47932

Distr.
LIMITED

E/CN.14/MIN.80/6
29 January 1981

ECONOMIC COMMISSION FOR AFRICA

Regional Conference on the Development and Utilization of Mineral Resources in Africa

Arusha, Tanzania, 2-6 February 1981

OBJECTIVES AND ROLES OF MINERALS IN THE ECONOMIC AND SOCIAL DEVELOPMENT OF THE AFRICAN REGION AND THE LAGOS PLAN OF ACTION

Secretariat of the ECA

Some Aspects of Policies for Development and Economic Growth in Africa since Independence

1. A consideration of the objectives and role of mineral resources development in Africa would by itself be distorted and imperfectly understood without a broader background of general policies and strategies for development and economic growth and the purpose of this section is to set out briefly and critically some of the main features of the way in which policy-makers and planners implicitly and often unconsciously approached the complex problems of engineering massive socio-economic changes in their national communities during most of the last twenty years.

2. During the past thirty years there has been a more or less continuous decline in the share of primary products in international trade yet primary products represent over 90 per cent of the Region's exports. Even more striking is the fact that developing countries are becoming importers of primary products (including raw materials) on an increasing scale whilst developed countries are becoming exporters of primary products also on an increasing scale.

3. In the twenty years since independence many African countries continue to be associated with the export of one or two dominant export primary products - coffee, or cocoa, or raw cotton, or groundnuts, or logs, or iron ore, or bauxite or copper or diamonds, or petroleum, or spices, - and very few have, by their own unaided efforts, succeeded in making more than marginal changes in the dominant product pattern of their exports. It seems as if member countries believed that they could effect a fundamental transformation of their economies, providing for expanding and diversifying production ensuring the development of the capital goods industries, effecting linkages within and among sectors, raising the general levels of living of, and providing steadily increasing employment opportunities for, expanding populations merely by continuing a policy of narrow specialization in primary commodity production for export. It also seems as if policy makers and planners in individual countries tended to assume that developed countries could absorb limitless supplies of their country's dominant export products at increasing real prices in spite of low population growth, changes in life-styles, tastes and patterns of consumption; that technological change, substitution effects and competition from other producing countries could be discounted, and that price and income elasticities of demand in developed countries re-inforced each other in such a way that real prices for the individual exporting country's dominant export products would continue to rise at such a rate as to neutralize the effect of inflation of the cost of their imports from developed countries and provide a surplus to meet the requirements of planned development of the

individual countries. These surpluses would accrue to the exporting country irrespective of the widespread presence and extensive intervention of oligopolistic foreign companies in both the transportation, processing and marketing of primary products from the developing countries and also in the supply to them of goods and services from developed countries. Moreover, the income thus earned would include adequate provision for the restoration and improvement of the productive capacity of soils, forests, etc. or the replacement of exhaustible resources by other productive resources so that extensive hidden capital consumption would not, in fact, be taking place in the mistaken belief that it constituted part of income. Both the internal and external expectations of the enduring power of monoagricultural, monomineral or mono-metal export economies have been demonstrated beyond any point of credibility as baseless and even unreasonable.

4. During those years the list of commodity stabilization schemes lengthened and their obvious inadequacies led to what seemed a natural conclusion: an all-commodity stabilization scheme, irrespective of profound and irresistible changes in the structure of international trade and economic relations. Paradoxically, it may be noted that the implicit assumption that developed countries are capable of absorbing unlimited supplies of specific primary products is inconsistent with the general charge levelled against developed countries that they were wilfully and recklessly consuming the world's non-renewable natural resources/raw-materials without regard to the economic future of the world as a whole or to the requirements for economic growth of the developing world.

5. The pre-occupation with extra-African exports rested on a number of misconceptions about development and economic growth. First, it was assumed that economic growth depended on investment and that investment meant simply the availability and use of money rather than, in reality, the mobilization and application of relevant factor inputs to production, marketing, Research and Development, and other processes. Since capital did not consist of gold bars and currency in banks in developed countries but of factories, roads and railways, research institutes, skilled manpower, educational institutions, raw materials in stock, etc., (to which should be added known and exploitable natural resources) the sheer availability of money, unless easily and directly convertible into these forms, did not constitute capital. In consequence policy-makers and planners were intensely pre-occupied with foreign exchange earnings and with international negotiations to secure larger and larger supplies of foreign exchange to obtain what were assumed to be relevant factor inputs for the building up of real capital. But, in general, what was actually obtained were inputs for the continuing narrow production of one or two primary products for export. The implications of a policy of neglecting factor input development appropriate to a wider resource exploitation base will be brought out later.

6. The secretariat's view is that economic growth means increases in the physical output of goods and services to meet the needs of the mass of the people. Such growth must come from the conversion of raw materials into

semi-finished and finished products. Raw materials are derivable from natural resources and their use in production almost always requires a considerable degree of complementarity among several natural resources. It is, therefore, the utilizable natural resource base and the choice of products to be derived from them that would determine the range and kinds of skilled manpower produced (or procured from abroad), the pattern of technologies locally developed or imported, the kinds of institutional services promoted and so on. In other words, factor inputs must be relevant to the production possibilities to be exploited and the choice of products. Thus the narrower the range of raw materials and product choices in the modern sector of the economy, the narrower the range of factor inputs and the greater the constraint on expansion and diversification.

7. In Africa both the determination of the natural resources/raw materials base and product choices tended to be left to foreign entrepreneurial initiatives based on their evaluation of 'world markets' and 'world demand' which effectively meant the markets and demand of developed countries, and on "world market prices" which were widely influenced by oligopolistic structures and mechanisms.

8. In the search for larger and larger supplies of foreign exchange to acquire factor inputs of the narrow range described, policy makers and planners appeared to have paid little or no attention to the large and increasing drain of foreign exchange to pay for services whose import volume, composition and unit prices escaped notice and surveillance or control, so that a gain of a few cents per pound in the export price of coffee or of oilseeds could very easily be negated by a rise in the unit price of imported services some of which, with imagination and vigour, could have been developed on an indigenous basis to meet local needs. The habit of regarding world markets as distinct from the national and regional markets in Africa (for both services and goods) added a further dimension to confusions in policy. In general, the concept of a market economy hinges on individual domestic markets. For the Africa Region on the other hand, the market has come to mean bits and pieces of markets in different developed countries for parcels of primary commodities produced for export. This meant that the role of the relatively integrated, independently functioning, domestic markets characteristic of developed market economies, which we said to be the determinant of the volume and composition of investment, production and employment, the matrix of sectoral and inter-sectoral linkages, of technological invention and innovation, of multipliers and input/output relations and so on, did not, in terms of modern production, exist except very marginally. The domestic market in Africa is, in general, characterized by a sharp break between the high income (mainly urban) market which forms part of the production and marketing systems of developed economies and the poverty market of the mainly rural sector. The former is characterized by extensive product differentiation; superfluous differences in technical design in relation to functional needs; rapid product succession; the domination of sophisticated consumer goods which lie well beyond local

production capabilities; the uncontrolled use of brand names and advertising and irrelevant and ill-applied trade marks policy and practice.

9. In these circumstances it is clear that the objectives of mineral and mining policy and the role of minerals and mining was to earn foreign exchange to pay for imports of goods (of which food and energy now constitute major components) and services, a good deal of which could have been based on abundant domestic natural resources/raw materials and indigenous factor inputs, had economic policy been differently framed and applied. Even this narrow objective of policy for minerals and mining has been often and substantially foiled.

10. The role which mining has played as a growth point in the past and today in other countries and regions is, in Africa, aborted by its enclave character. The role of minerals as a direct input into domestic production has similarly been virtually non-existent since a demand for minerals is a function of the demand for metals and other intermediate mineral products, and the demand for the latter is a function of the demand for capital goods and other engineering production. Until recent times, the role of the engineering industries particularly of capital goods production received little more than sentimental acknowledgement in economic policy objectives and national development plans in many African countries for many reasons. Where it has attracted attention, governments have been persuaded to believe that firstly, viable manufacturing sectors would develop from assembling, packaging, bottling and labelling consumer products imported in bulk and that the manufacturing process could be learned by beginning at the end. Ministries of industry or of planning had no information on the number (though usually few) and output of metal-working establishments in their country and ministries of education and labour did not have at their disposal profiles of the pattern of manpower required for an average size fertilizer or mini-steel plant. It was known in many member countries that mineral resources of considerable range had existed in various locations but exact technical evaluation was left open to depend on the accidental interest of international mining companies. Thus in the twenty years since independence only a few member countries had acquiredworthwhile capabilities in geological and mining exploration, in the evaluation of their mineral resources, in their extraction, primary processing and marketing or in negotiating the terms of such operations by foreign mining companies. The determination of the mineral resource base, the determination of complementarities and of product choice and the development and mobilization of factor inputs have been external to and independent of African domestic needs and plans. Since few countries command the full range of minerals for complementary inputs in production there is an implied need for intra-African trade in industrial raw materials including minerals. The absence of an intra-African market and of trade mechanisms to serve this purpose re-inforces the point that economic development policy did not include the direct involvement of African mineral resources in economic growth, i.e. in increases in the physical output of goods and services to meet the needs of the mass of the people. The late 1970's were therefore such that the Region depended to an astonishing extent on extra-African supply bases in

developed countries not only for food and energy and services but for manufactured products of all kinds including capital goods, other manufactured products spare parts, and even simple implements and tools. In the event of any major international disaster such as a third world war which cut the Region off from such bases such dependence would have disastrous consequences in every country and in every sector.

II

The Crisis

11. The effect of long term trends in international trade in primary products, the massive effort to construct or repel the entry of processed products into the economies of developed countries, the manifest failure of conventional trade aid, and technical assistance to bring about the structural transformation of African economies and the initiation of processes of self-reliant and self-sustaining development and economic growth, led to the formulation of the Monrovia Strategy for the African Region in the International Development Strategy for the United Nations Third Development Decade and its spelling out in the Lagos Plan of Action adopted in April, 1980, in Lagos, Nigeria, by the Heads of State and Government of the Organization of African Unity. The Lagos Plan implies a long term effort to arrest the dangerous decline of the African economies to establish the platform and to provide the motor for self-reliant and self-sustained development and economic growth. The most cursory reading of the Plan makes clear the enormous expansion of raw materials supply which it presupposes and the corresponding requirements of capabilities in establishing the natural resource base, in undertaking the associated derivation of raw materials, in the establishment of complementarities, in the development of relevant factor inputs, and in the determination of the pattern of product choices. These requirements appear to assume the proportions of a crisis.

12. Even though a Third World War may not be an immediate expectation, studies by the ECA secretariat, the Work Bank, the OECD and other institutions indicate that if the 1970s were regarded as difficult for African development and economic growth, the 1980's promise to be much worse. Already, for some member countries, imports of food and energy and debt service payments account for more than 70 per cent of current earnings. The debt situation is likely to deteriorate as loan funds are likely to be made available from developed countries not only on harsher terms but mainly to re-finance existing debt. At the same time official and non-official measures are being taken to restrain bank lending to the developing world on the scale of the 1970s and foreign private investment from the same sources are expected to become more highly particularistic as to host country and project preference. African governments confronted with the need to compress imports are likely to be faced with desperate choices among such items as food, energy, medicines and drugs, educational supplies, fertilizers, implements and tools, spare parts. In circumstances such as those of the 1960s and 1970s it might have been possible to retreat into a colonialstatus in return for guaranteed supplies of such essentials but in the 1980s this option may only be open to countries selected on the basis of criteria laid down by aid givers, lenders and investors.

13. Up to the end of the 1970s, the African region continued to be a significant supplier of a number of mineral raw materials principally to the industrialized countries including the EEC, Japan and the United States of America. The major mineral raw materials exported by the region included antimony, asbestos, bauxite, chromium, cobalt, copper, diamonds, gold, iron ore, lead, manganese, nickel, petroleum, phosphate, tantalum, tin, uranium and zinc.

14. The mineral raw materials exports of the African region play an absolutely essential and strategic role in the economies of the industrialized countries. These mineral raw materials provide the industrialized countries with essential inputs into their manufacturing industry which is the basis for their dynamic growth.

15. During the last decade, many of the mining transnational corporations were reported to have intensified their mineral exploration activities in relatively safe regions and away from many developing countries including Africa. Thus it is estimated that currently over 80 per cent of worldwide mineral exploration expenditure (excluding the centrally planned economies) is concentrated in the USA, Canada, Australia and South Africa. This illustrates that there is less private capital available to Africa for mineral resources development than that which the continent requires.

16. Furthermore many mineral development analysts hold the view that there will be, in the coming years, a declining intensity of use of minerals in the industrialized countries as a result of (a) shifts in the types of final goods and services demanded directly by consumers and investors; (b) technological developments that alter the efficiency with which raw materials are discovered, extracted, processed and utilized in the production of final goods; and (c) substitution among raw materials inputs in response to relative price movements and relative rates of technological development. Thus with the exception of few mineral resources which the industrialized countries may not be endowed with the demand for African minerals by the industrialized countries is likely to decline with time.

17. Another factor which could dampen the demand for minerals by the industrialized countries from developing countries is the probable recovery of some minerals such as manganese, nickel and cobalt from sea nodules in the near future.

18. Nevertheless, fears have arisen that a combination of the entrepreneurial gap which has now emerged particularly in Africa (and which is not capable of solution merely through the supply of investment capital) combined with the long lead times between exploration and the effective supply of mineral raw materials to users in developed countries may lead to a serious gap in supply.

19. It is now necessary to consider the state in which policies of the past twenty years have left the Region. Firstly and obviously they have left member countries with little technical knowledge of the range and location of

their mineral resources and with little capability for building up that knowledge at speed. Secondly, member countries command little technical capability for evaluating known mineral resources and determining their alternative uses. It should be noted that the scope of technical knowledge of these two kinds constitute an important factor in determining complementarities first at the national level and second at the multi-national level where it is pivotal to co-operation in trade and engineering production.

20. Thirdly, past policies have inhibited the development of instruments for the exploitation of known mineral resources. In many cases policy-makers have resorted to the acquisition of majority share-holding in foreign mining companies to which their country is host seemingly without full grasp of the long established and well known effects of the separation of ownership from management. Holding companies have been created to manage such shares in the name of the state but it would not be too great a distortion to suggest that the pre-occupation with foreign exchange earnings and tax revenues have in effect made such holding companies a branch of the central treasury rather than an operational instrument capable of undertaking exploration and evaluation work, of mounting mining, primary processing and marketing operations in ways that are familiar elsewhere such as India, Brazil, Mexico, and the Philippines.

21. The same pre-occupations have inhibited the indigenous development of factor inputs, especially manpower, so that the withdrawal of the entrepreneurial and managerial function by private foreign enterprise not only prevents the expansion of the mining sector but on occasions leads to the actual termination of mining operations.

22. The weaknesses noted above clearly undermine the bargaining position of host countries but this is re-inforced by other negotiating weaknesses to which attention will be paid later.

III

Mineral Resources Development and the Challenges of the 1980s

23. The challenges that face the African Region today may thus be summarized as the rapid and extensive building up, at national and multinational levels, of capabilities for mineral resources exploration, evaluation, extraction, primary processing, intra-African transportation and trade in minerals and for utilizing the mining sector as a growth pole as significant as it has proved in, e.g. the Republic of South Africa.

24. This is an apparently daunting task but is is not beyond the imaginative or the practical reach of member States working independently or in collaboration with each other.

25. The principal objective of this building up is obviously to meet regional as well as extra-African demand for minerals in the next twenty years. This is not a task that, as is sometimes implied in studies of the world minerals crisis, is merely a matter of mobilizing vast quantities of investment capital for the expansion of the world mining industry. What is required is the expansion of African indigenous capabilities for determining and exploiting African mineral resources for intra-African and extra-African purposes. The emphasis is thus on the development of indigenous African factor inputs, principally manpower and institutions. The Region not only cannot wait until foreign international companies change their minds nor can it depend indefinitely on the degree of permanence of such a change of mind. In any case there can be no necessary congruence between the particular mineral, extraction and processing interests of international companies and those of individual countries at any one time. The recognition of this divergence has been one of the factors in the establishment of state national mining corporations in several Third World countries since the end of the Second World War.

26. It is possible to rely on management and consultancy contracts with foreign international mining companies but this can only be a temporary substitute for national institutional capabilities.

27. Any meaningful programme of action for the development of African indigenous capabilities in the mining and minerals field will therefore require firstly urgent consultations at multinational and regional levels on profiles of such capabilities, on inventories of those that exist, on how they may be rapidly developed for both national and multinational use and on the means of developing new or additional capabilities.

28. It would be impracticable to attempt to cover in full here the scope of the capabilities required but some illustrations are necessary.

29. Of all factor inputs the most crucial is manpower. As was indicated above one of the policy phenomina most difficult to understand in Africa is the almost complet divorce in many countries of the pattern of output of third and middle level educational institutions from the available physical natural resources but of which economic growth

must be built. It is this factor which, the secretariat believes, underpins much of the weaknesses and external dependence of the Region and which contributes to the foreign exchange drain in out-payments for imported services. In this connexion, it is interestin to note what the OECD thinks about the problem.

30. In the "1980 Review - Development Co-operation" of OECD, four factors as the underlying constraints in low-income African development were identified: high fertility, political complexities, the conditon of the rural poor and human resources. And in assessing the relative importance of each of them, the authors have the following to say:

> "Of the underlying constraints on low-income African development we have touched upon, the gap in skilled human infrastructure - in the numbers of appropriately trained personnel and the institutional arrangements for training, deploying, and using them - is no more pervasive than high fertility, no more deeply imbedded than the region's political complexities and certainly no more fundamental than the conditon of the rural poor. But it is the most immediate, proximate constraint. The pace at which it is relaxed will heavily influence the speed with which the development process can efficiently absorb increased resources".1/

31. Steps should include the following: The preparation of manpower profiles (however rough and ready) to assist manpower development planning for each stage (exploration, evaluation, extraction, primary processing, R&D, marketing) and based where practicable on a modal unit of activity; the exploitation not only of new thinking about the content but also about the organization of teaching and learning including the selection and development of multinational teaching companies embracing teaching/learning, production, marketing, R&D, demonstration and extension; the present role and future potentialities of existing mining enterprises for manpower developmtnt over and beyond the individual companies immediate needs. This applies particularly to the gaining of practical experience in areas of specialization (foundry technology, business finance, personnel management, equipment assembly, etc.) which are neither specific to the industry or the sector. Technical assistance from other Third World countries should be given high priority2/ where practicable technical assistance from developed countries for institution building to meet multinational needs should be sought. There are no centres of excellency such as the Institute of Geological Sciences of the United Kingdom, the B.R.G.M. of France, or the Federal Institute of Geosciences and Natural Resources in the Federal Republic of Germany to meet even the needs of the whole African Region much less those of individual countries and there is no reason why assistance for such institutional development should not appear high on the list for forthcoming international negotiations particularly with developed countries which expect to have access to Africa's mineral resources to meet their own needs. Technical assistance programmes

---

1/ 1980 Review - Development Co-operation, Organization for Economic Co-operation and Development, Paris, November 1980, p.39.

2/ E.g. from Brazil for African Portuguese-speaking countries.

sought from developed countries should also include refresher courses for university and middle level teachers as well as for operating and R&D African personnel. Strong emphasis would have to be placed on open-endedness and on the inter-locking relationship of theory and real practice.

32. In so far as Research and experimental Development (R&D) are concerned, there is a broad and questionable trend in technology transfer which permeates all sectors of African economies, i.e. the unquestioning acceptance of technologies produced in developed countries to meet their own circumstances and needs. For example, in the field of energy Africa would move from hydro-power to petroleum and is getting ready to move from petroleum to nuclear power and/or coal. In the field of forest resources wholesale destruction of forests still occur because of the heedless application of timber extraction technology, designed for homogeneous stands in temperate regions, to the mixed stands characteristic of most of tropical African forests.

33. In the particular field of mining the Region moved from underground mining with its relatively small initial capital investment cost to open pit methods involving vast investment in each moving and processing equipment for the separation of small metallic contents from the ore. This technology was designed to deal with the large deposits of low grade ores available in developed countries following the exhaustion of higher grade ores after decades of exploitation. Applied in Africa, where metal content may be as much as 10 times higher, one of the effects has been to raise to previously imaginable levels the initial requirements of finance capital and consequently to shift the bulk of gross income to developed countries to sustain the mining machinery industry. Now that the increasing energy costs of what has been described as "capital-greedy, low grade"[1/] mining projects are mounting, it is anticipated that there may be a shift in mining technology from exploitation of large scale low grade ores to smaller richer ores of a kind commonly found in the Region. There is little doubt that, unless a revolution in the production of safe, cheap energy occurs, the Region will again follow the change in technological style. The effect of such factors on the financial aspects of mining in Africa will be considered later but it should be borne in mind that package financing methods, involving the participation of often more than a dozen parties including sellers and leasors of mining machinery tend to exaggerate the capital and the recurrent (maintenance and spare parts) costs of open pit mining methods. Had member States singly or collectively built up their own mining corporations there is no reason why they would have to wait for initiatives from international companies for bringing about a shift in mining technology.

34. Apart from this pattern of behaviour according to which the Region follows the dominant technology in developed countries which correspond to their relative scarcities and abundance of raw materials and factor inputs and not to the relative scarcities and abundance of raw materials and factor inputs in Africa, every effort is now being made to effect economies in every aspect of mining operations partly due to the decreasing availability and increasing cost of capital, partly to the impact of increases in energy prices, as well as other considerations. So far as the African Region is concerned a factor of particular significance for accelerated industrial development is the exploitation of small scale deposits of mineral raw materials to meet local needs and markets. This makes it necessary to devote attention to technologies of small-scale

---

1/ Editorial, Mining Magazine, July, 1978.

mining and their improvement. The trend towards giantism in mining (as in so many other sectors) does not create a favourable climate for the development of small-scale mining technologies in developed countries and the African Region must set up its own facilities for contributing, along with other Third World regions to its development.

35. There are thus at least four major areas of R&D which requires independent action by indigenous institutions in Africa: the pattern of change in mining technology in relation to the net advantages of and to the Region; the monitoring of trends in the development of technologies of exploration (e.g. the virtual revolution in scaling down, simplification and portability of equipment), ore extraction and processing, beneficiation, etc., and the dissemination of such information not only to mining companies but also, for broad purposes of policy guidance, to policy makers and planners; the development of technologies for small-scale mineral resources exploitation.

36. The fourth areas of R&D concerns exploration. It is strongly urged here that the quiet revolution in ground level exploration hardware opens up possibilities of very rapid coverage of promising areas of geological formations by indigenous personnel with relatively low level specialization including students carrying out their year of national service. It is suggested that early consultations at technical level on appropriate institutional development for R&D in Africa is required. It was argued earlier that the rapid development of technical knowledge of the natural resource base was a necessary condition of raising the level of complementarity and the range of production possibilities at the national and multinational levels and of developing intra-African trade in mineral raw materials. This building up will not go far unless policy-makers and planners break out of the prison of conventional approaches to mineral exploration and evaluation. For example, it has been pointed out that there are many more mines hidden away in the generally ill-organized and neglected archives of departments of mining geology and mining in cities in Africa or very likely in dusty provincial offices.

37. Mining legislation in general provides for core samples and copies of drilling logs to be submitted to the appropriate national authority. Almost everywhere else other than Africa such samples are subjected to detailed and patient laboratory analysis and the corresponding logs to careful evaluation and interpretation.

38. The poor investment in the development of the national geological and mining services, their geographical organization, the grossly deficient equipment resources made available to them make it impossible for a third source of information to be tapped: the familiarity of rural population with mineral substances around them whose significance and use may be little understood.

39. These are only a few illustrations of ways in which the building up of technical knowledge of mineral resources may be accelerated and it is suggested that they, along with others, should be the object of workshops, seminars and study visits organized within the next two years. The role of the existing and proposed cartographic centres and mineral resources development centres may have to be considerably enlarged to enable them to take the lead in areas of R&D such as those indicated above.

40. Another significant challenge arises from several considerations including: the scale of development of mineral exploration and mining required in the Africa Region within the next 10 to 20 years if the Lagos Plan of Action and its inevitable successors are to be implemented; the probable retreat from (or at least less automatic and widespread resort to) open pit mining methods; the need for the development of small-scale mining, methods and technologies; the potentialities of new approaches to methods and technologies of mineral exploration and evaluation; the foreign exchange pressures on Africa in the 1980s; the experience and successes of such countries as India, South Korea, Brazil, the Republic of South Africa, all suggest that the development of equipment for mineral exploration, evaluation, extraction and primary processing will have to be deliberately begun within Africa in this decade. Special attention will therefore have to be given to case studies of the development of the mining equipment industry in selected countries and to study tours to those countries; to the analysis on national and multinational levels of imported technical inputs for the mining industry; to studies of the technical necessity of the present variety of equipment with a view to standardization and the local manufacture of parts and components; to the structure, manpower requirements, capital investment levels, etc., of the mining equipment industry; to steps needed to establish national or multinational state enterprises for mining equipment production; to the possibilities of government enterprises with similar corporation in other Third World countries or elsewhere; to the value added aspect of intra-African development of mining equipment manufacturing industries; to the implications of policy being diverted to favour assembly rather than manufacturing, etc.

41. In preceding paragraphs a number of issues have been raised which clearly affect the volume and effect of financial resources required for the expansion of the mining sector in Africa. These include: the growth and retreat of open pit mining methods; the development of small-scale mining; techno-economic improvements in exploration, extraction and processing technologies; the higher content of African minerals; the local manufacture of mining equipment; the utilization of abundant energy resources, etc. The calculation of capital investment requirements for the expansion of the world mining industry suffers from a number of weaknesses which distort their significance. The first is the assumption that technologies are taken as fixed and incapable of adjustments with significant differences in financial calculations - see the fourth point below. The second point is the assumption that the geographical pattern of factor input simply will remain unchanged. The third is that internal and external costs of factor inputs mean the same thing to a developing country. The fourth is that this significance is somehow disposed of by the conversion of a national currency into one or even a second international currency and that the effect of inflation and high labour costs in developed countries will continue to be absorbed somehow, in foreign exchange terms, by Third World countries. The present structure and level of capital and recurrent costs depend on factors which it should be one of the objectives of African policy to change.

42. Whatever measures might be taken to scale down the capital investment and other financial requirements of the expansion of the mining industry in Africa - and here it is proposed that universities should begin to organize special training courses in the analysis and negotiation of mining financial arrangements - large volumes of foreign exchange resources will undoubtedly be required for financing this expansion. Thus mobilization and redeployment could be entrusted to a regional mining development bank supported principally by the major mineral and oil exporting member States, which gradually builds up specialized experience and capabilities in the evaluation of mining

projects, in the negotiation of large scale financial packages; in providing consultancy services to governments and African multinational corporations, and in monitoring trends in mining finance flows and changes in terms and conditions of mining investment.

43. The progress of institution building in Africa has been greatly and adversely affected by several factors to which it is desired to draw attention before any further examination of the subject within the field of mineral resources development.

44. One factor has been the poor perception of the main causes and factors of economic growth resulting from a distorted understanding of the main thesis of neo-classical economic theory. Raw materials, real factor inputs, institutions all tended to disappear from view. Awareness of the range of institutional devices required to support on expanding, diversifying, economic system is still being painfully acquired. At the national level the structure of government and even philosophies and processes of public administration retain most of the features which preceded independence. Thus persistence of traditional structures and processes affect the way in which policy for national resources in general and for mineral and mining development formulated even in mineral rich countries. As was noted earlier it also affected the way in which policy was executed not only in terms of the personnel and other resources of ministries and departments responsible for mineral resources development often quite inadequate but linkages between them, other ministries, the mining sector and institutions of education are frequently haphazard.

45. The concentration of policy on financial returns at the expense of real and permanent benefits (building up of technical knowledge of the mineral resources base, development of manpower, R&D, industrial linkages) also had the effect of over-shadowing institutional development for really shaping the mining sector to meet national needs. In addition a certain unwillingness to venture into strange territory (often represented as too complex and too risky for amateurs) developed as a result of which the entrepreneurial function was left to foreign international firms. It seemed to have been assumed that they would always, somehow, be there, able and willing and permanently rooted in the local soil.

46. At the multinational level, the hesitancy to compromise the sovereignty of individual States and the fear of not, from moment to moment, getting an exactly fair share of the benefits of economic co-operation, tended to lead to the development of institutions for consultation or for secretarial purposes rather than for genuine operations. The member States now, it must be pressed, have no alternative but to overcome scruples and fears and to take substantial leaps forward in institution building for operational purposes if the Region is not to sink into a state of colonialism not experienced in its history. Included in these will be three of particular significance: production and marketing companies, supporting intra-African trade mechanisms and institutions concerned with the development of appropriate physical infrastructure. Without these the level of complementarity of mineral raw materials for national and multinational production will remain at a level so low as to defeat attempts to initiate and sustain processes of self-reliant and self-sustaining development and economic growth.

47. A fourth institutional form which deserves notice is consultancy services. Business consultancy services is considered by the secretariat as a basic requirement of promoting economic growth. It also represents one of the most costly forms of external

dependence. Considerable thought will have to be given to the promotion of indigenous consultancy services in the minerals and mining field even though it is recognized that this requires a long gestation period.

48. The challenges outlined in the preceding paragraphs and the proposals for meeting them do not constitute either an exhaustive analysis of mineral and mining development problems in Africa or a comprehensive programme of action. They however serve to show some of the aspects of the subject to which the secretariat believes urgent and deliberate attention should be given and which it feels should be given high priority in negotiations with developed countries or their international companies if the objectives of satisfying the Region's needs as well as those of developed countries for mineral resources from Africa.