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SUPPORT

OTHER FUNDS AND PROGRAMMES

UNITED NATIONS REVOLVING FUND FOR NATURAL RESOURCES EXPLORATION

Report of the Administrator

Summary

This report describes in detail the activities of the United Nations Revolving Fund for Natural Resources Exploration in 1985-1986 and is submitted in compliance with Economic and Social Council resolution 1762 (LIV), paragraph 1 (c) and conforms to biennial reporting established in General Assembly resolutions 36/200, paragraph 11, and 39/217. The report provides information on programme management, investment follow-up activities and additional funding for mineral and geothermal projects, complementing the annual report of the Administrator: main programme record, and UNDP-administered funds.

The financial presentation highlights the positive response of the Fund to co-financing initiatives. The need for new and higher levels of contributions to the Fund is brought to the attention of the Council.

I. PROGRAMME OVERVIEW

1. The overriding priority of the Fund in 1986 remained the broadening of the support base for its development efforts at a time when mineral exploration financing, world-wide, was at a low point. Pledges for 1987 were marginally higher than in 1986. While there is reason to be encouraged by the recent increase in donor support in the form of voluntary contributions, particularly the prospects for third-party co-financing, there is deep concern that the financial base of the Fund will not grow sufficiently to keep pace with growing project demand.

2. Many initiatives were taken during the year to promote the work of the Fund with a wide range of overseas development agencies, professional mining groups, mining companies and technical and service institutions in the geologic and related sciences. Such contacts now form the basis of a growing constituency with good prospects for supporting the Fund actively in the years ahead. Prospects are particularly promising for co-financing support of specific projects which would allow the Fund to allocate its own resources for additional projects.

3. In 1986 the Fund increased the number of its field operational projects to nine, its highest level, with five of its projects now in Africa. Programme expenditure obligations increased by 237 per cent over 1985.

4. The Fund began field operations in four new mineral exploration projects (Honduras, Côte d'Ivoire, Kenya (2nd Phase) and Rwanda). With the initiation of the geothermal exploration project in St. Lucia, 1986 became the year with the greatest number of new projects in the history of the Fund. The Fund also continued its new project development cycle, sending staff and specialized consultants to several countries which had expressed an interest in Fund participation in order to examine exploration possibilities, to evaluate available data and to discuss the operational system of the Fund with Governments. The project "pipeline" (included as Annex I) shows the effort to diversify exploration targets to include critical and industrial minerals and those with an application in high technology fields. In addition to export potential, more consideration is being given to domestic markets where there are large potential import substitution benefits and prospects for increases in agricultural and industrial productivity, including the mineral processing component of manufacturing.

5. On the world scene, metal prices with some important exceptions, continued to be depressed. There were further cutbacks in the exploration budgets, both domestic and overseas, of many countries with important mining traditions and there was a further reduction of new mining ventures. These developments and their implications for developing countries and for the Fund are being examined. The scope of this assessment is highlighted in this report.

6. With the present unfavourable world-wide investment climate in mining, one of the problems to be faced by the Fund is the difficulty, even with encouraging exploration results, of attracting follow-up activities, feasibility studies and the investment required in the developing countries. Potential investors, both

domestic and foreign, are limiting their activities to opportunities where risks are minimized and there is a relatively high level of confidence in the investment return over a relatively short time span. The result is that increasing exploration activity with highly encouraging results is now required to generate subsequent investment interest.

II. PROGRAMME ACTIVITIES

7. Preliminary results of detailed exploration activity were encouraging in the projects in Haiti, Peru, and Sierra Leone and detailed work continued in these countries in efforts to obtain more precise information. In Haiti, the drilling programme over the Faille B prospect defined a number of gold-bearing veins with potential economic value. Drilling is widely spaced, however, and there exists the difficulty of extrapolating between drill holes. Short of undertaking underground tunnelling the most cost effective manner in which to increase knowledge of the veins is additional surface stripping and close-spaced drilling in selected areas to permit a more accurate estimation of grade and tonnage. Representatives of several mining groups have shown interest in the area, the consensus being however, that additional exploration work, as outlined above, is required to raise the level of confidence of grade and tonnage estimates.

8. In Peru, the work programme in the Ananea area (Area 1), involved the excavation of 33 pits to a total depth of 191.6 metres and drilling for a total of 2,376 metres in six different zones. Heavy mineral concentrates of samples in Ananea and the gold content of concentrates determined by the project laboratory in Arequipa. The results of both pitting and drilling have already outlined zones of glacial moraine with economic grades and of sufficient volume. However, up to 3,000 metres of more detailed drilling, as well as extensive pilot testing, are needed before sufficient data will be available for more accurate calculations of reserves and other geologic and economic parameters. Given the geologic characteristics of this type of deposit, where gold is found at shallow depths, there is the advantage that reserves can be determined rapidly with a high statistical degree of confidence; the technical risks are therefore lower than in underground mining operations.

9. In Sierra Leone, field operations were concentrated in the Makona (North) area, where detailed soil sampling confirmed the previously detected soil anomalies. Additional pit and trench samples show only sub-economic grade gold mineralization confined to narrow quartz veins of limited extension. In the Mapoko area, a detailed soil grid was sampled; the results revealed only two low-grade anomalous zones. Results over the Yirisen preliminary soil grid are more promising. Anomalous gold values have been identified over a considerable strike length which remains open at the north end. Current work is directed to obtaining more information on the possible bedrock source, prior to taking a cost-benefit decision to undertake a more detailed exploration programme.

10. By the end of 1986, field work was well under way on the projects approved earlier in the year by Council decision 86/37 for projects in Honduras and in the

Côte d'Ivoire. The objective of the project in Honduras is to locate ore-grade precious and/or base metal mineralization in three zones: Quita Gana (Area I), Chantón (Area II) and Yuscarán (Area III). For logistical reasons the field work started in the Yuscarán area where geological mapping, geophysical surveys and clearance of old underground workings were first carried out. Results of these surveys indicated that diamond drilling was justified and a total of 3,000 metres of drilling was programmed. Of this amount, about 2,000 metres in 10 holes was completed by the end of 1986. The exploration results are promising and four drill intersections of the main Guayabillas structure show economic grade of precious metal mineralization along a strike length of about 500 metres. Mineralization remains still open at both ends and the deepest intersection shows the vertical extension of the mineralization to be at least 250 metres. When the proposed drilling programme and other exploration is completed in Yuscarán, the project will shift its activities to Quita Gana, Area I, where the exploration target is a skarn-type Zn-Cu deposit.

11. In the Côte d'Ivoire, stream sediment, panned concentrate and soil sampling was underway in areas considered to have a potential for Au and Cu-Zn mineralization.

12. In Rwanda, detailed mapping and soil sampling was carried out in two areas. A geophysical survey, to delineate better the targets in depth was undertaken prior to the year end. The project is a follow-up of regional and semi-detailed work carried out by UNDP/United Nations Department of Technical Co-operation for Development (UNDTCD) project in Area I and by Société minière du Rwanda (Somirwa)/Bureau de Recherches géologiques et minières (BRGM) in Area II.

13. Work started and was completed on the supplementary exploration programme in Kenya, approved in 1986. The work programme included 10 drillholes in the area known as Wire Hill. No economically significant mineralization was discovered. The final report is being prepared.

14. All the preparatory work was completed prior to initiating exploration drilling in St. Lucia, the first geothermal exploration of the Fund. It became necessary to increase the Fund contribution towards the budget in the St. Lucia project by more than \$500,000, given the increased costs associated with the unforeseen complex technical logistics for the development of this project in an island nation. All major contracts were awarded; all major work prior to drilling was completed in 1986. The drilling of two exploratory wells to an approximate depth of 2,000 metres each will begin in the first quarter of 1987.

15. Regarding the geothermal exploration project in Mexico, the Project Agreement was ratified by the Government, setting the stage for preparation of the detailed work programme. Field work is expected to begin in Mexico by mid 1987.

16. With regard to follow-up investment initiatives, evaluation of the usefulness of crushed shell/phosphorite for direct application as soil treatment and fertilizer was completed at the Loudima (Congo) agricultural station. Impressive peanut yields have resulted from crushed shell/phosphorite with the addition of one

ton crushed shell per hectare resulting in a 17 per cent yield increase. Five tons per hectare produced an impressive 41 per cent increase in peanut yield. A crushed shell/phosphorite application of one ton per hectare resulted in a yield increase of 72.7 per cent in corn.

17. Field tests show that the crushed shell rapidly increased soil pH to desirable levels for plant growth and maintained them over two growth cycles. The shell/phosphorite additions reduced soil acidity, toxic aluminum and manganese, as well as effectively providing the essential plant nutrients calcium and phosphorus in large amounts and other plant nutrients in lesser amounts. The mixture was prepared from a bulk sample collected offshore of Pointe Noire. It has therefore been demonstrated that the utilization of such a mixture in agricultural production in the Congo could have a major positive impact on sustained, increased production. Such results, moreover, suggest the possible doubling of the offshore exploitable reserves so far indicated, as the shell fraction could be added to the phosphorite for agricultural purposes. Further work aimed at increasing off-shore reserves will take place in 1987 as part of a comprehensive feasibility study. Joint financing in the amount of approximately \$300,000 is being discussed with the Government of France.

18. The final report on the kaolin deposit discovered in Benin was submitted to the Government. The most favourable zone, known as Adakplamé, has good quality, easily accessible kaolin clay reserves estimated at one million tons. With this quality and quantity of reserves, there would appear to be a potential for the profitable local manufacture of industrial ceramic wares for domestic use and for export to West African markets. The Fund has offered to assist the Government in efforts to attract interest in carrying out a feasibility study with potential follow-up investment.

19. The invitation for international bidding in early 1986 for the precious metal mineralization in Argentina was not successful, as no bids were received. Informal contacts by the Fund with some of the mining companies that purchased the bidding documentation indicated that, while recognizing the very encouraging exploration results and the possible economic potential of the mineralization discovered, the technical and financial risks were considered too high, given the present state of knowledge of the deposit, for them to comply with the feasibility study and financial investment conditions stipulated by the Government.

20. An additional \$375,000 allocation to the project in Argentina, which has been requested for technical appraisal by the advisory body of the Fund, the Joint Operations Group, is supportive of a new Government plan of up to \$4 million for additional exploration work and feasibility study on the Huemules precious metals deposit with a view to bringing this deposit to the development stages. The Fund contribution supports an additional 2,000 metres of drilling to provide more information of the lateral and vertical continuation of the discovered mineralization in order to provide reserve estimates with greater reliability, and, it is hoped to attract mining development financing.

21. With its reduced funding capacity, the Fund limited further new commitments after the June Council session to additional funding requirements in St. Lucia 1/ and initiated the consultation for additional funding in Argentina. 2/

III. FINANCE AND MANAGEMENT

22. The financial picture of the Fund is presented in Annexes II and III. Given the fact that all the financial resource availability of the Fund for new approvals was allocated in 1986, a continuous annual flow of new funds is required in order to approve new projects. Notwithstanding funding limitations, it is essential to continue the identification of new project proposals which require considerable lead time before potential technical and economic viability can be determined, and complementary co-financing possibilities can be investigated.

23. Over the last several years, the administrative budget of the Fund has been stable and the number of headquarters posts has remained the same. This has been the case despite the fact that the number of active projects has increased dramatically and that the Fund has assumed responsibility for managing large co-financing contributions. Headquarters staffing will be kept under constant review and will be adjusted in accordance with the needs of the programme.

24. For planning purposes, the Fund can count on from approximately \$2.5 to \$3.5 million for new approvals from its own resources in 1987. It is also negotiating for another \$4 million in co-financing. Depending on co-financing success, the Fund can approve from one to three new mineral exploration projects in 1987.

25. The Fund will also continue the identification and appraisal process of 10-15 possible new projects as well as provide, at the request of Governments, investment follow-up co-operation on successful completed projects. Given the high costs of geothermal exploration, the Fund can consider new project appraisals only if major co-financing interests materialize. Several potential donors have expressed interest in project development in specific countries. The Fund will follow up with a limited number of field appraisal missions and discussions with potential donors with a 1988 target for a new geothermal project approval.

26. The many financial, technical and other uncertainties associated with new exploration project development have been a long-standing preoccupation of the Fund. The more recent financial constraints have only accentuated this concern. Considerable time, manpower and costs go into the assessment of numerous possible project proposals without knowing in advance whether any given proposal will measure up to the project selection criteria of the Fund or to what extent funding will become available to finance new projects.

27. Despite these uncertainties, the Fund will continue an active project development policy in response to the growing demand from the developing countries for its specialized and unique services. Given the high risk nature of exploration and the more well-selected projects, the Fund has in its portfolio, the greater the number of potential "successes". The Fund continues the quest for increasing financial support while also searching for innovative means to meet this demand to the maximum extent possible.

28. Serious financial constraints have further motivated the Fund to seek more vigorously additional means to finance exploration projects. As noted above, co-financing is an important complementary funding source allowing for the pooling

of resources in a joint work programme, thereby reducing total exploration costs to the Fund and extending its financial capacity to co-operate with a greater number of developing countries. Financing through Management Services is working successfully in the St. Lucia geothermal exploration project with the United States Agency for International Development (USAID). Important agreements with other donors are in the negotiation stage.

29. Co-financing possibilities will obviously play a role in the project selection process. While there are diverse priorities and interests among potential third party donors, there most probably will be a preference for co-operating with the Fund in the lower per capita income countries.

30. The Fund and the Governments of China and Italy reached a tentative agreement in 1986 to co-finance a pyrophyllite exploration project in Fujian Province in China. The exploration potential of the two areas selected is considered to be good. The delimitation of the exploitable ore within the known occurrences and subsequent development of any economic mineralization found during the course of the work of the Fund would definitely prove beneficial to the economic development of Fujian Province and could be followed up rapidly through the Provincial Mining Organization. Pyrophyllite is a commodity with numerous industrial uses whose local demand is steadily growing and which could be saleable on foreign exchange markets.

31. Co-financing of a geothermal exploration project in the Yunnan Province in China is also under consideration. In the target area, surface hot water is 96.6 degrees centigrade and isotopic geothermometers show 240 degrees centigrade. Should a co-financed project be developed, emphasis would be placed on electric power production with multi-purpose utilization also under consideration.

32. In 1986 the Fund also investigated possibilities with potential donors for receiving expert and consultant services in kind. The response was very encouraging and the details are being worked out with several potential donors for the institutional financial arrangements and the matching of available expertise for specific Fund project requirements. Also for the first time in 1986 the Fund made use of the United Nations Volunteers (UNV) system in a project in Rwanda and it is making plans to utilize the Associate Expert Scheme, both excellent means to make use of young professional talent in exploration geology and related fields.

33. The difficult financial climate demands closer Fund scrutiny of cost/benefit estimates at the several key decision-making points in the project development cycle. The Fund, for example, is looking for new projects as far advanced as possible in the exploration cycle where considerable reconnaissance work has already taken place, thus permitting rapid target selection for detailed exploration and evaluation work. Risks as well as costs are thereby reduced.

34. Once a project becomes field-operational it is incumbent on management, whenever possible, to spend less than the maximum approved allocation. The Fund therefore is stressing the importance of monitoring and assessing technical results and their potential economic significance, deciding to terminate work where results are not sufficiently encouraging to warrant additional Fund expenditures.

35. Where results are encouraging, the Fund endorses association of potential investors at the earliest possible stage in further work. This has been difficult to accomplish, since in several Fund projects with promising results, exploration risks have either been considered as still too high to attract other financing and investment interests, or the financial investment conditions stipulated by the Government have not been attractive to the private sector.

36. The Fund therefore has decided in several cases to continue with exploration work and additional expenditures beyond the point where it would have liked to withdraw in favor of private or public mining development interests. To do otherwise would be to abandon indefinitely the potential benefits to the recipient country, as well as to the Fund.

37. At each stage in the exploration cycle, the objective of the Fund for the activities it plans to undertake is a more reliable assessment of potential economic viability leading down the line to mining investment and production at a level which attains "profitability" in the traditional financial sense of the term. Risk factor analysis by the private sector and the balancing of financial requirements with potential returns becomes an integral part of the investment decision process.

38. With respect to replenishment, when the Fund was established the Expert Group estimated that it would take 20-25 years for the Fund to receive a substantial part of its financing from replenishment contributions from solid minerals projects. The Expert Group also predicted that the first replenishment of the Fund should occur approximately 10 years after the beginning of operations if operations were to progress smoothly. Ten years have now passed and, notwithstanding the depressed market for minerals, the Fund estimates that four of its successful projects could be approaching the production stage: Ecuador (silver); Argentina (gold and silver); Congo (phosphates); Benin (kaolin). The Fund might therefore receive its first replenishment contribution in the not-too-distant future.

39. It is important for the Fund to assess how it can better fulfil its mandate. In so doing, it must take into account the realities of mineral exploration and mining investment, the financial resources available to the Fund and the priorities of the developing countries, as well as the investment interests of the industrialized nations. The Fund has commissioned a study to examine a number of relevant issues including project selection criteria, implementation procedures and financing arrangements, as well as the commodity price outlook in the years ahead.

40. With regard to future projects, the Fund currently has 12 invitations to undertake projects in various countries. Action is being taken to evaluate each of these possible projects with a view to identifying the most attractive in terms of the individual country and Fund interests. Attention is being focused on broadening the geographical distribution of projects. Particular emphasis is being given to undertaking projects in Asia and the Far East. Similarly active consideration is being given to broadening the range of deposit types being sought to include critical and industrial minerals, given the increasing demand for these commodities.

Notes

1/ Approved under the Minimum Work authority of the Administrator and reported to the Council (DP/NRE/PROJECTS/).

2/ Approved under the supplementary funding authority of the Administrator and reported to the Council (DP/NRE/PROJECTS/).

Annex I

PIPELINE PROJECTS

Country	Principal Targets	Status
CHINA	Pyrophyllite	Evaluatory missions were completed and a Project Recommendation was prepared. Following comments from the Government, modifications will be made to the Project Recommendations. Estimated date of signature is approximately mid-1987. Sources of co-financing funds were actively followed-up.
DOMINICAN REPUBLIC	Gold, Manganese	Evaluation mission mounted to assess potential projects offered to the Fund. Field evaluation will be undertaken in the first quarter of 1987 in order to prepare a Project Recommendation.
GHANA	Gold	Official request was received from the Government for Fund to explore for gold and diamonds. Evaluatory mission identified potential targets which will be assessed in the field during the first two months of 1987.
GUATEMALA	Gold	Project Recommendation being revised to include new area, previously excluded. Following review of new drillhole information, Government informed of Fund willingness to finance project. Fund is awaiting Government response.
KENYA	Zinc, lead	Project request for the exploration of sedimentary Pb-Zn prospects in the coastal ranges was evaluated during December 1986. A further specialized mission was suggested for early 1987 in order to prepare a Project Recommendation. Sources of co-financing are being investigated.

Country	Principal Targets	Status
PHILIPPINES	Gold, Chromium	Gold prospects were evaluated positively during the last quarter of 1986. Chromium possibilities are to be investigated during an evaluatory mission scheduled for the first quarter of 1987.
SRI LANKA	Titanium	An official project request was received for the evaluation of titanium bearing heavy mineral sands in southern Sri Lanka. An evaluatory mission by a specialized consultant will be carried out in the first quarter of 1987.
ST. LUCIA	Gold	Gold prospects identified through regional geochemical survey covering the island, were offered to the Fund for consideration. An evaluatory mission is scheduled for early 1987.
TANZANIA	Gold and other minerals	A project identification mission was completed in December 1986. The Fund is now awaiting an official request from the Government.
ZIMBABWE	Gold, Tungsten, other minerals	A project request is awaited following a project identification mission in November 1987. On receipt of the official request an evaluatory mission will be scheduled.

UNITED NATIONS REVOLVING FUND FOR NATURAL RESOURCES EXPLORATION

RESOURCE AVAILABILITY AND UTILIZATION

(in millions of US dollars)

	ACTUAL			ESTIMATED	
	1984	1985	1986	1987	1988
I. <u>Availability of resources:</u>					
Balance as at 1 January -	16.7	13.6	15.3	8.6	8.7
Additional resources received -					
Voluntary contributions <u>a/</u>	.2	4.4	.4	5.0	3.7
Interest and other income <u>h/</u>	1.8	1.2	1.2	1.0	1.0
	2.0	5.6	1.6	6.0	4.7
TOTAL	18.7	19.2	16.9	14.6	13.4
II. <u>Utilization of resources:</u>					
Project expenditure <u>b/</u>	3.8	2.6	6.9	4.5	4.0
Programme support and administrative services costs	1.3	1.3	1.4	1.4	1.4
TOTAL	5.1	3.9	8.3	5.9	5.4
III. <u>Balance of resources as at 31 December:</u>					
General resources	13.6	15.3	8.6	8.7	8.0
TOTAL	13.6	15.3	8.6	8.7	8.0
IV. <u>Resources available for further programming:</u>					
General resources as at 31 December (as in III above)	13.6	15.3	8.6	8.7	8.0
<u>Less:</u> Unspent project allocations	4.5	13.8	11.4 <u>a/</u>	7.0 <u>e/</u>	3.2 <u>f/</u>
Balance available as at 31 December	9.1 <u>c/</u>	1.5	(2.8) <u>g/</u>	1.7	4.8

(Footnotes on following page)

(Footnotes to Annex II)

- a/ Includes \$.15 in 1983 in the form of co-financing.
- b/ Includes pre-project expenditures.
- c/ Revised from presentations to the Council in prior years in order to maintain the uniformity of the calculations.
- d/ Based on estimate of total projected expenditures on approved projects whenever reliable estimate can be made or the maximum allocation approved by Governing Council minus the average per cent under expenditure on field work completed projects: 19 per cent.
- e/ 1986 unspent project allocations of \$11.0 million plus \$.4 million in additional approved allocations for Argentina in 1987 minus project expenditures of \$4.0 million in 1987.
- f/ 1987 unspent project allocations of \$7.0 million minus project expenditures of \$3.8 million in 1987.
- g/ Exclude 1986 \$2 million unpaid pledge for Japan.
- h/ Includes payment of 65,000 management services fee (USAID) in 1986.

Annex III

UNITED NATIONS REVOLVING FUND FOR NATURAL RESOURCES EXPLORATION
CONTRIBUTIONS RECEIVED IN 1986

(in millions of US dollars)

Voluntary contributions

For 1986 and prior years

<u>Donor</u>	<u>Balance</u> <u>31 December 1985</u>	<u>Additions</u> <u>and</u> <u>adjustments</u>	<u>Collected</u>	<u>Balance</u> <u>31 December 1986</u>	<u>Pledges</u> <u>for 1987</u>
Bangladesh	1 210	3	1 213	-	1 210
Benin	500	-	500	-	-
Burundi	877	(71)	-	806	-
Chile	5 000	-	5 000	-	5 000
Indonesia	10 000	-	10 000	-	10 000
Iraq	21 290	-	-	21 290	-
Japan	-	2 000 000	-	2 000 000	- <u>a/</u>
Kenya	-	-	-	-	20 000
New Zealand	-	260 417	-	260 417	-
Norway	747 356 <u>b/</u>	51 655	401 660	397 351 <u>c/</u>	- <u>c/</u>
Panama	1 000	-	-	1 000	-
Rwanda	500	-	-	500	-
St. Lucia	5 000	-	-	5 000	-
Sierra Leone	472	(396)	-	76	-
Zaire	500	-	-	500	-
TOTAL	793 705	2 311 608	418 373	2 686 940	36 210 <u>a/</u>

a/ Anticipated pledge of \$2,000,000.

b/ Pledge for 1986 and 1987.

c/ Pledge for 1987.

d/ Exclude (c/).