

Japan International Cooperation Agency

Steering Committee of the Study on the Strategic Plan of
Mineral Resources Development in the Islamic Republic of Mauritania

**The Study on the Strategic Plan of
Mineral Resources Development
in
The Islamic Republic of Mauritania
Final Report**

March 2006

**Japan International Cooperation Agency
Economic Development Department**

ED
JR
06-003

Preface

In response to a request from the Government of the Islamic Republic of Mauritania, the Government of Japan decided to carry out the Study on the Strategic Development Plan for Mineral Resources in that country. The study was implemented by JICA, the Japan International Cooperation Agency.

For a total of 7 times between October 2003 and March 2006, JICA dispatched to Mauritania survey teams comprised of members from Mitsui Mineral Development Engineering Co., Ltd., including Team Leader Yuji Nishikawa; Norwest Corporation Ltd.; and Project Environment Co., Ltd.

On-site surveys were conducted with the cooperation of relevant Mauritanian government officials, then the team members returned to their respective home countries where they worked to complete this report.

It is our hope that the present report will help to promote this study and will serve as a vehicle for strengthening friendly relations between Japan and Mauritania.

In closing, we would like to express our sincere gratitude to everyone who helped to make this report possible.

March 2006

Tadashi IZAWA
Vice President
Japan International Cooperation Agency

March 2006

Mr. Tadashi IZAWA
Vice President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

It is with great pleasure that we submit to you this final report on the Study on the Strategic Development Plan for Mineral Resources in the Islamic Republic of Mauritania.

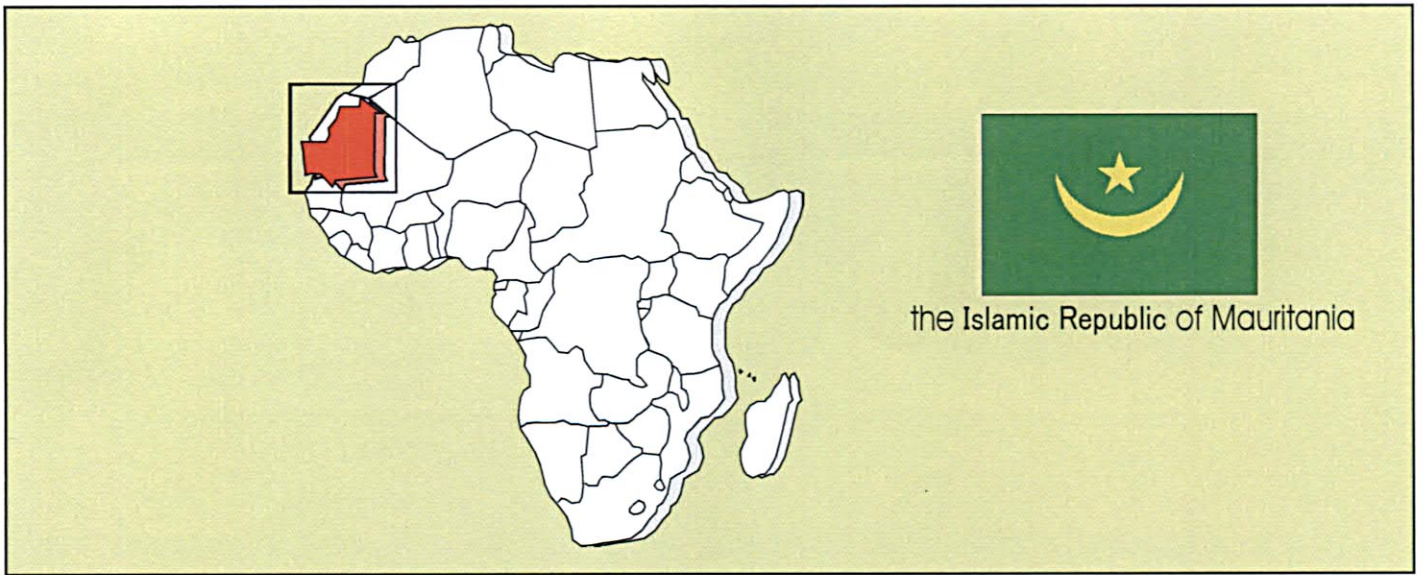
This study was conducted by Mitsui Mineral Development Engineering Co., Ltd. under contract with your organization for a 30-month period from October 2003 to March 2005. This report was compiled to promote the mining industry in Mauritania and to formulate a strategic development plan that will promote exploration to increase the accuracy of data on that country's mineral resources potential.

The strategic development plan proposes a practical strategy and development targets, and provides an effective action program to attract investment from the private sector. Attracting foreign investment, and advancing and promoting exploration, development, and the mining industry in general, are very important to the overall social and economic development of the Islamic Republic of Mauritania. As such, it our expressed desire that the Mauritanian Government make it a top priority to bring this plan to fruition.

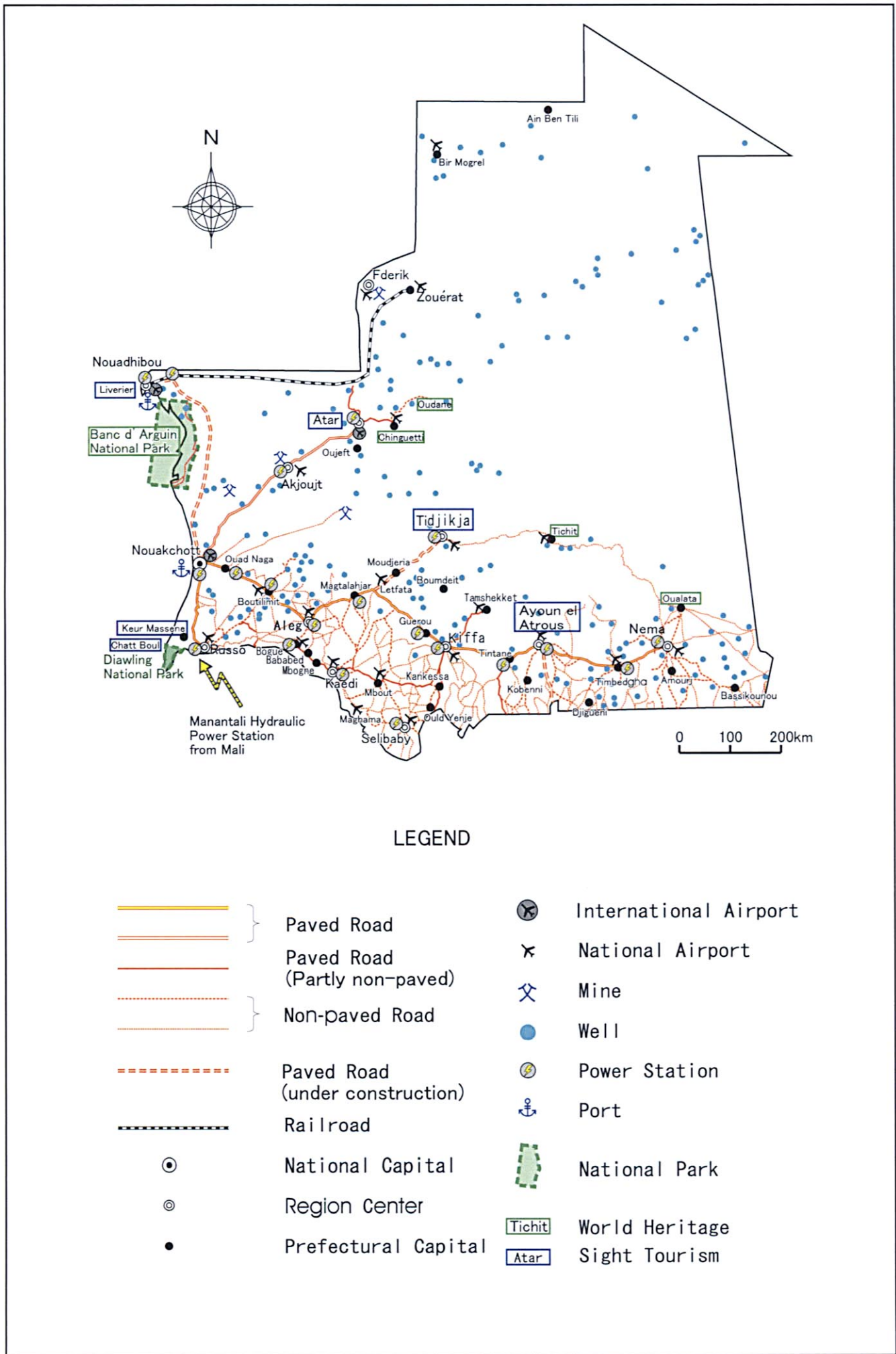
In closing, we would like to express our sincere gratitude to your organization, the Japanese Ministry of Foreign Affairs, and the Ministry of Economy, Trade and Industry for your support and guidance with this project. We would also like to thank the Mauritanian government, the Ministry of Mining and Industry, the Ministry of Economic Development, the Mauritanian Geological Survey, and everyone else who provided their services to assist us with the study.

Yuji Nishikawa
Team Leader

Survey Team for Mineral Resources Strategic Development Plan
for the Islamic Republic of Mauritania



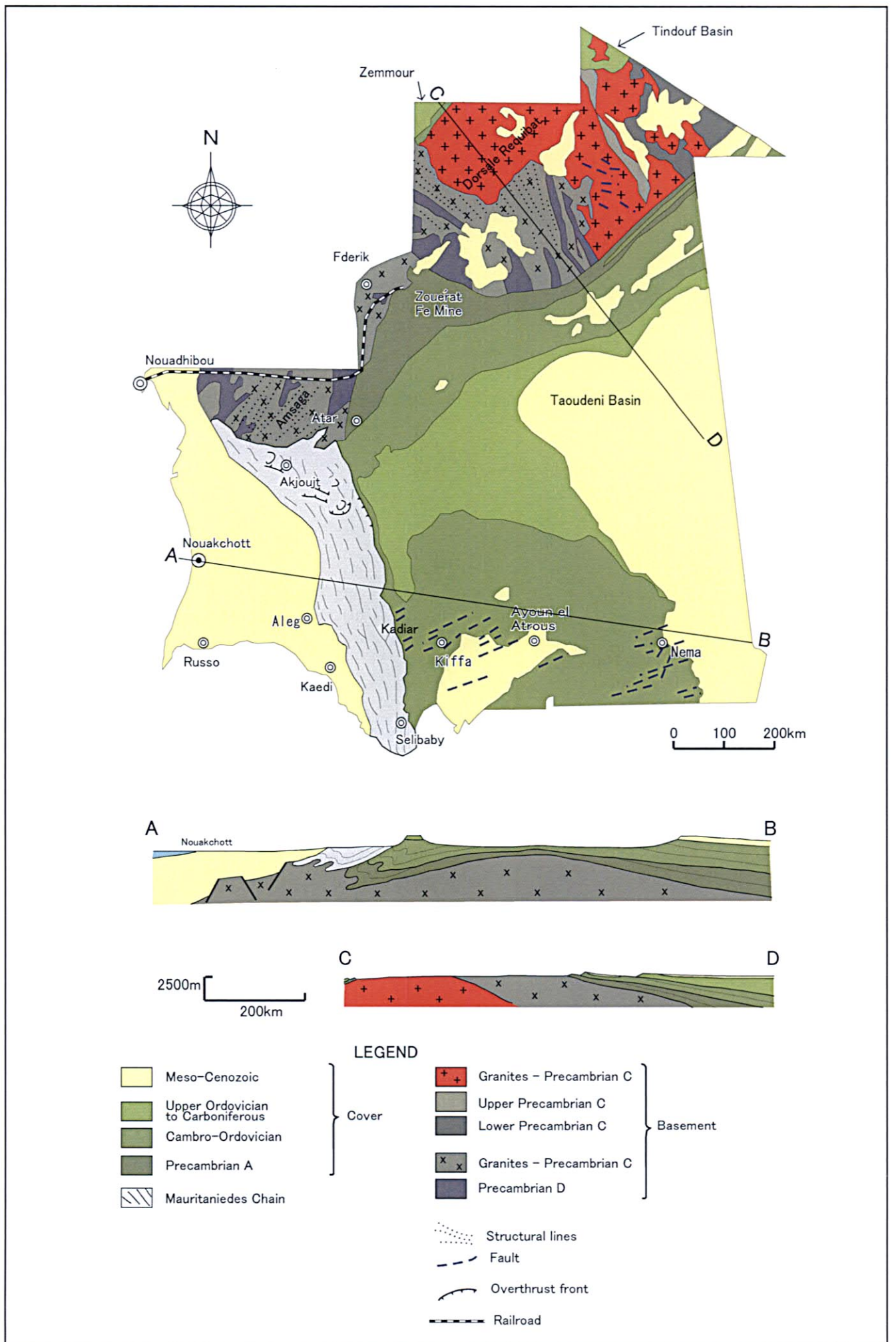
Location Map of the Islamic Republic of Mauritania



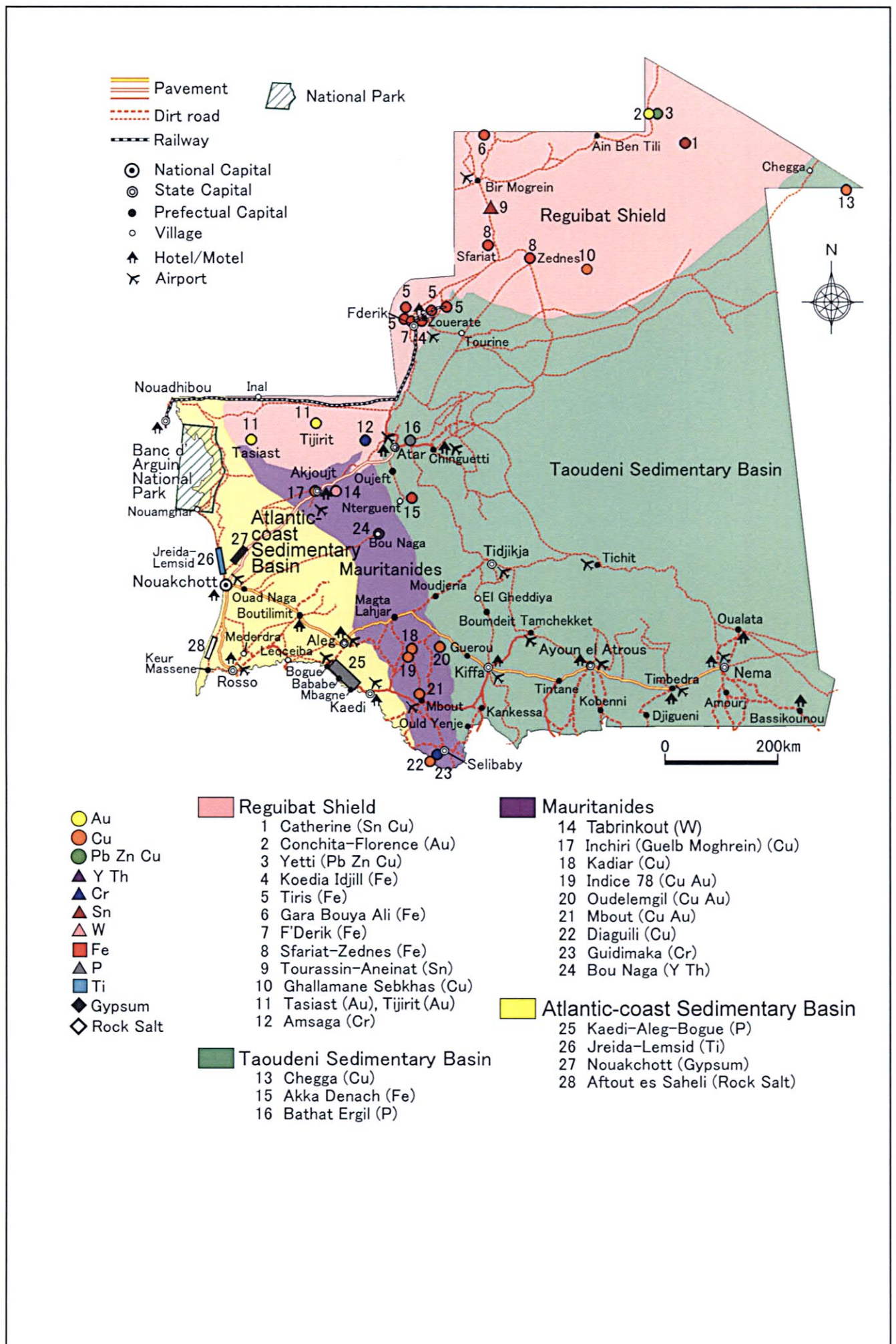
LEGEND

- | | | | |
|--|---------------------------------|--|-----------------------|
| | } Paved Road | | International Airport |
| | | | National Airport |
| | } Non-paved Road | | Mine |
| | | | Well |
| | Paved Road (under construction) | | Power Station |
| | Railroad | | Port |
| | National Capital | | National Park |
| | Region Center | | World Heritage |
| | Prefectural Capital | | Sight Tourism |

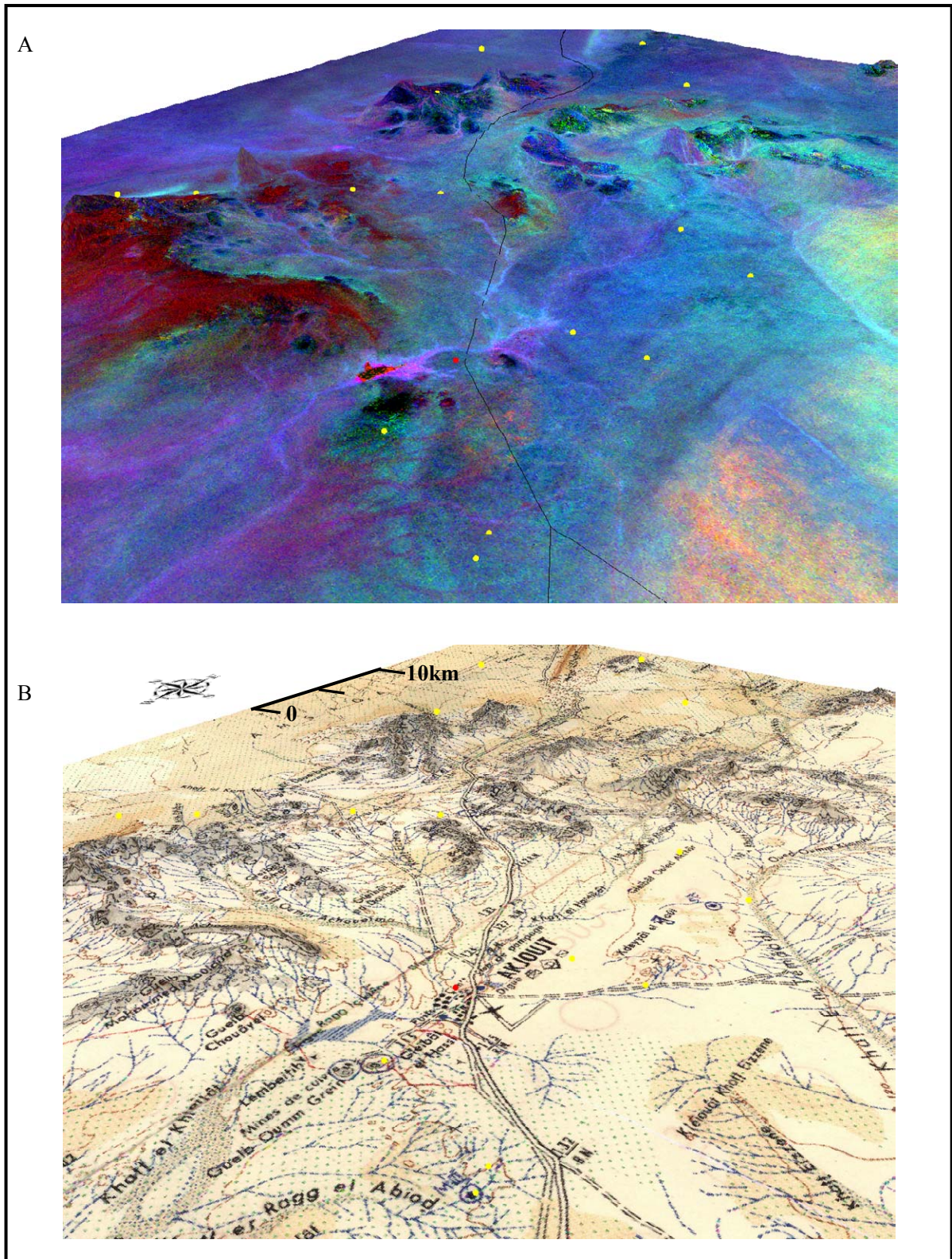
Infrastructure Map of Mauritania



Geological Map of the Mauritania



Distribution Map of Mineral Deposits and Manifestations of Mauritania



Three dimensional view using processed satellite imagery and topographical map of Akjoujt area *

A) Satellite imagery data : Landsat **, yellow points: mineral occurrences, curve : road data ***

B) Topographical map : 1/200,000 ***

* Elevation data : ASTER DEM ** Abrams rationing *** based on PRISM database



Open pit at the Akjoujt mine (Guelb Moghrein deposit). Having a small diameter of 400m S-N (left to right in the photo) and large diameter of 500m E-W, the mine was excavated until 1978. Currently, it is closed.





Camp scene at the Tijirit deposit survey site. Workers live in tents, and water and food have to be brought in.

Camp scene at the Tasiast deposit Survey site. This is the exploration base for the Tasiast Gold Company. There are no developed roads leading to the site, and it is a roughly 100km ride across sand to the nearest national highway.




Views of Deposit Areas

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The Mauritanian Office for Geological Exploration Search

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Kedia Djil © OMRG

About this Web Site

This web was created in March 2005 as foundation information to promote mining opportunities in Mauritania to the widest international audience possible. The Mauritanian office for Geological Exploration (OMRG), Islamic Republic of Mauritania, is responsible for geological exploration for mining fields within Mauritania and intends to use this web site as the main public archive for disclosure of mineral resource information, covering related background information and documents concerning exploration and mining activities.

The government of Mauritania considers its mining sector as the backbone of the country's economy. Active investment is seen as a key driver for growth in this sector. On behalf of the Mauritanian government would like to encourage everyone to examine the opportunities to participate in Mauritania's growing mineral industry.

This web site has been built as a part of the project "Work on the Strategic Plan of Mineral Resources Development" financed by [the Japan International Cooperation Agency \(JICA\)](#).

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OMRG website Top Page (<http://www.omrg-mining.mr>)



الجمهورية الإسلامية الموريتانية
 شرف - بناء - عدالة
Republique Islamique de Mauritanie
 Honneur - Progrès - Justice

وزارة المعادن والصناعة
Ministère des Mines et de l'Industrie



Mohamed Ould Ismail Abdou
 Minister of Mines and Industry

GREETING OF THE MINISTER

I am very pleased to announce the launch of a new Website by the OMRG, the Mauritanian Office for Geological Exploration, for promotion of the Mauritanian mining sector. The Ministry of Mines and Industry (MMI) deals with all mining sector activities, of which the OMRG is an important component dedicated to geological exploration and minerals research. The OMRG website provides a wealth of information intended to satisfy the needs of both international and domestic stakeholders.

Since Mauritania gained independence in 1960, the mining sector has always been an engine of the country's economy. For nearly 50 years, iron ore mining managed by the state-owned company SOM has dominated the Mauritanian mining scene. The Mauritanian Government now assigns a high priority to the sector due to clear evidence of substantial mineral potential. Recently, significant measures to promote growth in the mining sector have been implemented, including:

- a review and update of current mining legislation;
- establishment of a modern and legally binding mining code;
- creation of a GIS database to ensure centralized archiving, processing, updating and distribution of data needed by potential investors;
- reinforcement of public sector capacity and the government institutions responsible for the mining sector.

The mining sector is gradually attracting foreign investors. A growing number of companies including large multinationals now request exploration permits and some of these are already engaged in field exploration programs.

I would really like to advise all interested parties to explore our new OMRG website and take full advantage of the information, mineral data and country background material that is provided.

I would also like to express, on behalf of the Mauritanian Government, our deepest gratitude to the Japanese Government and the Japanese International Cooperation Agency (JICA), for sponsoring and implementing the Strategic Plan of Mineral Resources Development in Mauritania, according to the instructions of His Excellency the President of the Republic, among to place Mauritania among the most important mining countries. The government is fully committed under the supervision of His Excellency Prime Minister to implement these instructions with the support of all our development partners namely the World Bank, BID, IDU, ACET etc.

Finally, I would like to extend my thanks to all the Japanese professionals and experts who worked tirelessly to make this project possible.

Best regards and yours truly,
Mohamed Ould Ismail Abdou
 Minister of Mines and Industry

Minister's Greeting

(3) Remote sensing analysis
 A preliminary remote sensing assessment has been carried out for the Tasiast area, with further image processing and the detailed ground truth survey due in the next fieldwork campaign. The local geology of SOM database is shown in Figure 18 of Appendix 1, 19 and a selection of useful LANDSAT and ASTER images for lithological mapping are shown in Figure 19 to 21.

(4) Consideration for Mineral Deposit Model
 According to this investigation, consideration for mineral deposit model in the Tasiast area is considered below (Fig. 7.3.22):

(1) **Formation of circumventance of evidence of sediment deposit (formation of subvolcanic zone)**
 An oceanic plate was formed until 2.1 Ga. On the oceanic plate, Fe and S erupted from mid-oceanic ridge in the oceanic plate turned oxidized and precipitated. Small scaled BIF was formed. After formation of BIF, two continental plates containing across the oceanic plate began to approach with other. On the occasion of approach, a partial break of the oceanic plate caused an earthquake. A shock of the earthquake caused submarine sliding. Thus, a part of BIF underwent brecciation in nonoxidized state at 2.0 Ga. Two continental plates collided. The oceanic plate was attached into the boundary from both sides. A suture zone where greenstones overlay the present Tasiast and Tijiast areas were formed. The oceanic plate underwent metamorphism and fracturing and cataclasis by collision.

(2) **Generation of magma (Andesite caused by collision)**
 About 1.7 Ga, owing to the collision with two continental plates, the collided boundary of the plate thickened. Thus, the bottom of the collided boundary sunk into mantle deeply along the boundary. Temperature around the bottom of the collided boundary rose by high temperature of the deep mantle. Thus, a new magma was formed by the melting of the bottom of the collided boundary of the continental crust.

(3) **Mineralization**
 About 1.6 Ga (1), magmatic fluid emitted from a new magma rose along the fracture in the suture zone and flowed into BIF in the suture zone. BIF underwent mineralization and alteration by inflow of the magmatic fluid. Mineralization and alteration comprises the below three stages of which features are different:

(1) **First stage (Fuscherite mineralization)**
 Feature of magmatic fluid is about 200°C of temperature, neutral to weakly acidic condition and reduction circumstance. By inflow of this fluid, W and Co enriched BIF, besides, Cr in BIF oxidized and precipitated as Cr₂O₃ and decreased afterwards.

(2) **Second stage (White epithermal alteration)**
 Feature of magmatic fluid is about 200°C of temperature, neutral to weakly acidic condition and reduction circumstance. By inflow of this fluid, Si and Fe in BIF dissolved and depleted, and K and Ca enriched BIF by dissolution of white application of carbonate etc.

(3) **Third stage (Gold mineralization)**
 Feature of magmatic fluid is about 150°C of temperature, 35% NaCl eq. of salinity. By inflow of this fluid, Au, Ag, and Fe in BIF enriched BIF. After this stage, alteration of sulfidation accompanied by formation of quartz vein, precipitation of carbonate and limonite took place.

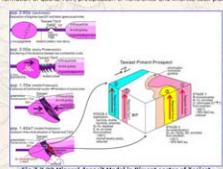


Fig. 7.3.22 Mineral deposit Model in Tasiast sector of Tasiast.

Geotectonic history in the north area of Mauritania is represented in Fig. 7.3.23, in which mineral deposit model of the Abajout, Zouarab and Tasiast area are combined.

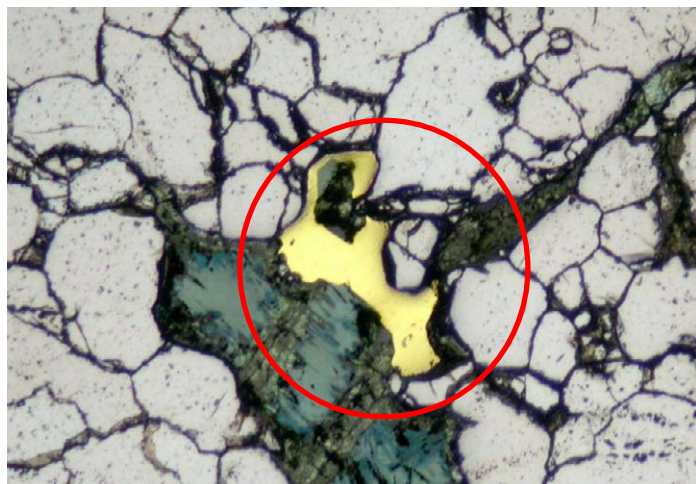
Mineral deposit Model of Tasiast deposit

Website



Native gold the Tijirit deposit

5mm



Photomicrograph of native gold at the Indice 78 prospect

0.1mm



Photomicrograph of platinum group minerals in chromite ore at the Guidimaka deposit

1 μ m

Occurrence of native gold and platinum group minerals

THE STUDY ON THE STRATEGIC PLAN OF MINERAL RESOURCES DEVELOPMENT
IN THE ISLAMIC REPUBLIC OF MAURITANIA
DARFT FINAL REPORT

CONTENTS

	Pages
CHAPTER1 Outline of Study	
1.1 Background of Study	1
1.2 Purpose of Study	1
1.3 Target Area of Study	2
1.4 Method and Content of Study	2
1.5 Site Study	3
1.6 Site Surveys on Environment and Infrastructure and Supplementary Geological Field Survey	8
1.7 Steering Committee	9
1.8 Individualized Training in Technical Transfer Steering Committee	10
1.9 Current State and Achievement Percentage of Survey	10
 CHAPTER2 Current Status of Investment Basement	
2.1 Outline	11
2.2 National Development Plan and its Implementation Status	12
2.3 Administrative Organization	15
2.4 Status of Economy	16
2.4.1 Economic Policy	16
2.4.2 National Budget (National Investment Enhancing Budget)	19
2.4.3 Industry Structure	20
2.4.4 Condition of Financial Markets	22
2.4.5 Status of Economy	23
2.4.6 Social Policy and Countermeasures on Poverty	26

2.5 Outline of Mining Industry	28
2.5.1 Position of Mining Industry in the Economy	28
2.5.2 Status of Mining industry in Mauritania	29

CHAPTER3 Current Status and Issues of Investment Climate

3.1 Outline	31
3.2 Mining Administration in Mauritania	31
3.2.1 Direction of Mine and Geology (DMG)	32
3.2.2 Mining Cadastre Unit	33
3.2.3 Mauritanian Office for Geological Research (OMRG)	34
3.3. Legal System of Mining	35
3.3.1 Mining Laws	35
3.3.2 Laws related to Environment	37
3.3.3 Investment Law	39
3.3.4 Tax	40
3.4 Role of PRISM and Implementation Status	42
3.4.1 Content of PRISM	42
3.4.2 Results	43
3.4.3 Programs in Future and Tasks	49
3.5 Mineral Resources Data Management and Information Publicity	50
3.5.1 Storage Situation of Information and Management System and Methods	50
3.5.2 Present Status of Information Publicity	51
3.5.3 SIGM GIS Database in PRISM	51
3.5.4 Database Usage Status	52
3.5.5 Present Situation with Usage of Websites	53
3.5.6 Content of Database and General Concept of Website	54

3.5.7 Technical Transfer	56
3.6 Infrastructure	59
3.6.1 Actual Situation of Infrastructure	59
3.7 Environmental consideration	68
3.7.1 Actual Status of Environmental Administration	68
3.7.2 Actual status of Monitoring and Environmental Issues	70
3.7.3 Administration of Mining Environment	71
3.7.4 Environmental Protection Measures for Mining Sector	72
3.7.5 Environmental Impact Assessment (EIA) in Mining	72
3.7.6 Tasks for Environmental Consideration	73
3.8 Actual Status of Mining Activities	74
3.8.1 Mining Activities of National and Private Companies	74
3.8.2 Actual Status of Exploration and Development	83
3.8.3 Mining Development Situation	88
3.8.4 Current Situation of Environmental Management	89
3.8.5 International Assistance	90
3.8.6 Tasks for Exploration and Development	91
CHAPTER4 Summary of the Results of Supplementary Geological Survey	
4.1 Overview	93
4.2. Description of Geologic Provinces	96
4.2.1 General Geology in Mauritania	96
4.2.2 Overview of ore deposits	102
4.3 Major deposits and characteristics of their mineralization	122
4.4 Metallogenic Provinces	154
4.5 Mineral Deposit Models	157

4.5.1 Tiris iron formation group	157
4.5.2 Koedia-Idjill iron formation group	158
4.5.3 Tasiast gold deposit	161
4.5.4 Copper and gold deposits in the Mauritanides	163
4.6 Selection of promising areas	167
4.6.1 Promising area	167
4.6.2 Promising deposit and mineralization	167
4.7 Guideline of the survey and exploration methods	169
CHAPTER5	Mineral Evaluation
5.1 Remote Sensing Data Analysis	175
5.1.1 Satellite Imagery Overview	175
5.1.2 Mineral Exploration/Development Targeting	179
5.2 Geological Provinces and Characteristics of Mineral Deposits	184
5.2.1 Characteristics of Ore Deposits in each Geological Province	184
5.2.2 Target Deposits for Development	186
5.3 Evaluation Methods of Mineral Resources	187
5.3.1 Present Status of Evaluation of Mineral Resources	187
5.3.2 SNIM Iron Mine	188
CHAPTER6	Development Strategy
6.1 Development Strategy Policy	189
6.2 Development Strategic Plan	189
6.2.1 Methodology for Realization	191
6.2.2 Scheduling of the Strategic Development Plan	192
6.3 Importance of Mining and Mining Policies	195

6.3.1 Position of Mining Industry	195
6.3.2 Mining Policies	195
6.4 Improvement of Investment Base	198
6.4.1 Mining Administration and Function	198
6.4.2 Policies for Poverty Reduction and National Budget for Mining	201
6.4.3 Financial Market	202
6.5 Improvement of Investment Climate	202
6.5.1 Promotion System	202
6.5.2 Infrastructure	207
6.5.3 Environmental Management	208
6.5.4 Information Disclosure and its Methods	212
6.5.5 Maintenance and Management of Mineral Resources Database	214
6.5.6 Utilization of Mineral Resources Database	215
6.5.7 Support to Investment Promotion Office	217
6.6 Introduction of Foreign Investment and Growth of Domestic Companies	219
6.6.1 Introduction of Foreign Investment	219
6.6.2 Nurturing Domestic Companies	220
6.6.3 Privatization of SNIM	221
6.7 Human Resource Cultivation	222
6.8 Promising Areas of Mineral Resources	225
6.8.1 Mineral Resources Survey (Promotion Measures for Exploration and Development by OMRG)	225
6.8.2 Exploration strategy	231
6.9 Action Programs	234
6.9.1 Action Programs at First Stage	235
6.9.2 Action Programs at Second Stage	237

6.10 Main Promotion Programs	239
6.10.1 Promotion of Exploration	239
6.10.2 Introduction of Foreign Investment (Promotion of Investment)	247
6.10.3 Human Resource Cultivation	257
6.10.4 Construction of Infrastructure	262
6.10.5 Environment Management	266
6.10.6 Compilation and Disclosure of Information	272
6.10.7 Organization of the Mining Sector	278
6.10.8 Nurturing Domestic Companies	282
6.10.9 Institutional Reform of OMRG	284

CHAPTER7 Recommendations

7.1 Positioning and Role of Mining Industry	290
7.1.1 Mining Industrial Structure	290
7.1.2 Role in National Development Plan	291
7.1.3 Strengthening the Ability to Formulate Mining Policy	292
7.2. Mining Policy and Mining Promotion	293
7.2.1 Mining Policy and Organization of Government	293
7.2.2 Relationships between Economic & Social Policies and Mining Promotion	294
7.3 Development Promotion	295
7.3.1 Promotion Measures	295
7.3.2 Strategies of the Majors	296
7.3.3 Joint Ventures with Juniors	296
7.3.4 Improvement of the Geological Infrastructure	298
7.3.5 Presentation of the Geological and Mineral Resources data and Disclosure of Information	299
7.3.6 Improvement of Infrastructure and Implementation of Construction Plans	300

7.3.7 Introduction of Technologies and Facilities	302
7.3.8 Personnel Training	304
7.3.9 Continuing Surveys and Promoting Exploration after the Supplementary Geological Survey	305
7.4 Conditions for Foreign Investment in Exploration and Development	306
7.4.1 Introduction of Foreign Investments	306
7.4.2 Investment Conditions for Foreign Capital	307
7.4.3 Characterization of Mining Investment by Japanese Companies	308
7.5 Environmental Protection	310
7.5.1 Environmental Management	310
7.5.2 Environmental Management and Framework for Mining (Areas for Exploration and Development)	310
7.5.3 Technologies, Tools and Facilities for Environmental Management	311
7.5.4 Environmentally Sensitive Areas	311
7.5.5 Extensive Baseline Survey	312
7.5.6 Strengthening Cooperation between Related Organizations	313
7.5.7 Information Disclosure	314
7.5.8 Environmental Awareness of local residents	314
7.6 Use of Database	316
7.6.1 Enhancing Development of Mineral Resources	316
7.6.2 Potential Fields for Future Usage and Relevant Approach	317
7.6.3 Maintenance and Expansion of Database	319
7.7 Mineral Resources Promising Areas	320
7.7.1 Promising Areas	320
7.7.2 Promising Deposits and Mineralization	321
7.7.3 Examination of mineral deposit model	322

7.7.4 Examination of Metallogenic Provinces	323
7.7.5 Potential for Rare Metals in Mauritania and Associated Characteristics	324
7.8 Mining Alliances with Neighboring Countries	326
7.8.1 Mining Technical Cooperation with Neighboring Countries	326
7.8.2 Cooperation in Environmental Protection with Neighboring Countries	327
7.8.3 Ripple Effect of the Mining Industry	328
7.9 Business Skills	329
7.9.1 Building a Foundation for Improving English Skills and Making English a Semi-official Language	329
7.9.2 Implementation of Promotion Measures	329
7.9.3 Importance of Planning, Implementing, and Checking	330

List of Tables

Table 1.5.1	Team Members List	4
Table 1.6.1	Site Surveys on Environment and Infrastructure	8
Table 1.6.2	Supplementary Geological Field Surveys	9
Table 1.7.1	Members of Steering Committee	9
Table 1.8.1	Training Items for Individual Technology Transfer	10
Table 1.9.1	Results of the Study	10
Table 2.2.1	Overview of the National Development Plans	12
Table 2.4.1	Implementation Programs for the Main Economic Policy	17
Table 2.4.2	Macroeconomic Indicators in Mauritania 1998–2004	18
Table 2.4.3	Macroeconomic Key Points in 2001-2004 Objectives	19
Table 2.4.5	Main Program in Investment Enhancing Budget in 2003	19
Table 2.4.6	Composition of National Budget	20
Table 2.4.8	Measures for Reducing Poverty	27
Table 2.5.1	Overview of Mineral Resources	30
Table 3.2.1	Budgets of MMI	33
Table 3.2.2	Budget for OMRG	34
Table 3.3.1	Groups of Mineral Resources by Mining Code	36
Table 3.3.2	Comparison of Mining Codes	37
Table 3.3.3	Legal Instability (by PRISM)	38
Table 3.3.4	Description on Impact in Mining Activities	38
Table 3.3.5	Royalty for Mineral Groups	41
Table 3.3.6	Comparison of Tax Regime with World Mining Countries	41
Table 3.4.1	Airborne geophysical programs in the PRISM project	44
Table 3.4.2	Tasks for Mining Management Capacity-Building and Current Status	44
Table 3.4.3	Main Tasks and Current Status for Investment Promotion	47
Table 3.4.4	Tasks in Future	50
Table 3.5.1	Currently Existing Websites on Mauritania	54
Table 3.5.2	Additional Datasets for OMRG/JICA GIS Database	55
Table 3.5.3	General Features of the OMRG/JICA Website	56
Table 3.5.4	List of Procured PCs and Peripherals	57
Table 3.5.5	List of procured GIS Systems	57

Table 3.5.6	Training and Education for GIS and its Related Software	58
Table 3.6.1	Road Construction Projects in Mauritania	61
Table 3.6.2	Water Management Organizations in Mauritania	62
Table 3.6.3	Water Supply in Main Cities in Mauritania (in 1,000 m ³)	63
Table 3.6.4	Capacities of Diesel Power Stations in Mauritania	64
Table 3.6.5	Cities with Airports Facilities in Mauritania	65
Table 3.6.6	Wharfs of Main Ports in Mauritania	66
Table 3.6.7	Main Investors (1996~2000)	67
Table 3.8.1	Principal Exporting Countries for SNIM (as of 2002)	74
Table 3.8.2	Main History of SNIM	75
Table 3.8.3	Brief Summary of Ore Deposits in Zouerate	76
Table 3.8.4	Classification of Mining Ores	77
Table 3.8.5	Summary of Mining Activities by Foreign Companies	82
Table 3.8.6	Issued Licenses in Mauritania	83
Table 3.8.7	Registered Foreign Companies in Mauritania	84
Table 3.8.8	Exploration Targets and Areas	85
Table 3.8.9	Medium and Long Program for OMRG	87
Table 3.8.10	Necessary Cost for Medium and Long Program	88
Table 3.8.11	Recent Cases of International Assistance in Mining Sector	90
Table 3.8.12	Tasks to Promote Foreign Companies' Activities	91
Table 4.1.1	Supplementary Geological Survey Details	94
Table 4.2.1	Ore reserves of iron ore	103
Table 4.2.2	Summary of geological survey at each deposit/prospect	121
Table 4.3.1	Classification of chromite ore	149
Table 4.4.1	Metallogenic province	154
Table 4.6.1	Promising areas	167
Table 5.1.1	Summary of minerals detectable using ASTER	177
Table 5.1.2	Image Processing Technique of ASTER	182
Table 5.1.3	Image Processing Technique of LANDSAT	182
Table 5.2.1	Geologic Province and Mineralization	186
Table 6.1.1	Development of Basic Policy	189
Table 6.2.1	Strategic Development Plan	190
Table 6.2.2	Methodology and Targets for Realization	192

Table 6.2.3	Scheduling of the Strategic Development Plan	193
Table 6.5.1	Tasks for Supporting System for Infrastructure	205
Table 6.5.2	Summary of Extensive Baseline Survey	206
Table 6.5.3	Role and Function of Investment Promotion Office	218
Table 6.6.1	Separation Plan for Privatization of SNIM	222
Table 6.8.1	Staff for OMRG and Training	231
Table 6.8.2	Draft exploration strategy	233
Table 6.9.1	Action Programs at 1st Stage	236
Table 6.9.2	Action Programs at Second Stage	238
Table 6.10.1	Survey Content	241
Table 6.10.4	Content of Investment Seminars	253
Table 6.10.5	Content of Curriculum in the Mining Faculty	258
Table 6.10.6	Content of English Instruction	259
Table 6.10.7	Content of Instruction by Invited Experts	261
Table 6.10.8	Infrastructure to be constructed	263
Table 6.10.9	Content of Water Resource Development Project	265
Table 6.10.10	Achievement State of 1:200,000 Geological Maps by PRISM	277
Table 6.10.11	Overhead costs of the OMRG system	285
Table 6.10.12	Equipment needed by OMRG	288
Table 7.1.1	Policy Formulation Capability	292
Table 7.2.1	Summary of Principal Failings	294
Table 7.3.1	Strategies of Majors at Each Stage	296
Table 7.3.2	Infrastructure - Current Status and Tasks	300
Table 7.3.3	Technologies and Facilities Tasks for Nonferrous Metal Mining	303
Table 7.3.4	Plan for Training System	304
Table 7.4.1	Tasks for Foreign Investments	307
Table 7.5.1	Technologies, Tools and Facilities for Environment Management	311
Table 7.5.2	Organizations involved with Environmental Protection related to Mining Activities	314
Table 7.6.1	Use of Database	317
Table 7.6.2	Potential Application Fields Based on a Mineral Resource Database	318
Table 7.7.1	Items for Selection of Promising Areas	321
Table 7.7.2	Examined Factors for Modeling Mineral Deposits in Mauritania	323

Table 7.7.3	Factors to Examine in Metallogenic Provinces	324
Table 7.7.4	Exploration Projects for PGMs in the World	324

List of Figures

Fig. 1.4.1	Flow of the Study	3
Fig. 2.2.2	Budget for PRSP Action Program	13
Fig. 2.3.1	Organization Diagram of Mauritanian Administration	15
Fig. 2.3.2	Schematic Organization Diagram of MEAD	16
Fig. 2.4.1	Mauritanian Main Economic Indices	18
Fig. 2.4.2	Location and Details of Foreign Supports in Investment Enhancing Budget	20
Fig. 2.4.3	Gross Revenues by Industry	21
Fig. 2.4.5	Trends in GDP of Mauritania	25
Fig. 2.4.6	Iron Ore and Fishing Export Revenues of Mauritania	25
Fig. 2.4.7	Economic Growth and Economic Indices in Mauritania	27
Fig. 2.5.1	Share of Exports Accounted for Mining Industry	28
Fig. 3.2.1	Organization of MMI	32
Fig. 3.2.2	Organization Chart of OMRG	35
Fig. 3.3.1	Feature of Mauritanian Investment Law	40
Fig. 3.4.1	Concept of PRISM	42
Fig. 3.4.2	Main Tasks to Strengthen Mining Management Capacity	45
Fig. 3.4.3	Procedure for Mining License	46
Fig. 3.4.4	Location of PRISM in Implementation of Programs	49
Fig. 3.5.1	General Structure of PRISM Database	52
Fig. 3.5.2	General Structure of Mineral Resources Database	55
Fig. 3.5.3	Procured PCs and Peripherals	57
Fig. 3.6.1	Road Network in Mauritania	60
Fig. 3.6.2	Railway in Mauritania	62
Fig. 3.6.3	Generated Electricity in Mauritania	64
Fig. 3.6.4	Location of Airports in Mauritania	65
Fig. 3.7.1	Organization of MDRE	69
Fig. 3.8.1	Main Production Indexes for SNIM	74
Fig. 3.8.2	Improvement of SNIM's Competitiveness	75

Fig. 3.8.3	Location of Zouerate	76
Fig. 3.8.4	Ore Production Results in Zouerate Mines	77
Fig. 3.8.5	P Stripped Waste in Zouerate	77
Fig. 3.8.6	Flow Sheet of El Rhein Plant	79
Fig. 3.8.7	Production of Magnetite Concentrate and its grade	79
Fig. 3.8.8	Recovery and Availability of Magnetite Processing	79
Fig. 3.8.9	Result of Mineral Development in Mauritania	88
Fig. 3.8.10	International Assistance for Mining Promotion	91
Fig. 3.8.11	Tasks for Promote Exploration Activities by Domestic Companies	92
Fig. 4.1.1	International Assistance for Mining Promotion	94
Fig. 4.1.2	Method and Position of Supplementary Geological Survey	95
Fig. 4.2.1	Geological Map of Mauritania	97
Fig. 4.2.2	Illustrated stratigraphic relation of the Reguibat Shield	98
Fig. 4.2.3	Illustrated stratigraphic profile of the Mauritanides	99
Fig. 4.2.4	Geotectonic history of northern Mauritania (1)	101
Fig. 4.2.4	Geotectonic history in the north area of Mauritania (2)	102
Fig. 4.2.5	Geological map of the Zouerate area	104
Fig. 4.2.6	Legend of the Geological map of the Zouerate area	105
Fig. 4.2.7	Geological profile of the Zouerate area	106
Fig. 4.2.8	Geological map of the Sfariat area	108
Fig. 4.2.9	Legend of the Geological map of the Sfariat area	109
Fig. 4.2.10	Geological map and geochemical anomaly of the Tabrinkout prospect	112
Fig. 4.2.11	Geological map of the Kadiar prospect	114
Fig. 4.2.12	Malachite dissemination in Kadiar prospect	115
Fig. 4.2.13	Geological and geochemical map of the Indice 78	116
Fig. 4.2.14	Geological and geochemical map of the Oudelemguil deposit	117
Fig. 4.2.15	Mineralized outcrop of Oudelemguil deposit	118
Fig. 4.2.16	Geological and geochemical map of Diaguili prospect	119
Fig. 4.3.1	Satellite images LANDSAT of the Zouerate area and ASTER of the Koedia-Idjill	125
Fig. 4.3.2	Regional geological map of the Tasiast area	127

Fig. 4.3.3	Geological map and geochemical anomalies in the Tasiast Piment area	128
Fig. 4.3.4	White argillized iron formation	129
Fig. 4.3.5	Native gold (left bottom: enlarged) and yellow nontronite vein cutting magnetite-rich BIF	130
Fig. 4.3.6	Turbulent sedimentary structure caused submarine sliding	130
Fig. 4.3.7	Pyrrhotite and native gold with porphyroblast of garnet in chlorite-amphibole band	131
Fig. 4.3.8	Occurrence of mineralized zone in the cores in the Tasiast Piment	132
Fig. 4.3.9	Satellite image of the Tasiast and Tijirit areas	135
Fig. 4.3.10	Lineament of the Tijirit area Red circle: Ator gold vein	137
Fig. 4.3.11	Geological and geochemical maps of the Tijirit area	138
Fig. 4.3.12	Regional geological map of the Akjoujt area	139
Fig. 4.3.13	Geological and geochemical maps of the Guelb Moghrein deposit	140
Fig. 4.3.14	Cummingtonite and talc in limonitized magnetite-bearing carbonate ..	141
Fig. 4.3.15	Magnesite concentrate in limonitized magnetite-bearing carbonate ..	141
Fig. 4.3.16	Outcrop of fissure with sulfate minerals	142
Fig. 4.3.17	Outcrop of fissure with sulfate minerals(1)	142
Fig. 4.3.17	Outcrop of fissure with sulfate minerals(2)	143
Fig. 4.3.18	Satellite images of the Akjoujt area and the Guelb Moghrein deposit	146
Fig. 4.3.19	Location of the Guidimaka deposit	149
Fig. 4.3.20	Geological and geochemical maps of the Guidimaka No.1 deposit	150
Fig. 4.3.21	Geological map of the GuidimakaNo.2 deposit	151
Fig. 4.3.22	Geological map of the GuidimakaNo.3 deposit	151
Fig. 4.3.23	Satellite images of the Selibaby area and the Guidimaka deposit	153
Fig. 4.4.1	Metallogenic provinces in Mauritania	156
Fig. 4.5.1	Mineral deposit model of the Tiris iron formation	157
Fig. 4.5.2	Pebbles and gravels of orthoquartzite cemented with iron oxides and silica materials	159
Fig. 4.5.3	Mineral deposit model of the Koedia-Idjill BIFs	161

Fig. 4.5.4	Mineral deposit model of the Tasiast gold deposit	162
Fig. 4.5.5	Thrust structure in the Mauritanides and geological age	164
Fig. 4.5.6	Mineral deposit model in the Guelb Moghrein copper and gold deposit	165
Fig. 4.5.7	Mineral deposit model of the Indice 78 copper and gold prospect	166
Fig. 5.1.1	A mosaic of ca.100 LANDSAT images, covering territory of Mauritania	175
Fig. 5.1.2	Draft LANDSAT lineament map of the M'Bout region, Mauritania	175
Fig. 5.1.3	Spectral signatures for the LANDSAT Thematic Mapper (TM), LANDSAT MSS and SPOT sensors	176
Fig. 5.1.4	Spectral resolution of ASTER versus other satellites	176
Fig. 5.1.5	Comparison between LANDSAT and ASTER to map hydrothermal alteration. Alunite is an indicator mineral for gold deposits	177
Fig. 5.1.6	Savings in exploration time and money: the ASTER advantage	178
Fig. 5.1.7	Death Valley: ASTER DEM overlain with an ASTER-derived mineral map	178
Fig. 5.1.8	Geological map (left) and processed LANDSAT image (right), Kadiar region	179
Fig. 5.1.9	Comparison of mineralized regions, using the same LANDSAT processing	179
Fig. 5.1.10	Flowchart of Image Analysis	180
Fig. 5.1.11	False Color Image and HIS Color Enhanced Image in Akjout	181
Fig. 5.1.12	Lineament extraction in Tijirit	182
Fig. 5.1.13	Buried mineralization zones	183
Fig. 5.1.14	Remote Sensing Analysis and Exploration Targets	184
Fig. 5.3.1	Resources Evaluation by OMRG	188
Fig. 6.5.1	Schematic Diagram for Joint Venture Extensive Areas Exploration System	204
Fig. 6.5.2	Location of Exploration System	204
Fig. 6.5.3	Location of Baseline Survey	207

Fig. 6.5.4	Construction Steps for Environmental Monitoring System	209
Fig. 6.5.5	Location of Environmental Management Database	210
Fig. 6.5.6	Mineral Resources Database and Exhibition of Information	213
Fig. 6.5.7	Promotion of Exploration/Development by Investment Promotion Office	219
Fig. 6.7.1	Organization of Technical Instruction Center	224
Fig. 6.8.1	Survey in Model Areas and Promotion of Expansion	228
Fig. 6.8.2	Mineral Mapping by remote sensing	229
Fig. 6.8.3	Draft of exploration schedule in the promising area	234
Fig. 6.9.1	Location of Action programs	235
Fig. 6.9.2	Action Schedule for Information Innovation and System Reform of OMRG at the 1st Stage	237
Fig. 6.10.1	ASTER and LANDSAT Data introduced by This Study and Main Mineral Potential Areas	274
Fig. 6.10.2	State of Achievement of 1:200,000 Geological Maps (as of 2005 Feb.)	257
Fig. 6.10.3	Conceptual Diagram of Mining Association	281
Fig. 6.10.4	Conception of the OMRG Network	287
Fig. 7.1.1	Structure of Mining Companies in the World	290
Fig. 7.3.1	Phased Improvement of Geological Infrastructure	298
Fig. 7.3.2	Promotion of Exploration attained from Surveys Continued by OMRG	306
Fig. 7.4.1	Possible Pattern of Japanese Companies' Investment in Mauritania	309
Fig. 7.5.1	Environmental Protected Areas and Distribution of Ore Deposits	312
Fig. 7.6.1	General Features for Maintenance and Expansion of Database	319
Fig. 7.7.1	Approach for Titanium Exploration Proposed in the Seminar	325
Fig. 7.8.1	Ripple Effects in Mining Industry	328
Fig. 7.9.1	Implementation of Promotion Measures	330
Fig. 7.9.2	Implementing and Checking the Plan	330

Chapter 1 Overview of the Study

1.1 Background of the Study

The mining sector in the Islamic Republic of Mauritania has been the backbone of the country's economy since the 1960s when Mauritania gained independence from France. However, almost no exploration has been carried out due to several factors including the limited availability of geological information, poor legal and fiscal framework and lack of mining sector promotion measures, in addition to the country's vastness, severe climate and lack of infrastructure.

In 1985, an agreement between the Government and the IMF defined the terms of an economic boosting program scheduled for three years and focused on the mining sector. In 1989 and 1991, programs for consolidation and development were implemented to support the efforts made on the before-mentioned program and the government has been actively promoting mining since then.

In order to establish a new development policy for mineral resources, Mauritania implemented a new mining policy in March 1997 and the Mining Code, the Decree on Mining Title and the Decree on Mining Inspectorate were passed in 1999. Today the mining sector contributes between 12 and 15% to GDP and accounts for 50% of Mauritania's exports. However, only iron mining has been fully promoted.

Though Mauritania's potential for mineral resources is being revealed gradually, the geological information is still not sufficient. The Government gives top priority to the promotion of the mining industry by strengthening private investors' activities in the exploration of potential mineral deposits and their development. At present, the Government is trying to make an appropriate climate for private investments by carrying out the "Project for Mining Sector Capacity Building" (PRISM) supported by the World Bank.

Against this backdrop, the Government of Mauritania requested the Government of Japan to implement the "Work on the Strategic Plan of Mineral Resources Development" in November 2000. In response to this request, the Japan International Cooperation Agency (hereafter JICA) signed a scope of work agreement for the study with the Ministry of Mines and Industry (hereafter MMI) and Mauritanian Office of Geological Research (hereafter OMRD).

1.2 Purpose of the Study

The purpose of the study was to consolidate the information related to geology, mineral resources, etc., for promoting the mining industry, and to make a strategic plan for promoting exploration in order to increase the potential mineral resources. This strategic plan showed a practical strategy and policy to produce an effective action program for promoting private investment. Specifically, the study had the following objectives: (1) construction of a GIS database of geologic ore deposits after consolidation of the basic data related to geology and mineral resources in Mauritania; (2) elaboration of a strategic plan for surveys of the mineral resources using the GIS database; and (3)

promotion of investment by domestic and international private mining companies by providing effective information on mineral resources.

1.3 Target Area of Study

The target for the study was the entire territory of Mauritania. Geological information from surrounding countries having a similar geological backbone as Mauritania was also used when necessary to study the Mauritanian geology and ore deposits.

1.4 Method and Content of Study

The study consisted of two stages: A – the basic survey stage, and B – the stage for strategic plan of mineral resources. At the basic stage, the information related to the national development plan, the mining policy, the mining law, environmental consideration, geologic ore deposits and potential mineral resources were collected and analyzed; deposits were defined and promising areas were selected based on remote sensing analysis and supplementary geological field surveys. At the stage for strategic plan of mineral resources, a draft strategic plan of mineral resources development was prepared and approved after discussions with Mauritanian counterparts. At the same time, the counterparts received technical transfer concerning the strategic plan for mineral resources. The final results of the survey will be presented at the international seminar of PDAC in March, 2006. The main tasks of the study were as follows:

A. The Basic Study Stage

- Review and analysis of information related to investment and environment.
- Review and analysis of information on mineral resources (publications related to geology, exploration reports, PRISM documents).
- Implementation of remote sensing analysis, supplementary geological field surveys and chemical analysis.
- Creation of ore deposit models and selection of promising areas.
- Construction of a GIS database for mineral resources
- Identification of problems to be resolved in the strategic plan of mineral resources

B. The stage for strategic plan of mineral resources

- Creation of a strategic plan of mineral resources (the strategy for exploration promotion of mineral resources)
- Information disclosure to promote investment (disclosure of mineral resources data through a website)
- Support for the establishment of an investment promotion unit

AMA (the Association of Mining Analysts) and presentations in PDAC (Prospectors & Developers Association of Canada).

(2) Study Team Members

The assignments and survey periods for each member were as follows (Table 1.5.1):

Table 1.5.1 Team Members List

Name	Assignment	First Site Survey Period	Second Site Survey Period	Third Site Survey Period
Nishikawa, Yuji	Team Leader/ Mineral Resources Evaluation	2003.11.15 ~2003.12.6	2004.1.10 ~2004.1.30 2004.2.20 ~2004.3.11	2004.5.31 ~2004.6.26
Watanabe, Yasushi	Promotion of Mining Industry	2003.11.17 ~2003.11.29	—	—
Murakami, Hiroyasu	Activities of Mining Industry	2003.11.17 ~2003.11.29	2004.1.16 ~2004.2.12	—
Thompson, Richard Terry	Investment Promotion	2003.11.20 ~2003.12.3	2004.1.16 ~2004.2.12	2004.6.2 ~2007.6.27
Marutani, Masaharu	Geology A	2003.11.17 ~2003.12.11	2004.1.12 ~2004.3.4	2004.6.3 ~2004.6.27
Higashihara, Masami	Geology B	2003.11.17 ~2003.12.11	2004.1.12 ~2004.3.1	
Teeuw, Richard Michael	Remote Sensing Analysis	2003.11.17 ~2003.12.10	2004.1.10 ~2004.2.3 2004.2.29 ~2004.3.12	2004.6.2 ~2004.6.13 2004.6.18 ~2004.6.30
Shingu, Kazuki	Environmental Consideration	2003.11.17 ~2003.12.11	2004.1.12 ~2004.3.4	2004.6.3 ~2004.6.27
Wada, Kazushige	GIS Database Construction	2003.11.17 ~2003.12.11	2004.1.26 ~2004.2.23	2004-6.7 ~2004.7.1
Itoh, Atsushi	Japanese-French Interpreter	2003.11.17 ~2003.12.11	2004.1.12 ~2004.2.27	2004.6.3 ~2004.6.27
Inoue, Toshio	Coordinator	2003.11.17 ~2003.12.11	2004.1.12 ~2004.2.9	2004.6.3 ~2004.6.27

Name	Assignment	Fourth Site Survey Period		Fifth Site Survey Period	Sixth Site Survey Period
		(1)	(2)		
Nishikawa, Yuji	Team Leader/ Mineral Resources Evaluation	2004.10.12 -2004.11.1	2005.2.18 -2005.3.12	2005.6.11 -2005.7.1	2005.11.12 -2005.11.23
Watanabe, Yasushi	Promotion of Mining Industry	2004.10.14 -2004.11.1	2005.1.24 -2005.2.26	—	2005.11.14 -2005.11.19
Marutani, Masaharu	Activities of Mining Industry	—	2005.2.4 -2005.2.26	—	—
Thompson, T. Richard	Investment Promotion	2004.10.13 -2004.11.12	2005.2.8 -2005.3.7	2005.6.14 -2005.7.4 2005.7.12 -2005.7.13	2005.11.12 -2005.11.19 ※2006.1.12 -2006.2.3
Marutani, Masaharu	Geology A	2004.10.14 -2004.12.12	2005.1.19 -2005.3.13	2005.6.17 -2005.7.9	2005.11.11 -2005.11.24
Higashihara, Masami	Geology B	2004.10.14 -2004.12.11	2005.1.19 -2005.3.7	—	—
Shibata, Kenichi	Remote Sensing Analysis	2004.10.21 -2004.12.6	2005.1.17 -2005.3.5	2005.6.17 -2005.7.2	—
Shingu, Kazuki	Environmental Consideration	2004.10.14 -2004.11.8	2005.2.21 -2005.3.10	—	2005.11.12 -2005.11.20
Wada, Kazushige	GIS Database Construction	2004.10.14 -2004.11.11	2005.1.17 -2005.2.14	2005.6.8 -2005.7.2	2005.11.12 -2005.11.20
Itoh, Atsushi	Japanese-French Interpreter	2004.10.14 -2004.11.11	2005.2.21 -2005.3.10	2005.6.17 -2005.7.1	2005.11.12 -2005.11.20
Inoue, Toshio	Coordinator	—	2005.2.7 -2005.3.12	2005.6.10 -2005.7.9	2005.11.11 -2005.11.24

※: Supplementary local survey

(3) Minutes with Mauritanian Side

The Japanese Team had four meetings with the Steering Committee, which represented the Mauritanian side in the “Study on the Strategic Plan of Mineral Resources Development in the Islamic Republic of Mauritania”, and reached an agreement on the following (minutes presented in Appendix II, 2 –5):

a. The first meeting (December 1, 2003)

- The contents of the Inception Report and study schedule;
- Supplementary geological field survey;
- Issues regarding PRISM cooperation and support from the Steering Committee;

b. The second meeting (June 14, 2004)

- Preliminary study for the strategic development plan;
- Recommendation items of the strategic development plan and contents of the website.

c. The third meeting (October 29 and 27, 2004)

- Explanation of the Progress Report and its approval;
- Framework and proposal items for the Strategic Development Plan;
- Explanation of situation and results in the supplemental site geological survey

d. The fourth meeting (June 20 and 23, 2005)

- Explanation of the Interim Report and its approval;
- Discussion on a draft Strategic Development Plan and its approval;
- Explanation of ore deposit models

e. The fifth meeting (November 18, 2005)

- Explanation of the Draft Final Report and its approval;
- Discussion on a Strategic Development Plan and its approval;
- Ascertainment of ore deposit models

(4) Material Procurement in Mauritania

The Japanese Team procured the necessary equipment and materials indicated by JICA in Nouakchott and set them up in OMRG (Appendix II, 7).

(5) Organization of Seminar

A. In the third site survey

A seminar and workshop were held for the purpose of technical transfer, with the following schedule:

- The Mining Seminar was held at a conference hall at Novotel in Nouakchott on June 14, 2004 (Appendix I, 8.4 and 8.5).

The Workshop on GIS and remote sensing was held at the information room of Nouakchott University on June 21 to 23, 2004.

a. Mining Seminar

The seminar opened with addresses from the MMI minister, the World Bank and OMRG and continued with lectures by each expert of the team as well as by experts from PRISM, OMRG and Direction of Mines and Geology (MMI). There was a total of about seventy participants from the MMI, Ministry of Finance, World Bank, OMRG, private companies and Nouakchott University.

b. Workshop

Technical instruction on remote sensing was given on the first and second days and the third day was dedicated to instruction on GIS by the remote sensing and GIS team members. A total of twenty people attended the classes, representing the OMRG, DMG, PRISM, CNRE and Nouakchott University. The classes featured several exercises in remote sensing analysis, GIS software use and GPS data entry in personal computers.

c. Publication of the seminars

A collection of the presentations (62 pages) given at the above seminar and workshop has been published (100 copies, including 7 presentations from JICA team members and 3 from the counterparts) and distributed to relevant organizations in Mauritania..

B. In the fourth site survey

With the goal of technical transfer, a geological deposit seminar and remote sensing seminar were held according to the following schedule (Appendix I, 8.1 and 8.2):

- Geological deposit seminar October 18, 2004 in the OMRG Conference Room
- Remote sensing seminar February 28, 2005 in the OMRG Conference Room

a. Geological deposit seminar

The team member for Promotion of the Mining Industry presented “IOCG Deposits”; the team member for geology presented “Results of a Geological Survey on the Guelb Moghreïn Deposit”. After that, views about these presentations were exchanged with the counterparts. In attendance were a total of 20 participants from OMRG, MMI (DMG), and PRISM.

b. Remote sensing seminar

The team member for Remote Sensing Analysis explained about processing data related to remote sensing, analytical methods, etc., and provided technical instruction. In attendance were a total of 15 participants from OMRG and other organizations.

C. In the fifth site survey

With the goal of technical transfer, a geological deposit seminar was held according to the following schedule:

- Geological deposit seminar June 24, 2005 in the OMRG Conference Room
- A lecture on “General Overview of the Supplementary Geological Field Surveys’ Results” was given by the JICA team member and opinions on the lecture were exchanged. In attendance were a total of 13 participants from OMRG, DMG and private companies.

D. In the sixth site survey

- Seminar for the Strategic Development Plan (Seminar for Draft Final Report) was held on November 17, 2005 in a hall in the NOVOTEL, Nouakchott.
- Totally 78 people participated in the seminar, including the minister of MMI, general secretary of MMI, representatives of the World Bank, MMI, private companies. Presentations were given by the counterparts and JICA team members.
- Opening ceremony of the website was also held the above-mentioned seminar.

(6) Participation in the international IGCP symposium

At the fourth site survey (1), an international symposium was held by IGCP (International Geoscience Programme) on 5-7 December 2004 in Nouakchott. In attendance were team members from Geology A and B who gave two presentations on the following topics and participated in a poster session. Also in attendance were a total of 150 persons from around the world and from domestic mining concerns.

a. Speeches/lectures

- The History of the Formation of Metal Deposits in the Western Reguibat Shield
- The Mineralization Process of the Guelb Moghreïn Deposit in the Akjouj Area

b. Poster session

- ASTER Image Analysis of the Akjouj Area

(7) Participation in “the Responsible Experts Conference” held by the Japan Mining Industry Association

At the “Responsible Experts Conference” held by Japan Mining Industry Association in June 8, 2005, the results of the supplementary geological field survey were presented in “Metallic ore deposits in the Islamic Republic of Mauritania” which was presented jointly by the OMRG and JICA teams. These results were also presented at an academic meeting of the Society of Resources Geology in Japan.

(8) Publication of a paper in “Japan Society of Energy and Resources” journal

A paper titled “Strategic Plan of Mineral Resources Development using GIS Database (written by Wada, Nishikawa and Kojima)” will be published in the “Japan Society of Energy and Resources” March journal (vol.27, No.2, series vol.156). It will be published in March 5, 2006.

(9) Opening an AMA Seminar and Participation in PDAC

The JICA team will coordinate and support the MMI to hold an AMA (the Association of Mining Analysts) seminar in March 1, 2006. Also, the JICA team will participate in PDAC (the Prospectors & Developers Association of Canada) which is held in March 5 to 8, 2006, in Toronto, Canada, and will appeal Mauritanian mineral resources and promotion of investment in it as well as the result of the study.

A paper titled “Strategic Plan of Mineral Resources Development using GIS Database (written by Wada, Nishikawa and Kojima)” will be published in the “Japan Society of Energy and Resources” March journal (vol.27, No.2, series vol.156). It will be published in March 5, 2006.

1.6 Site Surveys on Environment and Infrastructure and Supplementary Geological Field Surveys

(1) Site Surveys on Environment and Infrastructure

In order to understand the actual status of environment and infrastructure, site surveys were implemented during the second site study in the Tasiast area where mining development is planned, and during the third site study at the iron mining facilities in Nouadhibou and the iron open pits in Zouerate (Appendix I, 7.1, 7.2 and 7.4). In the fourth (2) site study, the team investigated the current situation of the Akjoujt Copper Mine which is scheduled for reopening (Appendix I, 7.3). During the site survey, several technologies were transferred to the counterparts.

Table 1.6.1 Site Surveys on Environment and Infrastructure

Survey area	Survey Members	Survey Schedule	
Tasiast	Nishikawa, Thompson and Shingu	2004. 1.25	~ 2004. 1.26
Nouadhibou	Shingu	2004. 6. 7	~ 2004. 6. 8
Zouerate	Shingu	2004. 6.19	~ 2004. 6.23
Akjoujt	Nishikawa and Ito (translator)	2005. 3.2	

(2) Supplementary Geological Field Surveys

In order to define the method and implementation plan for the supplementary geological field surveys, a preliminary survey was conducted in the southern provinces (Kadiar, Indice 78 and Bou Zrabie) during the first site study. Based on the implementation plan, supplementary geological field surveys were carried out in Akjoujt, Zouerate and Tasiast provinces during the second site study. In the fourth site surveys, supplementary geological field surveys were implemented in Selibaby, Ouedelemguil, Jreida-Lemsid, Kadiar, Indice 78, Zouerate, Sfariat, Tasiast, Guelb Moghreïn and Tijirit provinces. The survey group was composed of JICA study team members and counterparts of OMRG. Several technologies were transferred to the counterparts through the supplementary geological field survey (Appendix II, 1).

Table 1.6.2 Supplementary Geological Field Surveys

	Survey area	Survey Members	Survey Schedule	
The 1 st Year	Southern area*	Watanabe, Murakami, Marutani, Higashihara and Teeuw	2003.11.21	~ 2004.11.23
	Akjoujt	Murakami, Marutani, Higashihara and Teeuw	2004. 1.18	~ 2004. 1.24
	Zouerate	(1) Yamaji and Murakami (2) Marutani and Higashihara	(1) 2004. 2. 4 (2) 2004. 2. 4	~ 2004. 2. 9 ~ 2004. 2.11
	Tasiast	Marutani and Higashihara	(2) 2004. 2.17	~ 2004. 2.23
The 2 nd Year	Selibaby	Watanabe, Marutani, Higashihara	22(2004. 10.19	~ 2004. 10.27004
	Ouedelemguil	Marutani and Higashihara	2 (2004. 11.8	~ 2004. 11.12004
	Jreida-Lemsid	Marutani and Higashihara	22(2004. 11.16	~ 2004. 11.28004
	Kadir,Indice78	Marutani and Higashihara	22(2004. 11.22	~ 2004. 11.2800
	Zouerate,Sfariat	Watanabe, Marutani, Higashihara	2 (2005. 1.26	~ 2005. 2.2
	Tasiast	Watanabe, Murakami, Marutani, Higashihara	(2005. 2.6	~ 2005. 2.9
	Guelb Moghreïn	Murakami, Marutani, Higashihara	2005. 2.13	~ 2005. 2.17
Tijirit	Murakami, Marutani, Higashihara	2005. 2.20	~ 2005. 2.23	
3**	Guidimaka	Marutani, Inoue	2005. 6.27	~ 2005. 7.3

NB) *Preliminary survey, **The 3rd Year

1.7 Steering Committee

Members of the Steering Committee consist of representatives of OMRG, MMI and PRISM and are shown in Table 1.7.1 (Appendix II, 6).

Table 1.7.1 Members of the Steering Committee

Assignment	Name	Organization
Chairman	Dijimera Oumar (Director General)	OMRG
Member	Samory Ould Souedat (Director)	PRISM
Member	Wane Ibrahima Lamine (Director General)	Direction of Mines and Geology
Member	Dia Souley Aly (Conseiller Technique)	Ministry of Mining and Industry

1.8 Individualized Training in Technical Transfer

JICA team member created instruction programs and held training sessions for counterparts to reinforce the technical transfer during the fourth site survey (2) (Appendix I-8).

Table 1.8.1 Training Items for Individual Technology Transfer

Field	Training Items
Geology	Geological mapping, summary survey, route mapping, ground truth by GPS, microscope-based observation and use of POSAM, IOGC type ore deposits, calculation of ore reserves
Remote sensing analysis	Tone correction, explanation of ER Mapper and analysis processing, utilization of remote sensing
Environment	Mine pollution, Environmental Impact Assessment, environment in Mauritania and environmental standards
GIS database	Methods of data logging, basic system and website system, website management, storing of remote sensing data, method for creating geological maps

1.9 Goals and Results of the Study

Table 1.9.1 Results of the Study

Item		Goals	Results
Strategic Development Plan	Understanding of the investment base and environment	Understand the state of investment in mining activities and provide a base for a strategic development plan	Grasped the actual state of economics, organization, law, environment, mining activities, etc.
	Role and purpose of the mining industry	Basis of the strategic plan	Items were analyzed from the national development plan, economic contributions, etc.
	Formulating guidelines and targets	Direction of exploration/development strategy and establishment of targets	Items were conducted. The strategic plan was formulated and guidelines and targets were prepared.
	Formulating the strategic plan	Development of a workable 15-year plan	The strategic plan was formulated after programs comprising the plan were discussed.
	Formulation of action program	5-year program tied to targets that are in accordance with guidelines	Feasible programs were formulated, based on the strategic plan.
Construction of database		Use of digitized OMRG data	Basic structure was completed. Basic data was entered.
Construction of website		Easy to see and use web site is important tool for promoting investment	The website was constructed. Disclosed information was increased.
Ore Deposit Model	Implementation of supplemental in situ geological survey	Acquisition of data need to confirm potential of mineral deposits	Data was acquired for realizing potential of deposits of Au, Pt, etc.
	Selection of growth zones and potential areas	Materializing deposits and growth zones	Growth zones and potential areas were selected based on results of remote sensing, supplemental geological surveys, existing literature, etc.
	Construction of Oredesposit model	Construction of Au, Cu deposit models	Deposit models were built, based on remote sensing analyses and supplemental geological surveys.
	Resource evaluation	Firm information about reserves	State of resources was fully understood. Methods to calculate and evaluate reserves were investigated.
	Incorporation into strategic development plan	Method devised to	Exploration promotion measures were included in development strategy.
Support of PRISM Investment Promotion Office		Est. of Investment Promotion Office	Outlines of concepts and designs were created and given to PRISM.
Investment Guidebook		Use for promoting investment	The investment guidebook was prepared.

PDAC	Compilation and presentation of materials	Published Investment Guidebook, Supplement and Newsletters.
Technology transfer	Acquire technology and improve counterpart's technology	Technical transfers were conducted by means of seminars, OJT, specific training programs.
Round-table Meeting for Mining Companies	Solve problems to promote exploration/development.	Problems and their solutions were discussed for exploration/development.
AMA seminar	Promote investment in Mauritanian mining	Held a investment seminar for Mauritanian mining in London to appeal its mineral resources.

Chapter 2 Current Status of Investment Basement

2.1 Outline

Mauritania launched the Poverty Reduction Strategy Paper (PRSP) as a national development plan in 2001, conducting policies for economic promotion, manpower, local development and health care in order to reduce poverty. Its macro-economy has been improving gradually by increasing GDP and stabilizing inflation (3-4%). Because its main industrial structure consists of mining, fisheries and agriculture, and exporting income is gained by the former two industries, its economic basement is weak. Therefore, industrial reforms and growth are tasks for the construction of an industrial foundation. Tax income is not sufficient for a national budget that depends on support from international organizations and donor countries. It is difficult to implement poverty-reduction measure without international supports. Though liberalization has been adopted in finance, Mauritania's finance market is still undeveloped and domestic companies find it difficult to grow.

Mining position in economy is important, accounting for 14% of GDP and about 50% of exports. The Mauritanian mining industry, however, is almost exclusively iron mining. Enhancing gold and copper development, thus promoting mining of domestic nonferrous mineral resources, is a key task for economic growth of Mauritania. At present, exploration is limited to gold and diamond and there are not many foreign companies working in the country yet. The mining basement is supposed to be enhanced by support from the World Bank while promotion of mining is a very important task for the development of local economy and mining activities are apt to be intensified.

A gold mine and a copper mine were opened during 2005, and production will be started in 2006. However, Mauritanian infrastructure is still under preparation so exploration/development areas are very limited. On the other hand, petroleum business is developing now and estimated to start production activities in 2005. It is sector with the potential to support the economy. In the organization of mining sector, Ministry of Energy and Hydrocarbons has separated from the former Ministry of Mining and Industry. The late augury of mining development will have an important role largely influencing PRSP, national finance and construction of economic foundation in accordance with its growth.

2.2 National Development Plan

The Mauritanian Government has set an objective to achieve economic independence from external funding and, therefore, foreign debt. The Government is making progress in this with the support from many international organizations by reforming its legal and institutional frameworks such as economic policy, the foreign exchange system and the tax regime and by liberalizing financial markets.

Table 2.2.1 Overview of the National Development Plans

National Development Plan Term	Objectives	Results
1963–1967	<ul style="list-style-type: none"> • Reduce dependence on external finance • Start economic development through study of natural resources 	<ul style="list-style-type: none"> • Investment to mining industry (start iron mine – partial participation of French investors) • Urban development
1970–1974	<ul style="list-style-type: none"> • Economically independent • Develop public sector 	<ul style="list-style-type: none"> • Left the West African Monetary Union • National currency issued (Ouguiya) • Iron mine nationalized
1981–1985 (IMF support)	<ul style="list-style-type: none"> • Stabilize the economy • Nationalize the development of natural resources 	<ul style="list-style-type: none"> • Debt rescheduled • Economy in recession • Deterioration of enterprise financial state (government gave loans to enterprises)
1985–1988 (World Bank support)	<ul style="list-style-type: none"> • Rehabilitate & restore public sector • Recovery of economy 	<ul style="list-style-type: none"> • Privatization of some enterprises • Inflation increasing • Speed of economic growth decreases
1995–1997 (ESAF support)	<ul style="list-style-type: none"> • Structural reform • Stabilize economy 	<ul style="list-style-type: none"> • Improvement to a more efficient tax system • Liberalization of foreign currency exchange system • Improvement of laws such as commercial & investment laws • Establishment of banking system

Implementation of the National Development Plan over the last 40 years has brought good results such as: an increase in per capita GDP, from US\$400 in 1985 to US\$500 in 2000, with a subsequent reduction in Poverty Indices (0.38 in 1990 and 0.43 in 2000). However, Mauritania is still among the least developed countries (LDCs) based on the United Nations standards. The Human Development Indicator (HDI) was 0.454 in 2001. The human development index (HDI) measures human development by combining three dimensions of development, i.e., longevity (life expectancy at birth), education (adult literacy and average years of schooling) and income. The Human Poverty Index is equal to 48.6 and ranks Mauritania 86th on the list (UNOP 2001).

Poverty is the most pressing issue. Upgrading of human resources is needed to increase the capability to deliver educational and literacy programs. Mauritania's low literacy rate means that significant improvement is still needed. Industrialization is still at the growth stage and diversification of the economy has not progressed and the number of private companies has not grown. Therefore it is of vital importance for the government to lead all the development programs. To start on the path to

poverty reduction, in January 2001 the Government issued a 15-year poverty reduction strategy paper (PRSP).

This PRSP is composed of a basic theme, usually an action program, and a mid-term plan from 2001 to 2004, which is based on 15 years of strategic vision. The national budget was adjusted in accordance with the needs of this program (Fig.2.2.2).

- **Economic development promotion**

- The mining industry, fishing industry, agriculture and tourism will become the engines of economic development.
- The mining industry alone accounts for 50% of foreign revenues and 14% of GDP.
- The objective of PRISM of the World Bank (1999-2008) is to promote the mining industry.

- **Proportion of economic activity in poverty-affected areas.**

- Implementation is adjusted to concentrate on urban population by developing the cities.
- To promote economic activities in local communities.

- **Increasing the capability of human resources.**

- To improve the education system
- To improve basic human living conditions
- To provide water and electricity
- To improve the health conditions of the population.

- **Promotion of democracy**

- By encouraging participants to engage in the national private sector
- By promoting the activity of public organizations, NGOs etc.

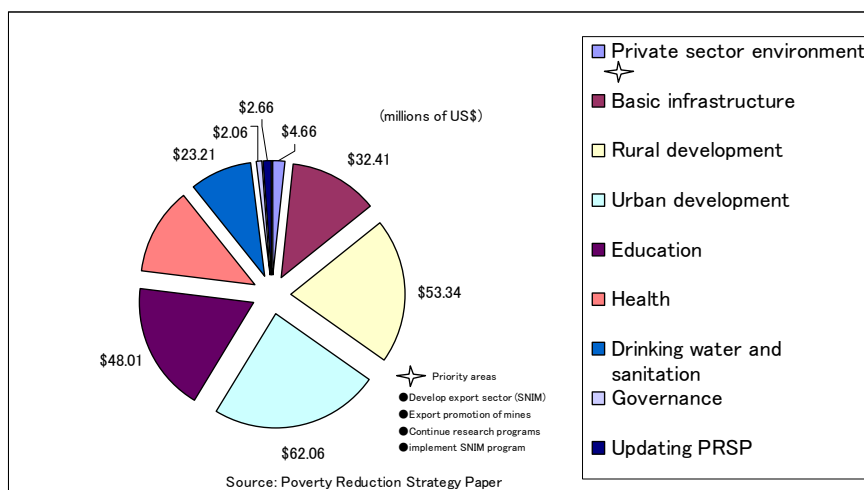


Fig. 2.2.2 Budget for PRSP Action Program

The budget for the action program until 2004 totals MU 12,000 million or US \$475 million. The budget allocated for priority sectors is MU 730 million or US \$280million. Financing for the action program is obtained from both the HIPC and the national budget. Each national action program

has to search for a donor and take steps to define the problems to be resolved.

The PRSP characteristics are listed below. However, many actions are required to keep the program progressing in order to achieve comprehensive economic development. Finding external sources is necessary to raise finance for the program. The following are topics and issues that affect the progress of the plan:

- Funding from donors is indispensable and dependency on the outside is strong.
- The effectiveness of multipliers in each sector is unclear,
- There is need for analysis,
- There is a need for a concrete plan to expand activity in each sector every year,
- Many programs have been implemented within each sector. There is almost no interaction among sectors,
- There is a lack of suitable human resources for implementation.

The plan covers all sectors but there is a lack of mutually-cooperative relationships between sectors, and it is essential that the budgets be allocated according to the needs of each sector.

The policy reforms of the 1990s significantly changed the economic landscape of Mauritania at both the macroeconomic and structural levels. They were aimed at re-establishing macroeconomic stability, progressive liberalization of the whole economy and reform of the key economic sectors including the public sector, mining, banking, fishing and agriculture. Efforts were also focused on human resources through the introduction of national education and health improvement programs.

The population of the country is characterized by its rate of increase at 2.9% per annum, extreme youth with some 45% of the population aged less than 15 years and growing migration to the cities with the nomadic population now at less than 8%. Urban population is growing through permanent settlement, accounting for 51% of the total.

By early 2002, the World Bank had established a systematic monitoring program to track the public spending on Poverty Reduction since the introduction of the PRSP. In mid 2003 it was reported that Mauritania had achieved all of the short-term measures in its plan on time, particularly the identification of poverty indicators and implementing a program of tracking expenditure to mitigate poverty. These have been supported by measures to introduce modern treasury operations and strengthen the National audit process.

Mauritania had also implemented a medium term objective by improving functional classification of its public spending system.

One concern is that the growth targets for the years 2001-2004 in the original PRSP were based on an assumed increase in mining activities. The plan had anticipated an increase in iron ore output by SNIM of 2 million tons/year by 2003. This was delayed due to declining sales, particularly to the recession European economies of France and Germany in 2004, but China buying an additional

1m tons from Mauritania, sales are increasing iron ore output again. Other improvements in the mining sector are taking time to consolidate with Tasiast and Akjout mines now respectively planning start up and recommencement of operations in 2005.

2.3. Administrative Organization

Mauritania is politically organized as a democratic, constitutional and multiparty state. There are political parties such as the Democratic Republican and Social Party (PRDS), Reunion of Democratic Forces (RFD), Union of Forces for Progress (UFP), Justice and Democracy Alliance (AJD), Action for Change (AC), Popular Front (FP).

Mauritania is an Islamic Republic with an elected President as Head of State. Its parliamentary system consists of two chambers, the Upper (Senate – 56 members) and the Lower (National Assembly – 79 members). Members of both houses are elected, to the Senate every 5 years and to the National Assembly every 6 years.

The President and his Presidential offices preside over Parliament, which through the Ministries and their functional structures administer the territory. The national and local administrative hierarchy consists of the Regions (Wilayas of which there are 13) and the Prefectures (Moughataas of which there are 53). The Moughataas contain a total of 208 communes or Baladia which deal with administrative matters at a local level and represent local interests.

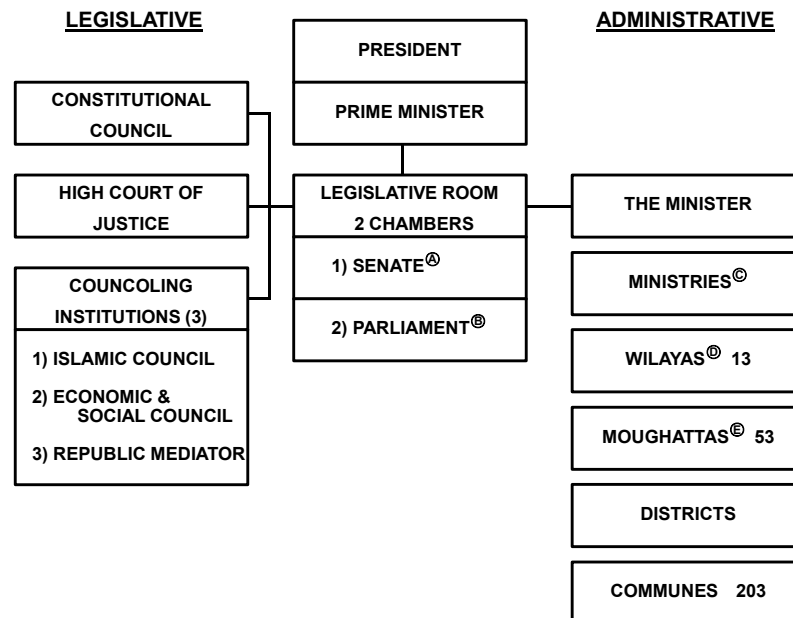


Fig.2.3.1 Organization Diagram of Mauritanian Administration

National Defense

Culture and Islamic Affairs

Justice

Communication

Interior, Post & Telecoms

Foreign Affairs

Finance	Commerce, Artisan & Tourism
Fishing and Maritime Economy	Mines and Industry
Economics & Development	Equipment and Transport
Rural development and Environment	Water Resources and Energy
Public Affairs, Labor, Youth and Sport	National Education
Health and Social Affairs	

Mining is related to the Ministry of Mines and Industry (MMI) and the Ministry of Economic Affairs (MAED). In May 2005, the Ministry of Energy and Hydrocarbons (MEH) was separated from MMI.

MMI is responsible for the mining sector which provides in excess of 50% the country's foreign exchange earnings. In 2004 this ministry had a budget allocation of MU 88.234 million (US\$ 294,000). Its main works are; planning and implementation of mining and industry policy, direction of the Cadastral Office, management of the operations of the Mauritanian geological survey, application of mining law, assisting with mine planning and the mines inspectorate as well as environmental management and supervision related to mining activities.

MAED is responsible for economic affairs and development, which is essentially the planning of the economy, especially as it concerns the country's development. In 2004 this ministry had a budget of MU 98.808 million (US\$ 329,360). Its main role is planning and setting draft policy for the future course of the economy. Planning of the economy is the main function and in the highly subsidized Mauritanian context this role is crucial to maintaining the balance of payments at acceptable levels to avoid borrowing.

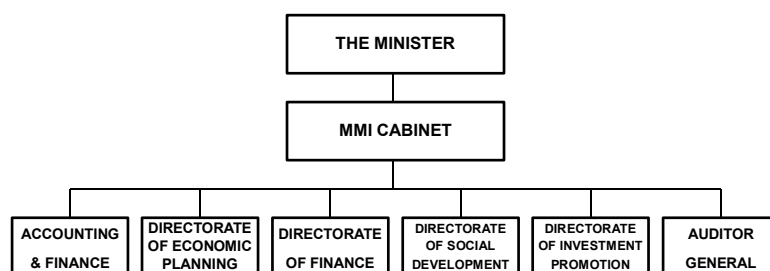


Fig.2.3.2 Schematic Organization Diagram of MEAD

2.4 Status of the Economy

2.4.1 Economic Policy

Since the mid 1980s, Mauritania has implemented a number of programs based on its economic policy with support from international organizations such as the IDA and IFC. It has made significant progress in restoring positive rates of growth by moving towards a market-oriented economy and reducing macroeconomic imbalances and inflation. Economic policy has focused on

liberalizing prices, eliminating barriers to international trade, liberalizing the exchange regime, stabilizing the financial sector, gradual privatization of State enterprises and fiscal and customs reforms (Table 2.4.1). Macro-economic policies and assistance in the implementation of programs related to economic policy and investment in infrastructure, based on support by international organizations and donor countries have also allowed Mauritania to register a steady GDP growth, a modest level of inflation, and a marked improvement in public finance and the balance-of-payments.

Table 2.4.1 Implementation Programs for the Main Economic Policy

Before 1990	1990–1999	Present Objectives and policies
<ul style="list-style-type: none"> • Creation of independent central bank in 1973 • Establishment of new currency, Ouguiya, in 1973 • Promotion of natural resource mining & basic public services • Reformation of credit policies & banking 	<ul style="list-style-type: none"> • Addressed bank insolvency problems • Reduction of external debt arrears • Reformation of public companies & agriculture sector • Market-based interest rates & foreign exchange system 	<ul style="list-style-type: none"> • Higher sustainable growth rate for poverty reduction (stabilization of macro-economy) • Increasing employment (promotion of investment) • Reduction of external current account deficit • Increase international investment (financial liberalization and tax concession) • Lower inflation rate (stabilization of macro-economy) • Effective management of bank liquidity (financial liberalization) • Flexibility in exchange rate management (financial liberalization)

- Since 1993, Mauritania's GDP has increased at an average annual rate of 4.5 percent.
- This has resulted in a substantial growth of the Real GDP per capita since 1992.
- Such a rate of growth has depended on government investment but has also been financed by external funds.

Despite the progress achieved, there is still a high level of poverty in Mauritania and it is still classified as a least developed country (LDC). Furthermore, Mauritania's foreign debt remained at a high level throughout the 90s rising to around US\$2.15 billion in 2002, which was equivalent to over 260 per cent of the country's GDP. In 1998, significant progress was achieved in improving the functioning of the foreign exchange market through a wider liberalization of the foreign exchange system and introduction of a new intervention policy for the central bank. This policy permits the bank to buy and sell unlimited amounts of foreign currency.

Table 2.4.2 Macroeconomic Indicators in Mauritania 1998–2004

Indicator	Unit	1998	1999	2000	2001	2002	2003	2004
GDP	US\$ million	980	986	956	988	990	1,106	1191
GDP per capita	US\$	410	384	362	363	352	383	ND
External Debt	US\$ million	2,010	2,138	2,150	2,150	2,138	2,150	2,150
Economic Aid	US\$ million	ND	ND	220	262	ND	ND	ND
Trading Deficit	US\$ million	109	72	153	202	51	190	ND
N.B. *Revenue	MU million	41,060	50,845	56,651	55,436	101,130	77,094	ND
N.B. *Expenses	MU million	35,800	50,643	56,057	62,071	84,536	94,651	ND
Unemployment	%	23	21	28.9	ND	ND	ND	ND

† Data provided from Report of the Bureau International du Travail, 21.01.04

* Forecast data from ONS – Previous data 1998–2002 is actual from ONS

ND: * N.B. is National Budget. These data were not available from ONS or other sources.

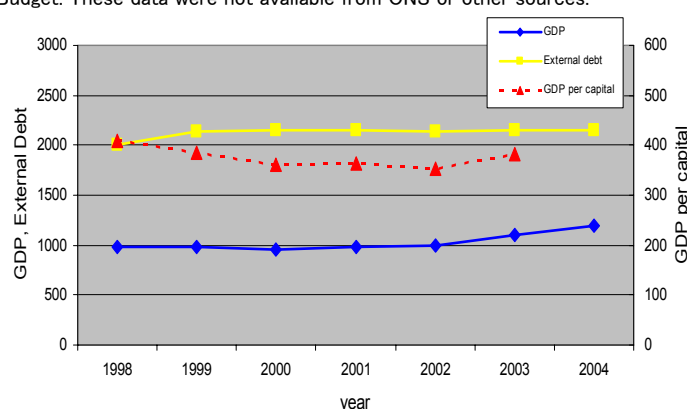


Fig. 2.4.1 Mauritanian Main Economic Indices

The economic policy was focused on strengthening macroeconomic stability, reducing debt, increasing the foreign currency reserves and the volume of investment as well as total factor productivity in the non-ferrous ore sectors, and deepening and accelerating structural reforms to stimulate private sector investment. In addition, the social development agenda was reinforced, especially in the education and health sectors (Table 2.4.2).

During 2001 to 2004, economic policy is still macro-economically stable and is growing by applying a sound budgetary policy based on the PRSP with increasing the production of iron ore by 17.5% and investment in the infrastructure, etc (Fig. 2.4.1 and Table 2.4.2). Also the policy for monetary liberalization is furthermore being promoted and direct taxation is being reformed, thus promoting the private sector and establishing a promotion policy for foreign investors. Factors hindering investment include the lack of infrastructure especially ports, roads, water facilities, etc. which must be developed to reduce costs of doing business, strengthen competitiveness and attract new investment. Therefore, economic policy must promote the development of infrastructure linked to the mining industry.

A robust budget is a top priority for implementing economic policy. Financial liberalization has recently been an important policy in Mauritania, and it is a base for improving the investment climate. It is absolutely essential to make further tax concessions to the private sector to promote

investment. The simplification of VAT would be very important for encouraging private sector activities.

Table 2.4.3 Macroeconomic Key Points in 2001-2004 Objectives

Indicators	Objectives
GDP Growth per capita for	More than 3% per year (13 % for the period)
Share of private consumption of GDP	68% in 2000 to 77% by 2004
Incidence of poverty	Reduce to 38.6% by 2004

Several targets such as those mentioned above have been set based on PRSP, and the implementation of various economic measures has stabilized the macro economy to some extent and there has been some growth. However, while the foreign debt has been halved by the Paris Conference it is still at about the same level as GDP, so a full-scale increase of GDP will require reform of industry.

2.4.2 National Budget (National Investment Enhancing Budget)

National Investment Enhancing Budget is made in accordance with Poverty Reduction Strategy Paper (PRSP). The purpose of the Investment Enhancing Budget is to create employment opportunities, improve living conditions for citizens and reduce poverty.

As a half of the total debt, US\$ 1.1 billion, was relieved at Paris Conference in 2002, the amount repaid decreased to half of that in 2003. Accordingly, the investment fund was increased to allot more funds for improving living conditions of the citizens. Therefore, the total Investment Enhancing Budget in 2003 was increased to MU 46.2 billion, which was 17.6% higher than in 2002. The main contents of the Investment Enhancing Budget in 2003 were as follows:

- Investment distribution reflected on the construction of infrastructure and poverty reduction
- The investment will support economic growth, and reallocation of funds attained by the growth will become possible.
- Financial plan emphasizing self-finance, and grants and loans from foreign countries.

The main program in Investment Enhancing Budget in 2003 focused on fisheries from the viewpoint in industrial development and gave priority to constructing urban infrastructure and connecting roads with neighboring countries in land development. Increasing the iron ore production system of SNIM and mineral resources surveys to promote mining apart from SNIM was deemed important in mining (Table 2.4.5).

Table 2.4.5 Main Programs in Investment Enhancing Budget in 2003

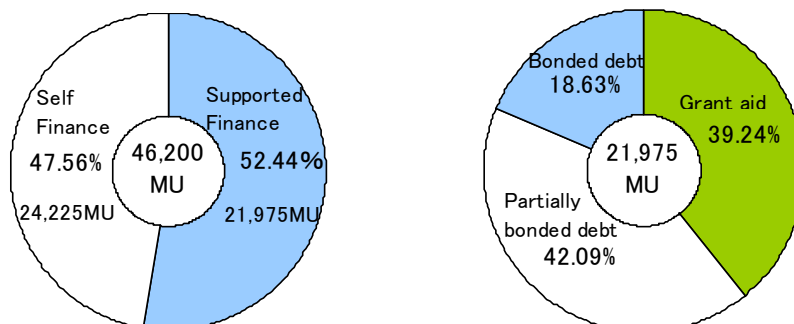
Sector		Main Programs
Industrial Development		<ul style="list-style-type: none"> ● Strengthening inspection of exclusive economic zone (EEZ) ● Protection of fishery resources and a follow-up study ● Construction of oil-related facilities in urban areas.
Land Development		<ul style="list-style-type: none"> ● Establishing basic administrative organizations in local capitals ● Construction of urban infrastructure ● Construction of roads connecting with neighboring countries
Mining	SNIM	<ul style="list-style-type: none"> ● Increasing iron ore production and exporting capacity ● Enhancing total process (production, transportation, ports, etc)
	Others	<ul style="list-style-type: none"> ● Continuing mineral resources surveys

Total of the Investment Enhancing Budget is MU 46.2 billion (approximately US\$ 185 million). The budget is allocated to all sectors but more than half of that is allocated to land development and manpower. The budget allocated to mining makes up 7% of all for SNIM and others. In the national budget, the part of self-finance is 47.56% and the portion of supported finance is 52.44% (Table 2.4.6 and Fig. 2.4.2). Supported finance by foreign countries consists of grants (39.24%) and bonded debt (60.72%), which indicates a clear dependency on foreign support. The bonded debt accounts for more than 60%, which shows the weakness of the national financial structure, partially paying back the debt and getting new loans (Fig.2.4.2).

Table 2.4.6 Composition of National Budget

Sector	Budget (Million MU)	Composition (%)		Budget Details (million MU)	
		2002	2003	Self Finance	Supported Finance
Agricultural Development	6,551.82	15.15	14.18	1,932.45	4,619.37
Industrial Development	4,367.74 (688.00)	9.14	9.45	1,667.75 (88.00)	2,699.99 (600.00)
Land Development	10,747.86	20.59	23.26	7,196.85	3,551.00
Manpower	13,383.58	30.85	28.97	5,503.58	7,880.00
Institutional Reform	2,191.00	4.07	4.74	1,316.00	875.00
Multi-sector projects	6,358.00	13.84	13.76	4,358.00	2,000.00
SNIM	2,600.00	6.36	5.63	0	2,600.00
Total	46,200.00	100.00	100.00	21,974.64	24,225.36

NB) (): Investment budget for industrial development (excluding SNIM)



A. Comparison of Self/Supported Finance B. Details of Supported Finance

Fig. 2.4.2 Location and Details of Foreign Support in Investment Enhancing Budget

2.4.3 Industrial Structure

The three major productive sectors in Mauritania are fishing, mining and agriculture. Revenues in 2000 consisted of 10% from fisheries, 24% from mining, 32% from agriculture, and 32% from other manufacturing industries and services. The industrial structure is mainly composed of primary industries. In addition to the three key industries, GDP is increasingly being supported by a very small portion of the manufacturing sector, the mainly banking- and finance-based service sector and the nascent telecommunications sector.

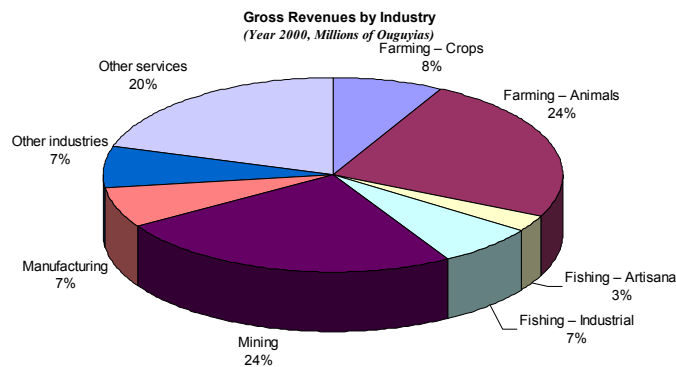


Fig. 2.4.3 Gross Revenues by Industry

In 1995, the fishing sector was Mauritania's largest foreign currency earner, representing 53% of total exports although the annual catch had started to decrease. Fisheries and the added value activities of fish processing are seen as important employment opportunities and as a source of foreign currency earnings. However, production in this sector has been reduced by overfishing. Given this sector's importance to the Mauritanian economy, several reforms have been carried out, e.g. improving sector management, monitoring marine resources, privatization of the "Societe Mauritanienne de Commercialization du Poisson" (SMCP), restructuring the fish market, and constructing a fish processing complex, among other things. In addition, the government has made efforts to protect the country's maritime resources and has improved its policing of Mauritania's 200-km Exclusive Economic Zone (EEZ) to maintain fisheries as an important industry supporting GDP.

Two sectors, agriculture and livestock, play an important role in Mauritania's economy, employing about 40% of the labor force and generating nearly 20% of GDP in 2000. This sector depends upon the rainfall, which in good years helps to increase the GDP and improve the balance of payments. Nevertheless, the food deficit was still about 200,000 t and cereal imports were encouraged. The Government views agriculture and livestock as priority sectors to further growth and reduces dependence on food imports and is encouraging private investment in the agricultural sector to modernize the production system. In the Senegal River valley, it has recently provided irrigation, and has increased productivity. However, the agricultural harvest was greatly reduced by swarms of desert locusts that devoured crops in 2004.

A major development project, backed by foreign donors, united Mauritania, Senegal, and Mali in the construction of the dams in Diama (Senegal) and Manantali (Mali) for navigation, electrical power generation/distribution systems and irrigation purposes.

The Mauritanian mining industry consists only of iron mining. Gold and other nonferrous metals had been mined to a certain extent in the past, but they are now merely in the exploration/development phase and have no share of GDP. Mauritania has annually produced and exported between 10 and 12 million metric tons of iron ore, which accounts for 50% of total exports by

value (in 2002). Iron mining is the most important industry in the country. SNIM, the national iron ore mining company, is the only producer of iron ore; its activities comprise the whole mining industry of Mauritania. Iron ore production has increased since the construction of new production facilities and reorganization of SNIM supported by EU and others. However, production has not expanded so much and it is equal to export. At present, the Nouadhibou port facility is working at its shipping capacity, and is slated to be renovated and expanded.

Exploration has been carried out for diamond and gold by foreign investors since the latter half of the 1990s. Based on the importance of mining and potentiality of mineral resources, the World Bank launched PRISM in 1999 to support the preparation of a new Mining Code, design of stable institutional framework, and the creation of geological maps and an environmental management system. Rio Tinto and BHP Billiton are advancing exploration for diamonds and Tasiast Gold (Canada) began constructing a new mine for the Tasiast Deposit in 2005 and will start its operation in September or October, 2006. The Guelb Moghrein Gold Deposit located in northern Akjoujt is now managed and owned by Mauritania Copper Mine (MCM) (Canada and Arab), which plan to restart production of gold and copper from the tailings at this former active copper mine. In 1995, it produced 1,415 kilograms of gold from the tailings, down from 1,975 kilograms in 1994. It is planned to redevelop and reopen in 2006 with a production scale of 30,000 t of copper and 100,000 oz of gold per year.

However, exploration/development has not been promoted so much because the infrastructure of Mauritania is still largely undeveloped and geological information is still being prepared by PRISM. Furthermore, there is no exclusive port for exporting nonferrous metal concentrate in large quantity. Full-scale exploration for copper is not currently carried out. But as other mining activities, there is a gypsum mine managed by a subsidiary company of SNIM, as well as a development project for phosphate in the south.

2.4.4 Condition of Financial Markets

Deregulation of the banking sector led to the establishment of private banks in 1996. The BMCI (Mauritanian Bank for International Trade), was the first bank to be privatized. Its principle area of investment is trade, but it also provides financing to property and construction. In Mauritania, almost everyone is involved in trade and this is regarded as an opportunity by the BMCI. Imports and trade make up a large proportion of the bank's turnover of between two-and-a-half and three billion MU (€8 and €10 million).

However, the newly privatized banks are short of long-term resources and this has led them to specialize in short-term loans at high interest rates. Now BMCI has recourse to the European Investment Bank (EIB) and is one of the three banks selected by the EIB within the framework of a global loan to Mauritania. The resources of the EIB are in the form of 10-year loans, which enable

them to make longer-term loans to the bank's clients. The nominal EIB loan rate is in the order of 9%, which permits refinancing at about 11 %. Although these privatized banks see stability in the large-scale sectors such as mining, they recognize the importance of supporting the small and medium-sized enterprises as well. These small-scale sectors are still very limited in Mauritania, despite the fact that industries such as tourism have potential for significant growth among them. Though private sector confidence in the banking system has increased and financial intermediation has deepened, loans are limited to the short term with a maximum interest of 13% per year. The strict enforcement of prudential regulations should continue. For this purpose, the BMCI's supervisory capacity has been strengthened.

Furthermore, banking supervision procedures have been improved and additional regulations issued, both aimed at enhancing information disclosure and transparency. Dependence on privatized banks for capital rising is likely to remain the principal source of funding for the short to mid term future. However, it is likely that the industrial development would be difficult without diversifying the capital rising by stock market etc in future.

In recent years, Mauritania's banking sector has undergone liberalization with the government selling its equity stake in commercial banks. Reform of the banking sector has led to limits on bank lending. Domestic confidence in the banking sector remains low and 60% of cash is still not placed in banks. However, this represents an enormous opportunity for the banking sector to increase savings and improve fund liquidity. It is noted that the government has succeeded in meeting the IMF's debt reduction requirements by producing year-on-year budget surpluses, which have reduced inflation and limited the crowding out of private sector credit.

2.4.5 Status of Economy

The Mauritanian economy is still, to a great extent, dependent on aid flows and earnings from its two largest industries, fish and iron ore. Since 1992, Mauritania has implemented a program of economic adjustments and structural reform, which has been encouraged and supported by International Financial Institutions (IFIs) such as the IMF and ADB.

In July 1999, Mauritania adopted a program supported by a three-year US\$54 million Enhanced Structural Adjustment Facility (ESAF), which became known as the Poverty Reduction and Growth Facility (PRGF) and was approved by the IMF. This facility was renewed in July 2003, with an additional US\$8.8 million on the same terms. At that time the IMF stated that in order to achieve the macroeconomic objectives of the program, which include sustaining high levels of growth (at 5 – 6% by 2005), low inflation (less than 4%) and a lower level of debt servicing (less than 26% of exports sum by the end of 2004), the government must maintain “an effective management of bank liquidity, flexibility in exchange rate management and strict debt management.” However, this robust macroeconomic performance has still had little effect on the lives of most Mauritians. Around half

the population lives below the poverty line and GDP per capita is about US\$350 per year. Most of the country's economic growth has derived from two industrial activities – fish processing and iron ore production. The iron mining is driven by European and world demand for the very high grade hematite ores. The iron mining industry and its subsidiaries have supported the economy for nearly fifty years.

Mauritania belongs to the Arab Maghreb Union (UMA), together with Algeria, Libya, Morocco and Tunisia. The UMA was set up in 1989, but has been impotent in recent years due to the breakdown in relations between Algeria and Morocco over the sovereignty of Western Sahara. However, it was revived in 2001 to resolve food security issues and strengthen trade ties throughout the region and there are examples of UMA joint ventures in Mauritania:

- The introduction of Mattel, a Tunisian telecoms operator into the newly privatized telecoms sector in 2000.
- The management and technical assistance provided by Tunisia in the construction of a new 450km highway between the capital Nouakchott and Nouadhibou, the nation's principal port.

Principal exports are fish and fish products (typically 45% of total value) and iron ore (40-50%). Main destinations are Italy (13.7% of 2001 total), France (13.6%), Spain (11.3%), Japan (8.4 %), and Belgium (6.8%). Principal imports are foodstuffs (typically 30-40% of total), petroleum products (24-30%), transport equipment (8-12%), and consumer goods (8-12%). Main sources are France (22.5% of 2001 total), Belgium (9%), Italy (5.6%), Spain (5.4%), and Germany (5.4%).

The agricultural and fishing sectors account for around a quarter of GDP and employ two-thirds of the working population. Less than 3% of the total area is cultivated arable land and 10% is pasture. Production of foodstuffs is restricted to irrigated land in the south along the north bank of the Senegal River. Over 97% of Mauritania consists of arid and semi-arid land and although it is unsuitable for crops, livestock rearing is an important sector. Nomadic herders comprise still around 10% of the population, although their number is declining.

The industrial sector contributes around 10% to GDP but employs just 6% of the workforce. The main industrial activity is fish freezing. In addition, there are various small import substitution industries (brewing, footwear, dairy processing, etc), oil refining in Nouadhibou and a small sugar refinery in Nouakchott.

Fishing contributes up to 10% of GDP and provides around 45% of export earnings as well as being an important source of food for Mauritians. Fishing is also one of important foreign currency earners. The mining sector contributes around 13% to GDP and employs 5% of the working population whilst producing 42% of export earnings. The government has tried to encourage foreign investment in the mining sector.

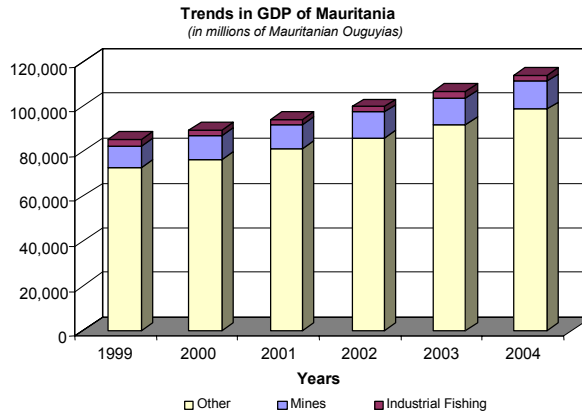


Fig. 2.4.5 Trends in GDP of Mauritania

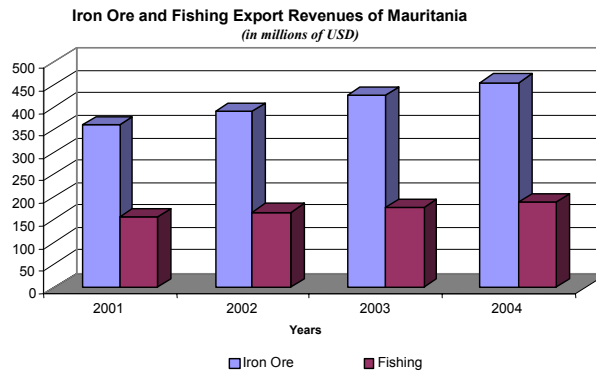


Fig. 2.4.6 Iron Ore and Fishing Export Revenues of Mauritania

The mining and fishing industry have an important role in the Mauritanian economy (Fig. 2.3.3 and 2.3.4). Today, although mining is only a direct employer of some 4,500 people it contributes nearly half a billion US dollars to the annual economy and as a sector continues to grow. Industrial fishing is also important but depleting fish stocks are inhibiting growth in this sector. Stable growth in GDP demands a more speedy development in other sectors, which include not only mining but also agriculture, industry and even tourism.

Although Mauritania has identified potentially large oil reserves, the precise amount is not known. In 2000, Dana Petroleum stated it had identified potential reserves in shallow and deepwater prospects in offshore blocks 1, 7 and 8. Fusion Oil and Gas Plc, which has a stake in Production Sharing Contracts (PSCs) A and B of 3% and 6% respectively, began drilling oil exploration wells in 2001. PSCs A and B cover a total of 28,000 km². In 2001, Woodside, another participant in the prospects, estimated proven reserves of 370 million barrels. Woodside has now proven three oilfields and intends to start production from its first discovery in early 2006. Mauritania's downstream industry consists of one small refinery located at Nouadhibou, which is operated by an Algerian company. China is planning to build an oil refinery near the port of Nouadhibou. Mauritanian oil has a good opportunity to become a driving force for economic growth in the future.

A majority of thermal generation is provided by isolated diesel generators in Mauritania. The Société Mauritanienne d'Electricité (Maurelec) is responsible for electricity generation, transmission and supply. Completion of work on the Manantali dam on the Senegal River has led to an increase in hydroelectric power supply to Mauritania, Senegal and Mali. The Manantali dam was completed in 2001, funded by loans from the Arab Fund, World Bank, African Development Fund, French Co-operation Fund, Islamic Development Bank, European Investment Bank and the Mauritanian government at a cost of US\$340.65 million. Total capacity of the five generators is around 800MW. Mauritania is allotted a share of 15%, 120MW at maximum. In addition, there is a plan to construct a thermal plant in Nouakchott to respond to increasing demand on electricity. The foundation for industrial activities is preparing steadily for the future.

2.4.6 Social Policy and Countermeasures on Poverty

The Government prepared and started Poverty Reduction Strategic Paper (PRSP) in 2001. This plan aims essentially at social policy and poverty-reducing measures and its main goals consist of promoting production activities in the areas with many poor people, improving the educational system and enhancing health care. The targets of the social policy are improvements in education and living conditions of the citizens.

- To eliminate sexual discrimination and provincial inequality.
 - ❖ To deracinate illiteracy, to upgrade knowledge levels and to increase a rate of junior high school attendance.
- To improve the life condition for citizens.
 - ❖ To integrate healthcare management, to build water supply systems in most rural areas and to build complete water supply systems in cities.

There are four strategies to reduce poverty, as follows:

- The first is to accelerate economic growth and reduce economic dependence on external factors.
- The second strategy is aimed at improving the growth potential and production capacity of the poor. This will help to reduce the gap between poor and rich
- The third strategy focuses on the development of human resources and giving the poor access to essential infrastructure, and improving their productivity and living conditions.
- The fourth strategy is essentially designed to encourage the participation of all agencies that are involved in the alleviation of poverty.

Mining activities are related with the first and second strategies mentioned above. Immediate objectives are based on the prospects for economic growth in specific economic sectors, e.g. mining and fisheries, budget and balance of payment issues and the development programs. Therefore, it is a fundamental task to stabilize and improve the current macroeconomic framework (Fig.2.4.7). For this reason, legal reforms are being made to promote equality, mining, fisheries

enhancement and construction of basic infrastructure (Table 2.4.8). The key objectives accomplished during the period 2002 to 2004 were:

- Achieving an annual average economic growth rate of 6% during the period.
- Reducing the incidence of poverty to less than 39%
- Reducing the incidence of extreme poverty to less than 22%

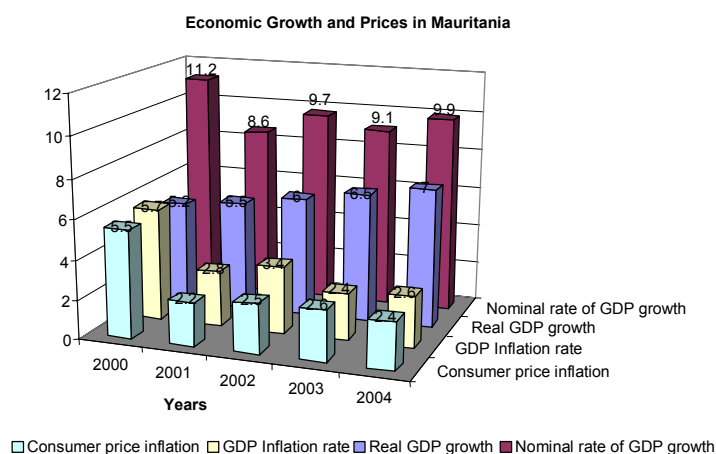


Fig.2.4.7 Economic Growth and Economic Indices in Mauritania

Table 2.4.8 Measures for Reducing Poverty

Objectives	Actions
Accelerated Growth	<ul style="list-style-type: none"> ▪ Stabilize macroeconomic framework ▪ Legal and judicial reforms in business promotion ▪ Promotion of mining activities ▪ Strengthening of fishing sector ▪ Arrangement of basic infrastructure <ul style="list-style-type: none"> ◊ Maintenance, construction and expansion of roads ◊ Electricity and gas supply ◊ Water supply system
Growth in Economic Environment of the Poor	<ul style="list-style-type: none"> ▪ Rural development <ul style="list-style-type: none"> ◊ Improvement in agricultural production ◊ Implementation of environmental protection ◊ Establishment of monitoring arrangements ◊ Development of manufacturing products from livestock ▪ Urban development
Strengthening of Governance and Institutions	<ul style="list-style-type: none"> ▪ Support NGOs participation in decision-making process ▪ Implementation of budget programs ▪ Improvement of government accounting office management ▪ Introduce information systems into management process ▪ Update of PRSP

The cost of the initial 2001-2004 campaign against poverty was estimated at US\$ 475m. Of this some US\$ 282m was assigned to the priority measures.

The effects of poverty-reduction measures are monitored by a set of specific indicators, which fall into the following categories:

- Direct reduction in poverty
- Acceleration of economic growth
- Preservation of macroeconomic stability
- Improvement in the overall level of education
- Improvement in the overall health of the nation
- Increase in access to potable water
- Increased incomes and improvement in living conditions in the rural sector
- Increase in incomes and improvement in living conditions in the shanty towns of large and secondary cities.

2.5. Outline of Mining Industry

2.5.1 Position of Mining Industry in the Economy

Since the time of Mauritania's independence from France in 1960, the mining sector has been the driver of the country's economy. It was principally composed of the nationalized iron ore mines of SNIM at Zouerate and Charter Consolidated's copper operations and the Torko process in Akjoujt. However, after the oil crisis of 1973 and the global recession that followed between 1975 and 1983, the economic situation of the country deteriorated substantially due to the lack of demand for these commodities. In 1985, economic rehabilitation launched under an agreement between the Mauritanian government and the International Monetary Fund led to improvements in the production system at the SNIM iron mine. Since 1991, through economic reforms with the financial backing of international financial institutions such as the World Bank and the IMF, the government has delivered economic growth. The sector now contributes between 12 and 15% of GDP, representing 55% of Mauritania's exports (Fig. 2.5.1). However, the mining industry is a "monoculture" consisting only of iron mines, and thus is greatly affected by projections in the iron mining industry.

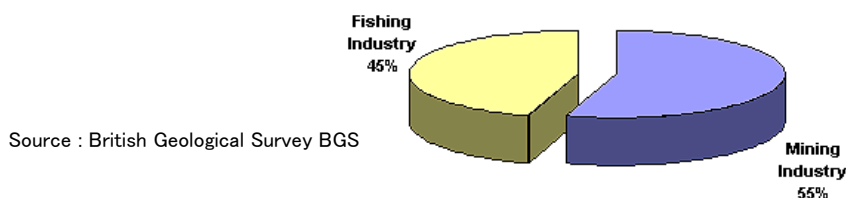


Figure 2.5.1 Share of Exports Accounted for Mining Industry

During the last five years the mining sector has seen much renewed activity and infrastructure development by the PRISM project initiated in 1999 by the World Bank and the IMF. The implementation of the New Mining Law in 1999 did not create any problems for the mining tax

system and foreign investment, but rather improved the country's competitiveness vis-à-vis its neighbors. This project set out objectives for new geological mapping and information data bases which have now been put in place by the BRGM of France and the BGS of the UK, and work has begun on developing an infrastructure for geological information. The country is structurally and geologically similar to the neighboring areas of Northern Africa, which are known to contain important deposits of economically exploitable minerals. The PRISM has thus provided new geological information on mineral potential for private investors. During the last five years this has led to permits being granted for exploration that has targeted diamonds, gold and oil and other hydrocarbons. As mentioned earlier, investment is now being made in gold mine development and copper mine redevelopment, and investment in oil production is also starting.

2.5.2 Status of Mining industry in Mauritania

Mauritania has a geological environment that indicates the existence of a wide range of minerals. Today, mining is one of the most important sectors of the country's economy. For over 50 years this iron ore mining, which has been conducted by the State-owned mining company SNIM, has dominated the Mauritanian mining scene. In 1999, the PRISM launched a project to further develop the mining sector, and this focused on attracting, stimulating and retaining private investment in the Mauritanian economy. The government has assigned the highest priority to the mining sector due to the substantial mineral potential. To achieve this, the government has implemented a program for development promotion of the sector, which aims to create a framework for investment climate.

- Reviewing and updating current mining legislation
- Establishing a modern and legally binding mining code
- Installing a modern, high precision geodesic network comprising 32 landmarks to cover the whole country of Mauritania
- Increasing the availability of geological information by implementing medium scale (1:500 000 for the entire country) and large scale (1:200 000 for the zones of resource potential) geological and metallogenic surveys
- Creating a Geographical Information System for geological and mining information (SIGM) to ensure centralized archiving, processing, updating and distribution of the data for potential investors
- Establishing a Geographical Information System for the Management of Environment (SIGE)
- Reinforcing the capacity of the public (government) institutions responsible for the mining sector.

The revised legislation, regulation and investment code in the sector, combined with tax incentives, has renewed interest in Mauritanian mining from foreign exploration companies. Large

multinational exploration and mining companies are already operating in Mauritania, including Ashton Mining (part of Rio Tinto Plc), Rex Mining, Diamet (part of BHP Billiton), De Beers and Defiance Mining (Tasiast). Gold and diamonds are the main commodities targets due to the lack of infrastructure (water, ports, roads, etc.). While most activities have stalled at the survey stage, the development of gold at Tasiast and the reactivation of an old copper and gold mine at Akjoujt have started. Most of the existing information about mineral resources in Mauritania concerns iron, copper, and gold (see Table 2.5.1), but there are exploration programs under way for various other minerals particularly diamonds, chromite, titanium, platinum group metals, rare earth metals and semi-precious stones, as well as hydrocarbons.

Table2.5.1 Overview of Mineral Resources

Type	Reserves (M tons)	Type	Reserves (M tons)
High grade iron ore	185	Phosphates (Bofal-Loubboira)	160
Kediat Idil iron ore	85	Gypsum (Ndrahamcha)	9
M' Hawdatt iron ore	100	Rock salt (Lekcheime)	120
Ferruginous quartzites	60	Sulfur	1
Copper ore (Moghrein mine)	22.6	Peat	0.4
Gold (Moghrein mine)	30 tons		

Source : OMRG

The Mauritanian hydrocarbon sector (oil, gas, etc.) is likely to become an important contributor to the country's economy. The Mauritanian Government's objective is to ensure the oil and gas sector will play a major role in the economy and it will refine the legal and fiscal regime to accelerate the growth of Mauritania's hydrocarbon industry. To assist with this process the Government proposes an attractive model contract to the oil companies, which includes favorable provisions. A number of international oil companies, including majors such as Woodside, Dana, Brimax, IPG and Hardman Resources, have signed contracts and have been carrying out exploration work in Mauritania. The Australian company, Woodside Petroleum has discovered three oilfields in the Mauritania Coastal Basin. The hydrocarbon potential area covers more than 160 000 km², with 100 000 km² of the basin being offshore. Woodside anticipates that initial production from its first discovery will start some time in 2006. Furthermore, gas fields have also been confirmed in this region. Thus, a major topic for debate will be how to utilize this gas and oil for the industrial development of Mauritania. The Taoudeni basin will be a future exploration target in the shield.