	-	-	-	-	-	-	320	-	-	620	8 321	9,2
Mica	:10 <sup>3</sup>	-	-	-	7,3	-	-	-	-	-	7,3	273	2,7
Potash	:10 <sup>3</sup>	2463	-	-	1795	-	196	-	-	150	4 610	26 816	17,2
Salt	:10 <sup>3</sup>	12,7	-	0,3	6,9	-	4,5	0,2	3,6	7,3	35,5	179,7	19,8
Sulphur	:10 <sup>3</sup>	768	60	14	2075	-	293	3	65	70	3 348	33 900	9,9
Fluorspar	:10 <sup>3</sup>	76	-	-	315	-	171	-	-	189	751	4 670	16,1
Pyrite	:10 <sup>3</sup>	221	-	-	-	20	297	66	-	-	604	9 440	6,4
Talc	:10 <sup>3</sup>	15	-	-	278	-	175	1	-	18	487	6 080	3

Substances not produced in the EEC: Cobalt, Columbo-tantalite, Ilmenite, Molybdenum, Platinum, Rutile, Vanadium, Zirconium, Borates, Natural Sodium Carbonate, Diamond, Natural Nitrates, Phosphates, Natural Sodium Sulphate.

Source: Annales des Mines, November/December 1980

## GERMANY

Germany has a considerable variety of mineral production, but, with the exception of potash, production is generally well below needs.

The metallurgy industry is able to cover needs in whole or in substantial part, except in a few special cases.

The primary processing industries, on the other hand, are generally geared to exports.

## IRELAND

Mineral production in Ireland is limited in practice to lead, zinc, silver and kaolin. There is virtually no metallurgical industry, and the country even has to rely on imports, principally from the United Kingdom, for a major part of the half-finished products its economy requires.

## ITALY

Italian mineral production is based principally on natural gas, lead, zinc in quantities below the needs of the country, and a fairly large number of non-metallic substances. It does however have metallurgical and primary processing industries that largely cover its market needs.

## NETHERLANDS

The Netherlands are the EEC's principal producer of natural gas. Production of other minerals is zero or extremely low, except in the case of salt.

The metallurgical industry is highly developed in certain areas (iron, aluminium, and zinc in particular), as is the primary processing industry.

## BELGIUM

Mineral production is confined to about 7 MT of coal.

The country does however have an extensive metallurgical industry: iron, copper, lead, zinc, antimony, etc, which imports all its raw materials and exports a considerable part of its production, in particular to the other Community countries.

Belgium also has an extensive primary metal-processing industry.

#### DENMARK

Denmark's only significant mineral production is some 400,000 t of oil. On the other hand, Greenland produces and exports large quantities of lead ore (containing silver) and of zinc and cryolite.

The Danish metallurgical industry has a fairly limited capacity. Its primary metals-processing industry is principally geared to covering the country's needs.

#### FRANCE (not including overseas territories\*)

Although France has fairly diversified minerals production (energy sources, iron, lead, zinc, silver, gold, tungsten, bauxite and numerous non-metallic substances) it is generally dependent on raw materials imports. However, it is a net exporter of potash, sulphur, talc and fluorine.

The metallurgical industry, with the exception of copper and certain special metals, approximately balances needs. The primary processing industry is generally a net exporter, principally to the other EEC countries.

#### UNITED KINGDOM

The United Kingdom is the EEC's principal producer of oil, natural gas and coal. Metal ore production is very low, but there is fairly diversified production of non-metallic substances (the United Kingdom is a major exporter of kaolin).

The metallurgical industry is generally unable to meet market demand, but the primary processing industries are substantial exporters.

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\*

New Caledonia is the world's second producer of nickel.

V. AGRICULTURE

Table 39

V. AGRICULTURE

Table 39

DEGREE OF SELF-SUFFICIENCY

Products	EUR	Germany	France	Italy	Netherlands	Belgium	Luxembourg	United Kingdom	Ireland	Denmark	Products	
		Vegetable products				1977/78		Vegetable products				
Wheat	97	99	176	60	57	65	61	55	135		Wheat	
Rye	109	125	128	84	64	75	65	-	173		Rye	
Barley	112	86	169	30	53	73	121	121	117		Barley	
Oats	97	94	109	69	147	71	99	93	99		Oats	
Maizé	58	18	128	69	-	2	0	-	-		Maize	
Total cereals	92	84	155	61	26	43	76	87	114		Total cereals	
Rice	53	-	9	120	-	-	-	-	-		Rice	
Potatoes	101	94	105	96	126	98	95	104	100		Potatoes	
Sugar*	125	129	226	84	147	207	40	114	242		Sugar*	
Vegetables	92	36	91	117	194	118	72	104	77		Vegetables	
Fresh fruit	73	42	75	139	43	39	26	27	64		Fresh fruit	
Citrus fruits	42	-	2	115	-	-	-	-	-		Citrus fruits	
Wine	94	74	86	120	-	8	0	-	-		Wine	
		Animal products				1978		Animal products				
Cheese	103	90	113	78	226	41	67	625	369		Cheese	
Butter	118	135	111	68	639	122	40	322	280		Butter	
Beef	94	100	103	58	88	90	72	603	286		Beef	
Veal	105	67	104	59	1230	97	163	400	100		Veal	
Pigmeat	100	88	84	76	224	171	62	142	350		Pigmeat	
Poultry	103	53	113	98	275	95	100	98	228		Poultry	
Total meat	96	86	92	75	193	119	71	267	298		Total meat	
Fish	:	:	:	:	:	:	:	:	:		Fish	
		Oils and fats				1978		Oils and fats				
Vegetable oils and fats	25	10	26	64	3	1	5	-	6		Vegetable oils and fats	
Slaughterhouse fats	90	108	98	93	60	87	63	322	88		Slaughterhouse fats	
Marine oils and fats	21	11	0	0	0	-	6	67	263		Marine oils and fats	
Total oils and fats	46	40	51	67	33	35	19	61	79		Total oils and fats	

\* Including the overseas departments

MOTION FOR A RESOLUTION (Doc. 1-582/81)

tabled by Mr DE CLERCQ and Mr DE GUCHT

on behalf of the Liberal and Democratic Group

pursuant to Rule 47 of the Rules of Procedure on the need to establish stocks of strategic materials in the European Community

The European Parliament,

- convinced of the urgent need to establish a genuine European energy policy,
- whereas energy and raw materials are essential to the functioning of European industry,
- whereas Europe depends to a large extent on the third world for its supplies of raw materials,
- whereas a great many sources of strategic materials tend to be concentrated in particular areas (for example, the Community is 99-100% dependent on external sources for its supplies of magnesium, platinum and vanadium which are situated mainly in South Africa and the USSR),
- whereas a number of commercial and political factors could jeopardize the Community's supplies of raw materials,
- whereas the protection of shipping lines is insufficient in itself to guarantee supplies of raw materials (Doc. 1-697/80),
- whereas it is necessary to develop at the same time an effective raw materials policy in the European Community,
- whereas the establishment of a strategy on raw materials must involve an attempt, at European level, to stimulate the development of our own resources and the recycling of raw materials,
- whereas the blocking of supply sources would have serious economic and social consequences in Europe,
- convinced of the need to adopt measures now to guard against the possibility of vital European industries being paralyzed in the event of an embargo on raw materials,

1. Considers therefore that:

- (a) the European Community must establish stocks of important strategic materials, as it has already done in the case of oil;
- (b) the European Community must encourage European firms to establish private stocks of raw materials;

2. Calls on the Commission to draw up a raw materials programme, taking account of Parliament's proposals as set out above:

3. Instructs its President to forward this resolution to the Commission, the Council and the Ministers for Foreign Affairs meeting in political cooperation.

OPINION OF THE COMMITTEE ON ECONOMIC AND MONETARY AFFAIRS

Draftsman: Mr P. SCHINZEL

On 15 April 1981 the Committee on Economic and Monetary Affairs appointed Mr Schinzel draftsman of an opinion.

At its meeting of 24 November 1981 'it considered the opinion' and adopted it by 16 votes to 2 with 7 abstentions.

Present: Mr Moreau, chairman, Mr de Ferranti, vice-chairman, Mr Deleau, vice-chairman, Mr Schinzel, draftsman; Mr Beazley, Mr Beumer, Mr Bonaccini, Mr Caborn, Mr Damseaux (deputizing for Mr Combe), Mr Delorozoy, Miss Forster, Mr I. Friedrich, Mr de Goede, Mr Herman, Mr Lange (deputizing for Mr Ruffolo), Mr Leonardi, Mr Miehr, Mr Nicolaou, Mr Notenboom (deputizing for Mr Schnitker), Mr Nyborg, Mr Papantoniou, Mr Prag (deputizing for Mr Hopper), Mr Purvis, Sir Brandon Rhys-Williams, Mr Romualdi (deputizing for Mr Petronio), Mr Seal (deputizing for Mr Rogers), Mr Schwarzenberg and Mr Wagner.

1. The Committee on External Economic Relations's provisional motion for a resolution (PE 72.820/res./fin./prov.) on 'supplies of mineral and vegetable raw materials in the European Community - survey and further outlook' deals with many industrial and economic aspects of the question. It is an unsystematic report and is difficult to understand from the point of view of content and language. The Committee on Economic and Monetary Affairs does not have sufficient time to give an exhaustive opinion on every aspect covered.

2. As the whole area of raw materials supply policy falls largely within the terms of reference of the Committee on Economic and Monetary Affairs, the latter has already dealt exhaustively with, and drawn up reports on, this problem in the past. Parliament has instructed the committee to monitor further developments in this area and, if necessary, to report on these developments<sup>1</sup>.

The committee will therefore draw up a report at the appropriate time. In the last few years nothing much has happened in this field to justify adding to the view taken and the suggestions made in the last report (Doc. 585/76).

Given the short time available, the committee would merely refer to the above report (Doc. 585/76) and has confined its opinion to a number of comments which give a far from complete picture.

3. The importance of raw materials for industry and the economy, and hence for the prosperity of the European Community, needs no further comment. Although an analysis of known reserves and resources shows that a general shortage or deflection of industrial raw materials is very improbable in the coming two decades, a responsible policy on raw materials supplies should nevertheless be pursued at Community level. The Community is, after all, dependent on third countries for 75% of its raw materials.

4. As complete self-sufficiency in raw materials is not feasible, the Community's policy must be directed towards reducing its dependence as far as possible. Research into the extraction and recycling of raw materials in the Community, the possibility of using substitutes, the extension of the life of products, and raw materials savings must be coordinated and promoted at Community level.

In its report (Doc. 585/76) the Committee on Economic and Monetary Affairs urged the Commission to present practical proposals to this end. The basis for this must be an inventory of the current measures taken in this connection by the individual Member States.

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<sup>1</sup> Interim report on the Community's raw materials supplies, Rapporteur: Mr SCHWÖRER (Doc. 585/76, 7 March 1977)

Since then the Commission has presented a proposal for a sectoral research and development programme in the field of raw materials (Doc. 1-271/81). The committee welcomes the proposal but does not intend to comment on the individual details, as it has not been asked to give an opinion on it. Although the proposal offers only a partial solution to the problem, full use should be made of the opportunity it offers, bearing in mind that it will help to reduce balance of payments deficits, create jobs, safeguard the environment, etc.

5. Since the Community is so dependent on external sources, the only way to safeguard raw material supplies and minimize the risks of a sudden interruption of deliveries of certain raw materials is through international cooperation which takes account of the independence and interests of raw materials producers and consumers. Cooperation of this kind should help developing countries which produce raw materials to achieve a higher degree of industrial development and guarantee consumer countries continued supplies of raw materials. The legal basis for certain aspects of this cooperation, for example unrestricted access to raw materials, price formation, etc., must be set out in international treaties and agreements. Unfortunately, virtually no progress has been made for a number of years in laying down international rules in this field.

How then is one to interpret paragraph 15 of the motion for a resolution, which mentions taking account of the outcome of international conferences in this area?

If supplies of certain raw materials are interrupted, it is clear that national measures will not be sufficient and that appropriate measures must instead be considered at European level. One approach could be to create buffer reserves at Community level structured in such a way as virtually to exclude short-term interruptions of supplies. The motion for a resolution is very weak on this point and merely refers to the disastrous consequences of a sudden interruption of supplies and to the impossibility of adopting effective national measures to safeguard supplies. The only European action mentioned in the motion for a resolution is the rapid exchange of information.

The motion should be amended so as to stress the role of Community policy.

6. Even if there is no interruption of supplies of raw materials caused by external factors, there is still the possibility of difficulties on the raw materials market. Insufficient investment is being made to safeguard future raw materials supplies; ultimately this will lead to an imbalance between supply and demand and hence to higher prices for certain raw materials. The inadequate level of investment is attributable to higher costs, falling profits for the mining companies and non-commercial investment risks in the developing countries. Measures must be taken to



remedy this deficiency. In its report (Doc. 585/76) the Committee on Economic and Monetary Affairs proposed the setting up of a European investment guarantee organization and asked the Commission to put forward appropriate proposals. The latter has admittedly now forwarded to the Council a proposal for Community measures to promote European investment in raw materials production, but this has apparently not yet made any progress.

Paragraph 14 calls for an investigation of the effects of industrialization in raw material producing countries on the industrial structure of the Community. Presumably this refers to the consequences of the increasing tendency for raw materials to be processed in the country of origin. This is one aspect of the new international division of labour. Any investigation should cover not only the impact of the industrialization of raw material producing countries but also the implications of the new international division of labour as a whole for our industrial structure. Europe should draw the appropriate conclusions as regards the right structural policy to follow, and it is within this framework that the necessary structural adjustments should be made.

The Committee on Economic and Monetary Affairs has repeatedly stressed the need for a European structural policy, without which the Community will be forced to accept the collapse of certain sectors as the terms of international competition change or even to restrict its industrial activities as a whole. Without advance planning and the systematic preparation of alternatives, this restructuring process will take a heavy toll on workers and employers alike.

8. Paragraph 17 of the motion for a resolution proposes the creation of joint consultative committees composed of representatives of the Council, the Commission and the European Parliament and internationally-acknowledged experts. The Committee on Economic and Monetary Affairs, within whose terms of reference supplies of raw materials largely fall, wonders whether it would not be better to respect the roles of the various institutions and involve the European Parliament fully in policy-making in this field instead of creating new committees. This has not been done up to now. The committee has hardly ever been informed, let alone consulted.

#### CONCLUSIONS

The Committee on Economic and Monetary Affairs,

- (a) Stresses the importance of raw materials for industry and the economy and hence for the prosperity of the Community;
- (b) Points out that the Community is dependent on third countries for 75% of its raw materials; stresses, however, that this level of dependency must be reduced as far as possible and that research into the extraction and recycling of raw materials in the Community, the possibility of using substitutes, the extension of the life of products, and raw materials savings must be coordinated and promoted;

- (c) Considers that raw material supplies can be safeguarded only through international cooperation which takes account of the interdependence and interests of raw materials producers and consumers; regrets that virtually no progress has been made in laying down international arrangements in this field;
- (d) Insists that the Community explore all possible ways of safeguarding supplies and promoting investment in raw materials; stresses that policy on raw materials supplies must be determined at Community level;
- (e) Points out that a study should be made not only of the impact of the industrialization of raw material producing countries but also of all the implications of the international division of labour for industrial structures in the Common Market, drawing the appropriate conclusions for European structural policy;
- (f) Calls on the Commission and the Council to keep Parliament informed about the progress of work on the formulation of a European raw materials policy.

OPINION OF THE COMMITTEE ON ENERGY AND RESEARCH

Draftsman : Mr F. IPPOLITO

On 23 April 1981 the Committee on Energy and Research appointed Mr F. IPPOLITO draftsman.

It considered the draft opinion at its meetings of 26 June 1981 and 28 October 1981 and, at the second of these two meetings, unanimously adopted it.

Present: Mrs Walz, chairman; Mr Gallagher, vice-chairman; Mr Normanton, vice-chairman; Mr Ippolito, vice-chairman and draftsman, Mr Adam, Mr Calvez (deputizing for Mr Galland ); Mr Eisma (deputizing for Mr Capanna); Mr Fuchs, Mr Ghergo, Mr Linkohr, Mr Moreland, Mr Pedini (deputizing for Mr Sassano), Mr Petersen, Mr Pintat, Mr Purvis, Mr Rogalla, Mr Seligman, Mr Vandemeulebroucke (deputizing for Mrs Bonino), Mr Veronesi and Mrs Viehoff (deputizing for Mrs Charzat)

General observations:

1. The admirably presented and documented report by Mrs L. Moreau succeeds in throwing into sharp relief the gravity of the situation in the EEC countries as regards their supplies of mineral and vegetable raw materials. The general survey she provides is all the more important in that the energy crisis and the shortage in the Community of indigenous energy sources at reasonable prices has somewhat overshadowed the problem of raw materials. It should be noted, in this connection, that in the case of 15 minerals that are essential for the development of industrial policy, only 5 countries (all outside the EEC) possess as much as 75% of known resources. The following table gives an indication of the seriousness of the disparities between internal production and consumption of 5 metals in 1979.

Metal	EEC cons. in 000 <sup>t</sup>	EEC prod. in 000 <sup>t</sup>	EEC % rate of self- sufficiency
Copper	2,239	7.4	0.3
Lead	1,058	176	16
Zinc	1,199	463	28.6
Tin	53	3.9	7.3
Antimony	8	0.8	10

2. It is impossible to find a way out of the predicament which the Moreau report describes so well (even if mainly in an illustrative way) unless there is a radical change in the policy pursued vis-à-vis the countries of the Third World, which, it is important to remember, are the main producers of raw materials and also possess low-cost energy (hydroelectric energy and, to a lesser extent, geothermal energy).

3. It follows from this that it is essential to restructure and convert a substantial part of Community industry, which must abandon sectors with high energy inputs and small workforces (such as the steel sector) and switch to mechanical and manufacturing industries using metals already refined outside the Community.

4. As has been made clear in a variety of quarters and, in particular, in the Brandt 'North - South' report, this will require a fresh approach to the policy pursued by the Community vis-à-vis the Third World countries, based on the guidelines formulated at the EEC-Latin America Interparliamentary Conference held in Bogotá last January.

### The introduction to the resolution

5. In the introduction to the resolution (paragraphs 1 to 4), emphasis should be laid on the fact that the problems arising from the shortage of mineral raw materials should be evaluated in close conjunction with the problems of energy, for the reasons described in points 3 and 4 of this opinion.

6. In addition, reference should be made to the mineral resources of the oceans, which represent one of the major sources of future supply. The Community as a whole has done virtually nothing to contribute to the study of these resources, even though certain industrial concerns in individual Member States have already formed appropriate partnerships with United States and Canadian multinational mining enterprises.

### Need for Community action

7. Paragraph 7 of Mrs Moreau's resolution needs to be somewhat improved, partly because it gives insufficient emphasis to the problems and partly because it fails to make any specific reference to the factors mentioned in point 6 (resources of the oceans) and in the general observations (point 4) of this opinion.

### Community resources

8. With a view to reducing the risk of shortages, the resolution mentions the need to promote action to enhance the Community's level of self-supply. In this part of the resolution (paragraph 8) there is also room for improvement: among other things, specific reference should be made to the need for some Community countries (e.g. Italy and Greece) to embark on basic mining research projects aimed at detecting ore deposits that cannot be readily discovered from a survey of surface conditions. Today, geochemical prospecting - even more than geophysical prospecting - and the generally improved level of our 'geostructural' knowledge - augur well for the success of such research and entail a relatively low level of financing.

### External supplies

9. As regards external supplies (paragraph 9 of the resolution), while acknowledging the desirability of the types of action recommended, we would stress the need for such action to be made an integral part of the Community's overall policy towards the Third World, which should be characterized by a substantially new political approach that envisages the development of joint enterprises in the mining and energy sectors in those countries satisfying the conditions mentioned in point 4 above, with the Third World countries providing the mineral and energy resources and the Community the capital, the technologies and the experts.

### Forward planning

10. Although the measures outlined in paragraphs 10 to 13 are considered necessary, we would also strongly urge that:

- trends in Community requirements for each material for the next twenty years should be studied and forecast;
- the essential process of industrial conversion, to which we referred in point 3, should be the subject of a more thorough examination;
- the mechanisms of the 'flexible Community structure' mentioned in paragraph 12 should be more clearly defined;
- the connection should be made between the problem of recycling certain harmful metals (chrome, mercury, etc.) and the need to reduce pollution and safeguard the environment.

### Vegetable raw materials

11. The resolution makes no reference to the problems of vegetable raw materials or, more seriously, to the grave problem of the undisputed worldwide domination of the foodstuffs sector by the multinationals. The problem of soya and of its replacement, in the preparation of feed, with artificial proteins, which could go some way towards breaking this monopoly and reduce world hunger, is not touched on in the resolution. It would be desirable, in this connection, to have the views of the Committee on Agriculture.

12. Similarly, the resolution makes no reference to the possibility of using the biomass, especially in countries with hot or equatorial climates, bearing in mind that in the near future this may make a significant contribution towards solving the energy problems of the countries which are not yet industrialized.

### Conclusion

13. In the light of the abovementioned considerations, the Committee on Energy and Research recommends that the Committee on External Economic Relations insert paragraphs in its motion for a resolution which take account of the following needs:

- the need to forge with the countries of the Third World - the major producers of low-cost raw materials and energy (hydroelectric energy and, secondarily, geothermal energy) - new cooperation links, on the basis of which they would guarantee supplies and the Community provide the financing and new production technologies;

- the need to restructure much of Community industry with the aim of scaling down sectors with high inputs of imported energy and promoting the development of the mechanical and manufacturing industries ;
- the need for the Community to pursue studies of and research into the mineral resources of the oceans, which constitute one of the main sources of future supply, taking account of the guidelines laid down in January 1981 at the Bogotá Conference ;
- the need to encourage studies and research into possible ways of replacing elements that are becoming depleted and recycling metals that are rare or damaging to the environment ;
- the need for basic mining research to be undertaken in certain Community countries, which would make it possible to exploit the existence of ore deposits that cannot be readily discovered from a survey of surface conditions, using geochemical and geophysical research techniques ;
- the possibility of using the biomass as a way of helping to solve the energy problems.

OPINION OF THE COMMITTEE ON DEVELOPMENT AND COOPERATION

Draftsman : Mr G. FUCHS

On 22 September 1981 the Committee on Development and Cooperation appointed Mr G. FUCHS draftsman.

At its meeting of 10 November 1981 the Committee considered the draft opinion and adopted it by 8 votes with 6 abstentions.

Present: Mr Poniatowski, chairman; Mr Kühn, vice-chairman; Mr Fuchs, draftsman; Mr Cohen, Mr Enright, Mr Ferrero, Mrs Focke, Mr C. Jackson, Mr Lezzi, Mr Michel, Mr Pearce, Mrs Rabbetghe, Mr J.D. Taylor (deputizing for Mr Kellett-Bowman) and Mr Wawrzik.



I. STATISTICAL REVIEW OF THE RELATIONSHIP BETWEEN THE COMMUNITY AND DEVELOPING COUNTRIES AS REGARDS COMMUNITY IMPORTS OF VEGETABLE AND MINERAL RAW MATERIALS

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Whilst the Community's deficit in mineral raw materials is clear (it is completely, or almost completely, dependent on outside countries as regards, in particular, its domestic consumption of chrome, cobalt, manganese, molybdenum, nickel, platinum, titanium, tungsten and vanadium, and dependent on outside countries for 37% of its tin, 81% of its copper, 79% of its iron ore and 61% of its aluminium), the part played by developing countries in furnishing it with supplies, though overall smaller than that of other industrialized countries, should also be noted. Community imports from the whole of the Third World form, as regards both fertilizers and crude ore on the one hand and ferrous metals on the other, 38% of total Community imports of these types of product in terms of value. In particular, the African, Caribbean and Pacific States supply the Community with 15% of all its imports of fertilizers and crude ore and 19% of all its imports of ferrous metals and the Latin American countries supply it with 15% and 11% respectively of its imports of these products.

The dependence of the Community on developing countries varies a great deal from one ore to another. It is particularly dependent on the ACP countries for uranium, aluminium and copper ore; imports from the ACP States account for 94.9%, 62.3% and 51.5% respectively of total Community imports of these products.

As regards vegetable raw materials, even though in this respect too imports from other industrialized countries are as a whole slightly higher, the importance of the developing countries should also be pointed out. Thus the ACP States and the Latin American countries supply 15.5% and 16.1% respectively of all imports of agricultural products into the Community.

The proportion supplied by the ACP States as countries supplying vegetable products to the Community varies greatly from one product to another. It is particularly high in the case of three types of product which are important items among agricultural imports into the Community: cocoa, groundnuts and coffee. Imports from the ACP countries form 85.9%, 46.6% and 41.6% respectively of all Community imports of those products.

From the point of view of the developing countries, their export earnings are to a great extent dependent on raw materials: in the case of all the

Developing countries which are not oil-producers, exports of basic products, excluding fuel, account for 43.4% of their total exports. For many of them three basic products or even a single product account for more than half of their export earnings. For some ACP States, a single basic product accounts for more than two-thirds of their export earnings. This is particularly so in the case of Zambia, Burundi and Mauritania which derive, respectively, from copper, coffee and iron ore 92%, 89% and 80% of their export earnings.

Moreover, it is also clear that as regards the developing countries considered as a whole the proportion of their total exports formed by ore and non-ferrous metals is much smaller than that formed by food products and other raw materials. Total exports of these types of product from all the developing countries which do not export oil amount respectively to 6.3 and 6.1 thousand million dollars as against 44.85 and 11.5 thousand million dollars.

This is borne out as regards the ACP States most of which are more dependent on exports of vegetable raw materials than mineral raw materials.

## II. COMMENTS ON THE MOTION FOR A RESOLUTION ON SUPPLIES OF MINERAL AND VEGETABLE RAW MATERIALS IN THE EUROPEAN COMMUNITY - SURVEY AND FURTHER OUTLOOK

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The motion for a resolution has three main features:

- (1) First of all it describes the Community's position as dependent and vulnerable without mentioning the need for any interdependence or cooperation between equal partners.

The mention made in the explanatory statement (page 18) of the possibility of the Community's acting as a prime mover in international cooperation and in the efforts to find an overall solution does not reappear in the motion for a resolution.

"The view expressed of the relationship between the Community and the outside world is essentially one of conflict."

- (2) Next, the text of the motion for a resolution takes into consideration only the needs of the Community. Although paragraph 11 of the motion for a resolution states that it is considered necessary to conduct a detailed investigation of the effects of industrialization in raw material producing countries on the industrial structure of the Community it does not in fact take into account either the specific needs of the developing countries as regards industrialization or their needs in the agricultural and food sectors, which are not mentioned at all, or their interests linked to the income derived from their export earnings.

The explanatory statement, which mentions the present and foreseeable growth of the mineral raw material requirements of the developing countries, refers to this merely as an additional stress which will have to be taken into account (pages 8 and 9).

In addition, the mention in the explanatory statement of the influence of development objectives on the control of production by producer countries (p. 12) and the acknowledgement of the need for Europe to accept the processing of raw materials at the site of extraction (p. 47) do not reappear in the motion for a resolution.

- (3) Finally, it is clear that, in spite of its title, this motion for a resolution devotes greater attention to mineral raw materials, a problem which is in fact more serious for the Community, than to vegetable raw materials, which are of greater interest to the developing countries; this impression is confirmed by reading the explanatory statement.

It should be observed that although the series of internal Community measures proposed in that motion (increasing knowledge of its own potential and making better use of its internal resources, promotion of new technology making it possible to exploit deposits hitherto inaccessible, or of insufficient size or yield, making more rational use of resources in the industrial process as a whole, including the useful life of products, more reliable recovery and recycling of wastes and research into increased substitution potential) concern both mineral and vegetable raw materials, the only measure external to the Community mentioned (the need to multiply and diversify sources of external supply, and therefore to give a priority impetus to new mining investment) applies solely to mineral raw materials.

The text of the motion for a resolution refers in this respect by way of example to the provisions of the Second Lomé Convention which should be renewed within a wider framework.

It does not take up the point made in the explanatory statement (page 41) that the Commission of the EEC specifies in its report on the agricultural situation that the achievement of market balance presupposes that solutions will have to be found, as regards agriculture, in international agreements.

III. PROPOSED AMENDMENTS TO THE MOTION FOR A RESOLUTION ON SUPPLIES OF  
MINERAL AND VEGETABLE RAW MATERIALS IN THE EUROPEAN COMMUNITY -  
SURVEY AND FURTHER OUTLOOK

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In order to take into due account and to stress the following:

- . The interdependence brought out by all the available statistical data;
- . The economic and political need for the Community to maintain, on the basis of complete equality between partners and in their mutual interests, close and continuing cooperation in a spirit of international solidarity with all the developing countries, especially those which are signatories of the Lomé Convention and the other associated States;
- . The provisions and mechanisms which have already been established by the Second Lomé Convention between 61 African, Caribbean and Pacific States and the Community and which consist, in particular, of:
  - a system to stabilize the earnings derived from the exportation of 44 basic agricultural products or by-products, STABEX (Title II, Chapter 1);
  - a parallel system for the stabilization of earnings derived from the export of 3 mining products, SYSMIN (Title III, Chapter 1);
  - a system of technical and financial assistance for the exploitation of mining potential involving the intervention of the European Development Fund and the European Investment Bank (Title III, Chapter 2);
  - agricultural cooperation (Title VI);
  - a special system for sugar applicable for an unlimited period (Title II, Chapter 2);
  - a Committee on Industrial Cooperation (Art. 78), a Centre for Industrial Development (Art. 79), a Technical Centre for Agricultural and Rural Cooperation (Art. 88) and joint institutions responsible for the management of this cooperation (Title X);

The following amendments to the motion for a resolution are proposed:

- . Replace paragraph 3 with the following:

3. Notes

- that the European Community is dependent on external sources of supply for raw materials
- that many raw materials producing countries, especially developing countries with economies based on the export of a small number of commodities, are dependent on the industrialized countries, including the European Community, for market outlets;

Recognizes, consequently, that the problem of relations between raw materials producing and consuming countries is one of interdependence rather than vulnerability.

. In paragraph 12 add a third indent as follows after the first two:

- the vicissitudes of a 'world market' dominated by speculation on the part of a few large multinationals and by the political decisions taken by certain countries.

. Add the following new paragraphs 12a, b and c:

12a. Recognizes that an adequate revenue for producers is a prerequisite for the maintenance of regular supplies of raw materials, and accordingly stresses the importance of European Community support for and participation in international commodity agreements and the Common Fund;

12b. Emphasizes the importance of giving practical expression to the interdependence referred to in paragraph 3 through international agreements such as the Convention of Lomé II, and sees the need for enhanced cooperation with non-associated developing countries, many of which are major producers of raw materials;

12c. Proposes that the Commission should examine the possibilities of concluding co-development agreements providing for multiannual trade arrangements on predetermined terms;

. Add to paragraph 14:

... and to take account of this when long-term development plans are being formulated;

. In paragraph 15, delete the bracketed section in the last two lines.

