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### DEVELOPMENT AND INTERNATIONAL ECONOMIC CO-OPERATION: NATURAL RESOURCES

#### Multilateral development assistance for the exploration of natural resources

#### Report of the Secretary-General

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\* A/36/150.

## I. INTRODUCTION

1. The General Assembly requested the Secretary-General by resolution 32/176 of 19 December 1977 to estimate, with the assistance of a high-level group of experts, the financial requirements over the next 10 to 15 years for the exploration and location of natural resources in interested developing countries. The group, convened in 1978, concluded that such an estimate of exploration requirements for non-fuel minerals and mineral fuels of individual countries was not practical without an assessment of their geologic situation, a review of existing national exploration data and current programmes, and an evaluation of the national absorptive capacity. It recommended that the needs should be assessed on the basis of detailed questionnaires, completed by those developing countries which had requested inclusion in the survey of financial requirements, followed by short-term visits of technical missions, to assist in making on-site reviews and, if desired, in identifying specific projects for the improvement of the geoscientific base and for further exploration (A/33/256, para. 6).

2. At its thirty-third session the General Assembly, in resolution 33/194 of 29 January 1979, decided to request the Secretary-General to organize the missions in consultation with the United Nations Development Programme (UNDP). These consultations led to the conclusion that the only available source of funding was from the UNDP Indicative Planning Figures (IPF) of each country. Unfortunately the majority of the interested countries could not spare the necessary financial resources from their IPFs, as noted in the Secretary-General's report (A/34/532, para. 8), and so the General Assembly at its thirty-fourth session, in resolution 34/201 of 19 December 1979, decided to provide the necessary financing, utilizing resources within the existing regular programme of technical co-operation.

3. The Secretary-General's first progress report on the assessment missions (A/35/383) was considered by the General Assembly at its thirty-fifth session and noted among the documents referred to in decision 35/405 of 10 November 1980. The present report to the thirty-sixth session of the General Assembly describes progress achieved, as at June 1981, by the Department of Technical Co-operation for Development as the principal entity within the Secretariat responsible for carrying out the assessment missions mandated by the Assembly and financed from resources within the existing regular programme of technical co-operation.

## II. REPORT ON PROGRESS

4. Requests from 43 countries were received for a total of 77 assessment missions. These are assessments of mineral resources and/or energy resources, depending on the request of the country, the resources known to exist and its geologic potential. Of the 77 missions, 37 are, broadly, mineral assessments and 40 are energy assessments. Coal and uranium are, where relevant, included in the minerals assessments and sometimes in the energy assessments. If so requested, individual missions are organized in respect of coal and geothermal energy. By June 1981, 44 missions had been undertaken and 31 reports completed estimating mineral or energy requirements in 22 countries.

5. The countries for which one or more reports were completed were: Botswana, Cape Verde, Comoros Islands, Djibouti, Egypt, Ethiopia, Ghana, Jamaica, Lesotho, Madagascar, Malawi, Mauritania, Mauritius, Mozambique, Nepal, Philippines, Seychelles, Somalia, Sudan, Sri Lanka, Swaziland and Thailand.

6. Nine of the reports cover petroleum and gas (or hydrocarbons and coal); three of the reports deal exclusively with coal; three reports deal with geothermal investigations; and the remaining 16 reports cover non-fuel minerals, except for two which also include uranium. Some of the reports cover more than one energy resource. Two reports were prepared for each of the following countries: Botswana, Cape Verde, Jamaica, Lesotho, Malawi, Philippines and Somalia. In most cases, one report was prepared for non-fuel minerals and the other for one or more energy resources. In the case of Mozambique, three reports were prepared, including a separate report for geothermal energy. For the other 14 countries, only one report was prepared dealing with either non-fuel minerals or energy resources.

7. The reports cover a wide variety of topics relating to the category of resources dealt with. These include a summary of the geology of the country and of the geological surveys that have been conducted; a history of exploration and resource development activities; the country's infrastructure and technical capacity for exploration and development; governmental organization for geological surveys, exploration and training; governmental policy and legislation with respect to foreign investment in the resource industries; and an appraisal of financial, personnel and technical requirements. The reports vary substantially with respect to the emphasis given to each of these categories. The information in the reports on geological surveys and mineral occurrences, together with the capacity of governmental institutions for carrying out geological investigations and exploration, will be of great value in appraising requests for technical and financial assistance. In a few cases, at the request of Governments, technical co-operation projects were identified and draft project documents included in the report.

8. In analysing the financial requirements for exploration contained in the reports, three major categories of activities may be identified. The first category concerns the development and strengthening of the capacities of national governmental institutions for carrying out geological surveys and mapping; data storage, processing and analysis; and the training of national personnel, including the establishment or strengthening of university departments such as geology, geochemistry, geophysics and computer processing. The external financial requirements identified in this category include funds for scientific equipment, foreign technicians (especially for training programmes), and fellowships for overseas study. Nearly all the reports cover these requirements, which range from \$5 million to \$10 million or more per country over five-year period.

9. The second category of activities specified in the reports involves the carrying out of geological surveys and mapping, aerial photography, seismic surveys and limited exploration, including drilling, to identify and evaluate areas of good mineral or petroleum potential. Such activity is essential for planning more intensive exploration projects to be undertaken by the Government or foreign mining or petroleum companies. Since nearly all the countries covered in the reports hope to attract foreign mining and petroleum firms for the exploration and development

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of their mineral resources, considerable emphasis was placed in the reports on the development of information that would induce foreign investment. Second category activities are especially important for providing such information. Financial requirements for this category of exploration activity depends on the type of mineral resource to be investigated. The amounts indicated in the reports range from \$10 million per country for non-fuel minerals to over \$100 million for petroleum.

10. The third category involves intensive investigation of limited areas, including seismic surveys and multiple drilling, in the case of petroleum; geophysical and geochemical surveys and mapping, intensive drilling and trenching, and data analysis for the preparation of feasibility studies, in the case of mineral exploration. Estimates of financial requirements for this category depend upon the findings of the second category of investigations and may involve hundreds of millions of dollars per country.

11. This points up a serious difficulty faced by the technical consultants who prepared the reports. Only in few of the countries surveyed has enough preliminary investigation been undertaken to identify intensive exploration projects, and in many of the countries covered by the reports basic geological knowledge is lacking. Hence, for most of the estimates of financial requirements, the investigators were limited to assessing financial requirements for the first two categories. Only in a few cases, where intensive exploration projects could be identified or regarded as probable, was it possible to include financial requirements for the third category of activities.

12. In assessing requirements for the second category of investigations described above, the technical consultants reviewed the geological information available for the particular class of resources to which their reports were directed. In some cases, for example coal, it was found that the potential for discovering significant resources of commercial quality coal were quite limited, and either no expenditures or only limited expenditures were recommended by the investigators. In some of the reports on non-fuel minerals, the authors found little evidence of the existence of exploitable base metals and, therefore, recommended that investigations be limited to non-metallic minerals, where they were found to be relatively abundant.

13. The aggregated total financial requirements for the three categories of expenditures discussed above for the 22 countries for which reports are completed (see annex I) amount to between \$2,203 million and \$2,415 million (allowing for ranges given in some reports). <sup>1/</sup> In some cases the financial requirements estimated refer to external requirements, but in other cases no separation was made between internal and external requirements. In most cases the period covered is 10 years, but in several reports the expenditure is estimated for a period of less than 10 years, and in two cases for a period of 15 years. For four of the countries reviewed, the requirements are estimated at \$5 million or less, including two countries where they are estimated at less than \$3 million.

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<sup>1/</sup> In most cases these amounts refer to 1980 dollars. In some of the reports estimates of capital requirements for exploitation were given, but these estimates have not been included in the present report.

14. The aggregate financial requirements are highly concentrated, with six countries accounting for a little over 75 per cent of total projected requirements, i.e., Jamaica, Madagascar, Mozambique, Somalia, the Philippines and Thailand. Requirements for petroleum exploration accounted for 58 per cent of the total, covering eight countries, leaving 42 per cent for non-petroleum mineral exploration, geological surveys and mapping, and institutional improvement. In the case of most of the countries for which no petroleum surveys have been prepared, petroleum prospects were regarded by the investigators as poor. Notable exceptions include Egypt, Sri Lanka and Thailand, where substantial petroleum exploration is already taking place. One half or more of the approximately \$1.3 billion reported as required for petroleum exploration activities would properly fit into the third category of activities.

15. In the three reports that deal exclusively with coal, one recommends \$5 million for coal exploration (Swaziland), while two recommend no further expenditures (Lesotho and Botswana). In the case of Botswana, substantial coal exploration and development have been undertaken by foreign companies but for various reasons, major coal exploration was not anticipated in the foreseeable future.

16. There are 16 reports dealing mainly with non-fuel minerals (including uranium), of which 11 indicated financial requirements of less than \$50 million over a 10- or 15-year period. In these cases the requirements were mainly for the first and second categories of activities. Five of the reports on non-fuel minerals estimated financial requirements ranging from \$65 million to \$135 million (excluding uranium), and these included somewhat more intensive investigations of the type included in the third category of activities. The five countries covered are the Philippines (\$135 million), Thailand (\$130 million), Mozambique (\$90 million), Egypt (\$69 million), and Ethiopia (\$65 million).

17. The General Assembly, when it initially requested the Secretary-General to estimate financial requirements over the next 10 to 15 years for location and exploration of natural resources in developing countries which so indicated their interest, was concerned that an adequate flow of financing be available to permit developing countries effectively to discover, explore, conserve and develop their natural resources. The intent, therefore, was to determine a global estimate of the requirements of these countries. It should therefore be pointed out that the assessment of financial requirements in the field of natural resources exploration reflected in the reports prepared on these 22 countries does not provide a reliable basis for estimating global requirements for natural resources exploration for all developing countries over the next 10 to 15 years. In other words, it is not appropriate to regard the total financial requirements assessed in the reports on these countries as representing, say, one fifth of the total requirements for some 100 developing countries. The reasons for this are as follows: first, as has already been noted, some of the 22 countries covered by the 31 reports did not request assessments for all types of mineral resources, and in at least one case, Egypt, a planned report on petroleum has not been completed. For example, there was no report requested for Botswana's non-fuel minerals; yet it is anticipated that very large sums will be expended in exploring that country's diamond and base metal resources by mining companies now working in the country. Exploration requirements for Sri Lanka and Thailand, where several petroleum companies are

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currently exploring, would, if included, have raised total estimated requirements significantly.

18. A second reason is that in most cases the technical consultants preparing the reports did not attempt to project exploration expenditures that might prove warranted following the completion of second category investigations, since they had little basis for making such projections. A third reason is that adequate geological surveys have not been conducted in most of the countries covered by these reports, and both exploration and mineral exploitation have been limited. Petroleum exploration, including exploratory drilling have been minimal except for four countries: Egypt, Philippines, Sri Lanka and Thailand. Finally, on present knowledge of the geology and the factors that determine geologic potential, it would appear that the countries so far included in the assessment survey may have substantially less mineral and energy resource potential than the average for all developing countries. Production of these resources is of major importance in only five of the 22 countries for which reports were completed. Several are located in south-eastern Africa which has been notably lacking in petroleum, and some are volcanic islands with little or no natural resources other than possible thermal energy. Compared with the non-fuel mineral and petroleum resources of most Latin American, South East Asian and South Pacific countries, the resource potential of most of the countries covered by these reports would appear to be relatively poor.

19. Since virtually all the countries covered by the reports hope to attract foreign mining and petroleum companies for exploration and development of mineral resources, most of the reports provide summaries of the mining and petroleum codes and provisions of model contracts for foreign investors. In a few cases the investigators found that the governmental policies for attracting foreign capital had not been properly implemented by legislation or regulations, or that there were obvious flaws in the administrative aspects of the code. In one case it was pointed out that no provision had been made for the exploitation of natural gas when found by petroleum companies. This can be an important constraint since petroleum exploration often results in natural gas discoveries rather than petroleum. Inadequate infrastructure, including the absence of transportation facilities, were sometimes noted as a constraint on exploration. Another report mentioned that an exceptionally high royalty for the country's major non-fuel mineral resource was impeding investment.

20. In some countries exploration has been undertaken in the past by foreign mining and petroleum companies, but the companies departed as a consequence of unstable conditions. One report suggested that greater efforts should be made to attract foreign companies.

21. Most reports summarized past and current exploration activities financed by UNDP, the World Bank or foreign governmental agencies. For several countries fairly extensive studies have been made by various bilateral and multilateral agencies, but the United Nations investigators were unable to obtain access to these reports.

22. In considering the priority to be given to meeting the financial requirements for each of the three categories of geological and exploration activities described above, it seems clear that for virtually all the countries covered by these reports, priority should be given to the first and second categories in order to

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provide adequate geological surveys and to identify minerals and their location of occurrence. Only in this way can projects for intensive exploration be identified as candidates for foreign investment contracts, or for implementation by national government agencies with the co-operation of external technical assistance and development financing institutions.

### III. CONSIDERATION FOR POSSIBLE ACTION BY THE GENERAL ASSEMBLY

23. As stated in paragraph 17 above, aggregation of the requirements for exploration and location of energy and mineral resources based on 31 reports covering 22 countries is not amenable to extrapolation of global requirements in developing countries. The General Assembly may therefore wish to consider continuation of the programme to permit more information to be collected, 2/ to provide a larger and more representative data base from which a more valid global estimate of financial requirements for exploration and location of natural resources may be drawn. Although a number of developing countries have specifically indicated that they are not interested in being included in the global estimate, many more have simply not responded to the offer of a mission to assist them with the task. As the programme has been recognized as being of tangible value to the participating developing countries and has elicited interest in many others, it is probable that further requests would be forthcoming. If the General Assembly should so request, another enquiry could be directed to those who have not yet responded and assessment missions thereby subsequently requested organized within the existing regular programme of technical co-operation to approximately another 25 countries during the 1982-1983 biennium.

24. In this connexion, it may be noted that the United Nations and the World Bank have arranged to co-operate and co-ordinate activities in the energy sector in respect of these assessment missions. The United Nations programme dovetails into the World Bank energy sector reviews which help provide member Governments with impartial advice on energy questions, by identifying policy issues and priorities for action. In countries under common review by both agencies, missions are, where feasible, and in agreement with the respective Governments, combined or scheduled to the best interest of the country concerned.

25. Some of the information contained in the reports, if made more widely available, might prove useful in promoting and accelerating the flow of financial resources to the developing countries and thus meet one of the objectives in General Assembly resolution 32/176. The Assembly might therefore wish to consider suitable approaches to this end at this stage of this programme of multilateral development assistance for the exploration of natural resources. One option may be through dissemination of information, if the Government concerned concurs, in the form of short summaries of the data relating to the infrastructure of the country, its geology, status of its mining industry, exploration activity, exploration opportunities and the estimated financial requirements of the natural resources assessed. The summaries could be broad enough to inform investors, public and private, and bilateral and multilateral assistance sources,

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2/ In addition to the 33 pending missions and the 13 reports in preparation not included in the present preliminary analysis.

development banks and thus possibly to elicit offers of assistance or investment. These summaries could be distributed with the prior agreement of Governments, at no additional cost, through the Natural Resources Forum published by the Natural Resources and Energy Division of the Department of Technical Co-operation for Development as part of its programme of work.



ANNEX

Financial requirements for natural resources exploration  
by country and resource as at 1 June 1981

(millions of US dollars) a/

<u>Country</u>	<u>Reports completed</u>	<u>Petroleum and gas</u>	<u>Coal</u>	<u>Geothermal</u>	<u>Minerals</u>	<u>Other fuel minerals</u>	<u>Total</u>
Botswana	2	99-189	- <u>b/</u>	-	-	-	99-189
Cape Verde	2	-	-	4	10	-	14
Comoros	1	- <u>b/</u>	-	-	-	-	-
Djibouti	1	-	-	-	3	-	3
Egypt	1	- <u>c/</u>	-	-	69	-	69
Ethiopia	1	- <u>c/</u>	-	-	65	-	65
Ghana	1	- <u>c/</u>	-	-	30	-	30
Jamaica	2	92	-	-	20	-	112
Lesotho	2	-	- <u>b/</u>	-	8	32 <u>d/</u>	40
Madagascar	1	324	36	-	- <u>c/</u>	1 <u>e/</u>	361
Malawi	2	0	0	-	12	-	12
Mauritania	1	- <u>c/</u>	-	-	4	-	4
Mauritius	1	-	-	3	- <u>c/</u>	-	3
Mozambique	3	115-205	2	0	90	-	207-297
Nepal	1	- <u>c/</u>	-	-	38-70	-	38-70
Philippines	2	411	-	-	135	-	546
Seychelles	1	76	-	-	-	-	76
Somalia	2	175	-	-	35	-	210
Sri Lanka	1	- <u>c/</u>	-	-	18	-	18
Sudan	1	- <u>c/</u>	-	-	26	-	26
Swaziland	1	-	5	-	-	-	5
Thailand	1	-	-	-	130	135 <u>d/</u>	265
<b>Total</b>	<b><u>31</u></b>	<b><u>1 292-1 472</u></b>	<b><u>43</u></b>	<b><u>7</u></b>	<b><u>693-725</u></b>	<b><u>168</u></b>	<b><u>2 203-2 415</u></b>

Source: Estimates included in reports for designated resource: figures rounded.

a 0 indicates that magnitude is not zero but less than \$500,000.

b/ Mission completed; report recommends no expenditures.

c/ Missions pending.

d/ Uranium.

e/ Tar sands and heavy crudes.

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