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UNITED NATIONS REVOLVING FUND FOR NATURAL RESOURCES EXPLORATION

PROJECT RECOMMENDATION BY THE ADMINISTRATOR

Mineral Exploration in the Adrar Des Iforas  
(MLI/NR/78/001)

1. Background

1. The Republic of Mali, with a per capita income of slightly over \$100 per annum, is one of the poorest of the least developed countries. It is a large, very sparsely populated country with an area of 1.24 million square kilometres, and a 1976 census of 6.31 million representing a population density of five persons per square kilometre. Adrar des Iforas, in the north-eastern, arid part of the country, has some 20,000 inhabitants, mostly nomads, and a population density of about one person per ten square kilometres.

2. Mali has considerable resources of iron and manganese ore, bauxite and phosphate but the development of mineral potential is inhibited by remote, landlocked locations and an almost total lack of necessary infrastructure. There is no industrial-scale mineral exploration in the country to date.

3. In 1978, the Revolving Fund began discussions with the Direction Nationales de la Géologie et des Mines (DNGM) about the possibilities of developing a viable mineral exploration project. After an initial mission, the Adrar des Iforas region was judged to have a good potential for mineral development. In December 1979, an expert evaluatory team, on behalf of the Revolving Fund, visited and assessed the most promising areas. It has been concluded that production of high unit value minerals (i.e. sources of niobium, rare earths, tin, tantalum and tungsten) would have the best chance to sustain the costs related to the remoteness and climatic vigours of the area and should justify the required infrastructure. An exploitable mineral discovery in this part of the country which, at present, produces virtually nothing, could have a significant impact on the national economy as evidenced by the example of the uranium and tin mining under similar conditions in neighbouring Niger.

4. Parts of the Adrar des Iforas region have been subject to airborne radiometric and magnetic surveys by a joint venture partnership between the "Direction Nationale de la Géologie et des Mines" of Mali and a group of Japanese interests. This programme, however, has been restricted to the search for uranium. In the past few years, the University of Montpellier (France) has been carrying out general geological survey work in this region.

5. The proposed project is considered to have potential economic viability. Both markets and prices for niobium, rare earths, tin and tantalum (or tungsten) have ranged from favourable to very favourable over the past few years and show a good potential for further growth. The carbonatite bodies in the Tadhak zone (Project Area 1), examined during the evaluatory mission, have been identified as unusually rich in rare earths and niobium.

6. In the Air region of Niger, alkaline complexes similar to those of Tessalit and Kidal, carry tin and high tantalum columbite mineralization. In 1979, 1,800 tons of tin concentrate were produced from alluvial deposits.

7. The Trans-Saharan highway now under construction will run, when completed, through the Adrar des Iforas region. It will substantially improve the outlook for commercial exploitation of minerals. Any ore discovery would certainly accelerate the development of this remote desertic region and be beneficial to the Republic of Mali.

## II. The project

8. The proposal is made here to carry out a reconnaissance exploration in three areas of the Adrar des Iforas region over a surface of about 15,000 square kilometres. The selected areas are believed to offer the best mineral potential under present economic circumstances.

9. The objective of the proposed reconnaissance work will be to identify and assess niobium and rare earth mineralization in carbonatites and tin and tantalum mineralization related to alkaline intrusive complexes.

10. The three project areas are defined by the following co-ordinates:

Area I:	Tadhak Zone	(Carbonatites at In Immanal and Oued Anezrouf)
		Longitude: 00° 10'E to 00deg 15'E
		Latitude : 19° 50'N to 21deg 00'N
Area II:	Tessalit Zone	(Alkaline granites)
		Longitude: 00° 55'E to 01° 20'E
		Latitude : 20° 00'N to 20° 20'N

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Area III: Midal Zone

(Alkaline ring complex)

Longitude: 00° 55'E to 01° 20'E

Latitude : 18° 20'N to 19° 10'N

Proposed work programme: Project Area I (Niobium and Rares Earths):

(a) Delineation of boundaries and dimensions of potential carbonatites by detailed geological mapping, petrographic examination and ground radiometric and magnetic surveys.

(b) Identification of mineralized zones by rock geochemistry, petrographic examination and ground radiometric and magnetic surveys.

(c) Preliminary checking of grades by surface sampling, trenching and pitting.

(d) Diamond drilling of selected targets to determine mineral distribution patterns to depths of about  $\pm$  100m.

(e) Assay work and mineral analyses of samples processed in the field to be carried out by specialized laboratories.

(f) Interpretation and re-assessment of airborne radiometric and magnetic geophysical data covering the Tadhak project area (Data flown by PNC)

Proposed work programme: Project Areas II and III (Tin, Tantalum):

(a) Identification of potential intrusives and primary mineralization by detailed geological mapping, petrographic examination and rock geochemistry.

(b) Systematic geochemical silt sampling of the relevant drainages.

(c) Testing of alluvium for heavy minerals by pitting and panning.

11. The Minimum Work Programme described above was approved by the Administrator in January 1981 and is to last approximately two years. Its cost is estimated at \$1,300,000.

12. In order to expand the options of the proposed reconnaissance, relevant airborne radiometric and magnetic data produced by the uranium exploration joint venture (PNC) will be sought from the Government. This data will be essential for the search of additional carbonatite bodies and for a more precise outline of those already known.

13. Valuable geological information, pertinent to the project areas, has been obtained from Montpellier University scientists. Co-operation with this group will be further maintained and, if required, arrangements may be made for their consulting services.

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14. If the results of the Minimum Work justify a follow-up, it is estimated that further exploration, needed to assess the eventual ore deposits and indicate their commercial feasibility, will cost about \$1,500,000. The follow-up programme would include mainly diamond drilling, limited underground exploration, reserve estimation, metallurgical testing and market surveys. This would bring the total possible expenditure for this project to the equivalent of \$2,800,000. Further activities which may be required beyond the Minimum Work will only be carried out if justified according to the Fund's operational procedures.

### III. Financial data

15.	<u>Revolving Fund allocation</u>	<u>\$</u>
	Minimum Work	1 300 000
	Possible additional expenditures for further activities following the Minimum Work	1 500 000
	Total possible cost of the project	<u>2 800 000</u>

The financial assets of the Fund are adequate to meet the cost of the Minimum Work Programme.

### IV. Recommendation

17. The Administrator recommends that:

The Governing Council,

(a) Note the approval by the Administrator of the Minimum Work for the project Mineral Exploration in the Adrar Des Iforas (MLI/NR/78/001) at a cost of \$1,300,000, as an obligation of the United Nations Revolving Fund for Natural Resources Exploration;

(b) Approve this project involving a total possible expenditure of \$2,800,000;

(c) Decide that this approval shall be cancelled unless the Government of Mali and the Fund shall have signed a Project Agreement within a period of nine months after the date of approval of the Minimum Work, it being understood that the Governing Council shall be notified of any such cancellation at the Council's first session after such action has been taken.