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**ASSESSMENT OF THE ADEQUACY OF ENVIRONMEN-  
TAL REGULATORY FRAMEWORK GOVERNING MIN-  
ERAL RESOURCES EXTRACTION AND PROCESSING :  
a comparative study of selected african countries and  
other developping countries**



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## *Abstract*

- i. Mining industry provides raw materials without which sustainable development could not take place. However, that industry is also known for its potential to modify the environment, a very sensitive issue at international level, especially since 1983, date of the establishment by the United Nations of a World Commission on Environment and Development. In Africa for example, in the mining sector, environmental considerations had since the early 1990s, delayed the development of Mount Nimba iron ores deposit in Guinea, in spite of measures taken both by the government and mining operators to preserve environment.
- ii. Mining activities being governed by mining codes, the current trend world-wide is to incorporate in these codes, provisions on the protection of environment against negative impacts of that industry. In Africa too, although in some countries environment protection is still regulated by many separate laws (Namibia) and/or by a general environment law (Uganda), amendment of mining codes have been made or initiated to incorporate in these laws provisions on environment protection and mining in order to create environment laws specific to the sector. Indeed, African mining codes established before 1990 dealt with this subject, but related provisions of these codes focussed only on the working environment, that is on issues regarding protection of workers safety and health. Today, issues on the negative effects of mining operations on physical environment are also addressed and some 1990s African mining codes contain provisions for example on the obligations for the miner to restore the mined out areas after mine closure.
- iii. This is a laudable step. However, the prevailing sentiment after an analysis of African mining codes containing provisions on environment protection, is that environmental laws specific to mining are not enough to provide a sound basis for broad environmental control programmes in that sector. For example, the issue of repair costs for mining damage to environment is not dealt with or not in a comprehensive way when it is.
- iv. Another example sustaining that assertion is provided by an issue very much to the fore now, which is the protection of social environment (cultural properties and rights of tribal people of the mining sites). That issue is not given enough attention nor regulated in mining codes with environmental provisions.
- v. These inadequacies of African mining environmental laws fortunately tend to be corrected by the adoption by many African countries of the practice of the **Environmental Impact Assessment (EIA)**, a widely accepted tool which ensures that environmental concerns are fully taken into account in the project planning process.

## *I. Introduction*

1. The purpose of the present study is to help provide an assessment of current environmental regulatory framework governing mineral resources extraction and processing in selected African countries.

2. The study reviews on a comparative basis existing specific mining environmental laws and practices in some selected African and non African countries. This review serves as a basis for the identification of some inadequacies of African mining environmental laws.

3. However, it should be noted that:

- The review covers only solid minerals;
- The cross-section of African environmental legislation affecting mining contained in this study is based on information and data available within the CDSR-AC.
- Because of limitations of desk studies and more, because only few African countries have specific environmental mining laws today, a fistful only of African countries, namely Angola, Côte d'Ivoire, Central African Republic, Guinea, Mali, Namibia, Niger and Uganda provides that information and data. However, it is hoped, as stated in the literature, **that the usefulness of the study does not lies only in presenting all or most of African mining environmental regulatory framework, but in identifying best legislation and practices in that area .**

## *II. Potential impacts of mining on the environment*

6. Information on the potential impacts of mining on the environment hereunder reproduced, is borrowed from a technical guide on environmental aspects of selected non ferrous metals ore mining, jointly established by UNEP and IEPAC with the assistance of ILO in 1991.

Table 1: Potential impacts of mining on environment

	Surface water pollution	Underground water pollution	Air pollution	Solid waste	Excavation	Noise and vibration	Remarks
Human health and activity	Soluble contaminants in domestic and/or agricultural use waters  Deposition of solids on agricultural lands, in sea and shallow zones  Withdrawal of water for industrial purposes	Soluble contaminants wells, springs, etc.  Natural water sources drying up as a consequence of water table lowering	Dust blown on inhabited agricultural lands(2)	Hazards related to lack of stability of waste deposits		Effects of noise on human health  Damage in buildings due to blasting vibration	(1) Occurrence of such impacts on underground waters is not a general case; its depends essentially on the hydrogeology on the area;  (2) Plant and especially underground mine atmosphere
Fauna	Alteration of aquatic fauna including destruction of fish species, accumulation of toxic elements by fish				Loss of habitat	Disturbance of habitat feature(3)	(3) Issues regarding unique habitat features (migration corridors, watering areas, etc.) for threatened or endangered species should especially be addressed
Flora	Alteration of aquatic flora	Accumulation in plants of toxic elements carried dust			Loss of habitat		Spatial requirements of mining operations are normally quite restricted; within that area the disturbance can be significant. Effects on species with limited geographic extent are essentially to be considered
Land use	Sand deposition in river channels, sea shallow zones		Land disturbance  Withdrawal of agricultural land		Land disturbance  Land subsidence due to underground mining		

Source: UNEP/IEPAC, 1991

7. As it can be seen from table 1, potential effects of mining activities on the environment include:

- Surface and underground water pollution with among other consequences, an alteration of aquatic fauna and flora;
- Air pollution which among others could lead to accumulation in plants of toxic elements carried by dust ;
- Solid wastes with as one of the consequences, land disturbance ;
- Excavation with possible loss of habitat ;
- Noise and vibration with possible damage in buildings and disturbance of habitat features.

*III. Magnitude of environmental issues in some selected countries:  
Case studies of Guinea and Tanzania*

15. Guinea and Tanzania provide two good examples of the magnitude of environmental issues some African governments are facing.

III.1. The Mount Nimba case in Guinea

16. Guinea boasts of a wide diversity of minerals with three being currently produced: bauxite, diamond and gold. Among dominant ones yet to be developed is iron, the main deposits of which are concentrated in Mount Nimba in the south west of the country shared with Liberia.

Global probable iron reserves of Mount Nimba are about 1(one) billion tonnes. Proven reserves of the project area are about 350 million tonnes of ore with an average iron content of 66.6%.

Nine years ago, iron was yet produced in the southern part of Mount Nimba which as mentioned earlier is shared with Liberia. Activities ceased in 1989, because of reserves exhaustion. In order to maintain the related infrastructure, but also not to completely interrupt supply of iron to European iron and steel metallurgists, a project was mounted with a view to establishing a commercial mining (production of 9 millions tonnes over 25 years with possibility of extending that capacity to 12 millions tonnes) in the Guinean northern part of the mountain which among others contains iron deposits of Pierré Richaud, Signal Sempéré, Château and Grands Rochers.

That project was to be implemented in 1993. It never was because of environmental constraints including water table lowering and soluble contaminants in water; reduction of agricultural land; alteration of flora, **destruction of some endangered animal species (especially viviparous toads, the presence of which had contributed to make the central area of Mount Nimba a World Heritage area).**

This deprived Guinea of a very good opportunity to develop its iron deposits: indeed the combination of factors which made the project feasible e.g iron ore reserves exhaustion in the neighbouring Liberia and Guinea taking over that country in the supply of iron to Europe which at that time was very anxious to minimise its dependency on Australian and Brazilian iron supplies, today will not have the same weight.

III.2. The Musugu case in Tanzania

17. In Tanzania, artisan mining is the most important section of mining industry. Nearly 500,000 people are involved in that sector which makes a large contribution to the Tanzanian economy, especially in terms of foreign currency earned .

Like in many other African countries with such activities, Tanzania suffers from the lack of both mining knowledge and appropriate equipment coupled with the lack of basic infrastructural facilities. In the case of Musugu's exploitation, these factors have resulted in dangerous mining practices which among others:

- Had led to substantial damage to the environment such as:
  - Large areas unusable for farming and grazing;
  - Unattended areas with numerous scars and dangerous pits hidden by overgrown grass;
  - Deforestation due to high demand for wood used in the construction of temporary shelters and for excavations supports; and,
  - Contaminated water (by mercury).
- Expose miners and surrounding people and animals to health hazards such as:
  - Direct contacts with mercury during the stirring of that material by hand ; inhalation of poisonous mercury vapour by miners, surrounding people and animals ;
  - Release of mercury fumes in the atmosphere, water and bush with possibility of mercury being picked up by animals, washed into rivers and reaching marine life, during the amalgamation process.

#### *IV. Some African governments solutions to environmental issues related to mining*

8. Up to the mid 1983, effects of mining on environment were not given due attention. Indeed, mining sector was known for its poor environmental management, which made it a target for environmental pressures groups especially in developed countries. With environmental protection issues gaining momentum world-wide under the impulse of the United Nations World Commission on Environmental and Development and the Rio de Janeiro Conference in the 1980s, policies and approaches were devised, laws enacted and some practices adopted here and there to solve environmental issues related to mining activities.

#### IV.1 African regulatory framework for environmental protection during mining

##### IV.1.1 Salient features

9. With regard to laws, some countries had established a comprehensive piece of legislation providing a common legal basis to all industries, while in others, environmental aspects are regulated by several pieces of legislation including specific mining environmental laws.
10. In Africa, with few exceptions such as Uganda where” a general legislation<sup>1</sup> in a national Environmental Statute established in May 1995 regulates environmental issues including those related to mining, ” the trend is towards the inclusion in mining laws of clauses on the protection of physical environment.

I.

<sup>1</sup> That legislation refers to mining and mineral processing as “ projects to be considered for environmental impact assessment”



11. As a matter of fact, African mining laws enacted before 1990s contained provisions for the protection of health and safety of mining workers and surrounding people, **which is one concern**

**within a much larger concern of environment, the latter including also protection of physical and social environment.** Since the early 1990s, amendments have been made or initiated to incorporate in these laws, along with issues on working environment (safety and health), clauses on the protection of physical environment. For example:

- In Angola, Articles 12 and 21 of Law No 1/92 of 17 January 1992 deals with protection of both working and physical environment;
- In Côte d'Ivoire, chapter V of the mining code (Law 95-553 of 18 July 1998) deals with protection of physical environment;
- In Central African Republic, Article 154 of Title IX of the future Law on mining addresses physical environmental issues;
- In Mali, Order 91-065/P-CTSP of September 1991 governing mining activities in that country contain a provision focussing on the protection of physical environment against mining activities;
- In Namibia, Article 130 of Minerals (Prospecting and Mining) Act, 1992, addresses physical environmental issues.

12. Indeed, environment related provisions of these laws stipulate that:

- Mining activities should be conducted in such a manner to ensure the protection of the environment, the rehabilitation of mining sites and the conservation of forests, in accordance with conditions and procedures specified in the Mining Regulations (Côte d'Ivoire); or in accordance with international environmental regulations in force (Mali).<sup>2</sup>
- Any holder of a mineral title or beneficiary of a quarry exploitation authorisation, prior to any mining operation, should prepare and submit for approval by Mining authorities and the authorities in charge of environment, a complete environmental impact study and a programme for environmental management including a plan for rehabilitation of the mining site and their estimated costs (Côte d'Ivoire, Gabon, Senegal);
- Environment controls should be done periodically, by both the holder of the mining permit or authorisation at his expense and as part of his programme of management and by the Mining Authorities and where necessary by international organisations, at the expenses of these authorities (Côte d'Ivoire);
- In the course of reconnaissance operations, prospecting operations or mining operations carried under any non exclusive prospecting licence, a mining claim or a mineral licence, when any mineral or a group of mineral is spilled in the sea, on land or in any water on or under the surface .....or when the land or water is polluted or any plant or animal life is endangered or destroyed or any damage is cause to any person including the State by such spilling or pollution, the holder of the licence should:
  - ❖ Report such spilling, pollution, loss or damage to the Minister;

1.

<sup>2</sup> A formula which implicitly covers also protection of physical environment

- ❖ Take at its own costs all such steps as may be necessary in accordance with good reconnaissance practices, good prospecting practices or good mining practices or as may be necessary to remedy such spilling , pollution , loss or damage (Namibia);
- Holder of the mining title and beneficiary of the authorisation are subject to specific legislative and statutory provisions governing environmental protection;
- Any person who shall in the course of prospecting or mining operations , or work connected therewith , permit any poisonous or noxious matter to be discharged into any natural water supply shall be liable to 10,000 shillings fine ( Uganda);
- The beneficiary of an authorisation for artisanal and semi-industrial mining shall be bound to rehabilitate the farmland and the normal irrigation of crops which might have been damaged by his activities (Côte d' Ivoire); and , to exploit mineral substances in a rational manner and to protect environment (Côte d' Ivoire).

Examples of Environmental provisions of mining legislation of African countries	
Country	Legislation/ environmental provisions
Angola	<p>Law No. 1/12 of 27 January 1992</p> <p>Article 42 provides that mining title holder should guarantee safety and health conditions of workers in working sites and environmental, fauna and flora protection and recovery of destroyed soils and rivers diversions to avoid any damage to populations.</p> <p>Article 21 provides that any damage caused to the life or health of people, to animals, houses, the soil, plain life, surface and underground waters and other natural elements as a consequence of prospecting, research, reconnaissance, mining activities are considered to be damages caused by geological activities. Any damage caused by geological and mining activities always implies responsibility on the part of the Prospecting Licence or Mining Title holder, who is subject to legal sanctions and to the duty of compensation, independently of contractual provisions.</p>
Cote d'Ivoire	<p>Act No. 99-512 of July 18<sup>th</sup>, 1995</p> <p>Chapter IV deals with security, public health and emergency in the events of accident.</p> <p>Chapter V deals with physical environmental protection.</p> <p>Article 76: activities governed by the mining code should be conducted in such a manner as to ensure protection of the environment, the rehabilitation of the mining sites and the conservation of forests in accordance with conditions and procedures specified in the Mining regulations.</p> <p>Article 77: Any holder of mining title should prepare and submit for the approval of The Mining Authorities, the Authorities in charge of Environment and any other department provided for by the Mining Regulations, a complete environmental impact study and a program for environmental management, which shall include a plan for the rehabilitation of the mining site and their estimated costs before undertaking any operation on the filed pursuant to the mining title.</p> <p>Article 78: The holder of a mineral title shall be bound to implement the environmental Management program approved by the Mining and Environment Authorities and to bear its associated costs.</p>
Mali	<p>Order No. 91-65/P-C/ESP of September 19, 1991.</p> <p>Requires the respect of international regulations in force as far as mining industry is concerned, works to be carried out in accordance with the regulatory and legislative provisions governing the forestry, fauna and aquatic resources, and which essential aspects of the feasibility study to acquire permits and exploitation authorizations deals with the impact study on mining activity on environment.</p>
Niger	<p>Mining Law (93-016) of March 1993</p> <p>Includes among other safety regulations and provides that granting of an exploration permit is subject among others to the approval of section on impact on the environment of feasibility study.</p>

Source: Compilation of Laws of concerned countries

#### IV.1.2. Some inadequacies of African mining environmental laws

11. From the aforementioned, it should be noted that the African mining environmental laws cited above:

- Do not define what is “manner”, “rational manner”, “good practices”, and “international regulations in force”. Especially regarding the reference to international laws in force, as shown further, there is no such an international model of mining environmental law. Indeed as mentioned earlier, in many countries world-wide, environment protection is regulated by many pieces of legislation including mining code;
- Do not fix an amount for environment control or for land reclamation. Or when it does, such as in the case of Uganda, the amount (10,000 Ugandan shillings) technically is not reasonable, especially in the case of restoration of mined out area with large open pits.
- Both small miners and big operators have the same obligations with regard to environment protection. On this particular issue, it is fair that given the damage of small mining activities on the environment (some aspects of that damage are detailed further) environmental regulation should be imposed on small miners. However, such measures should not be detrimental to their activities. Indeed, some incentives (compare to large scale mining activities) should be introduced at that level to encourage small miners as a section of emerging domestic private sector.

13. In other terms, environmental provisions in current African mining codes are formulated in general terms, amounting to vague statements in respect to environment protection. When they have far-reaching implications as when they refer to the rehabilitation/restoration of mined-out areas, proposed solutions are not technically nor financially reasonable.

14. Besides, they don't deal with social-cultural issues. It is true that currently and world-wide no country has a mining legislation with provisions on those issues. However, dramatic events<sup>3</sup> due to disagreement between affected local communities( most of the time very poor people especially in remote and rural areas) governments and mining firms about benefits and costs created by mining, experienced by some countries such as Papua New Guinea and

I.  
<sup>3</sup> . One remembers the Landowners riot in Panguna in Bougainville ( Papua New Guinea) in 1979 during the copper mine development and production phase and the events which followed the closure of the mine including clashes among civilians and Papua New Guinea Defence Force which led among others to the killing of both civilian and troops ; change in the government; the killing of the new prime minister; mercenary intervention etc..

One also remembers, as far as Africa is concerned, the events in Nigeria involving local communities and oil companies although this was in the field of hydrocarbons.

brought to global attention by modern avenues of communication make it necessary to deal with these issues in order to accommodate the interests of local communities.

IV.2. Some practices developed by African governments to respond to environmental issues related to mining

15. The above underlined inadequacies of current African new mining codes with provisions on environment protection tend to show that these frameworks are not specific enough to provide a sound basis for broad environmental control programmes in that industry. However and fortunately, they include a very important clause requiring an early review of project proposals through an **Environmental Impact Assessment (EIA)**.

IV.2.1. The Environmental Impact Assessment (EIA) practice: Case studies of Guinea and Tanzania

16. Indeed, the EIA, a widely accepted tool ensuring that environmental concerns are fully taken into account in the project planning process, helps assisting miners during the decision-making process by focussing on the major environmental issues surrounding that project. It also allows the miners to place environmental considerations alongside social, political and economic factors even in the absence of a legal framework.

IV.2.1.1. The Guinean Environmental Impact Assessment.

17. Guinea for example has no provisions on environment protection in its 1990 mining code. However, an Environmental assessment had been established in the framework of the Mount Nimbi iron ore development project. Issues addressed by that EIA include:
- ❖ Biological environment issues: protection of some endangered animal species such as the viviparous toads and of fauna;
  - ❖ Physical environment issues : water pollution (soluble contaminants in water); water drying up as a consequence of water-table lowering; increased running; reduction of agricultural land surface);
  - ❖ **Social environment issues: Land settlement (mining workers mixing with or living near indigenous people); employment (indigenous people moving away from traditional business to join mining enterprises); Landscape (landscape alteration )**.

IV.2.1.2 The Tanzania Musugu Environmental Impact Assessment.

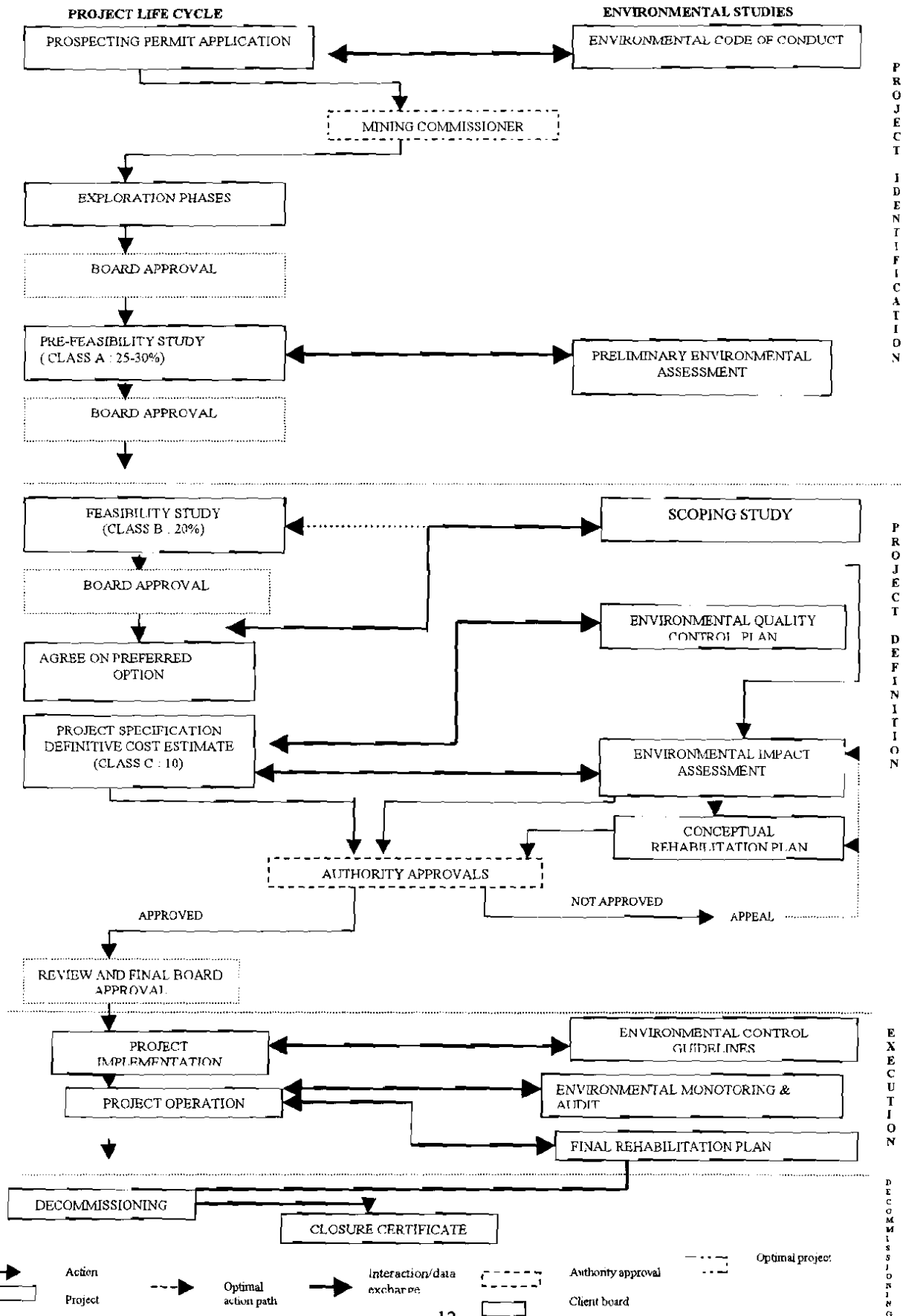
18. Tanzania too has no specific mining environmental legislation. In the absence of that framework, Tanzania had included in its Musugu artisanal gold mining programme, a detailed environment impact assessment of mining activities on environment with a view to coming up with a report containing:
- ❖ All possible impacts of these activities on environment;
  - ❖ Possible mitigation and enhancement measures; and,
  - ❖ Possibilities of special incentive scheme for encouraging miners on environmental protection measures.

19. In conclusion to this chapter on EIA, it should be noted that the outlines of the EIA report both in Guinea and Tanzania had been designed respectively for the Nimba and Musugu projects. According to our knowledge, there is no general guidelines for the establishment of an EIA as observed in some other developing countries.

#### IV.2.2. The Integrated Environmental Management: Case study of Okandanje graphite project in Namibia

20. In spite of its wide adoption, EIA is rejected by some people who find it anti-development. South Africa for example had developed several models of what it calls an Integrated Environmental Management (IEM) plan. Unfortunately those models had never been published.
21. The IEM model reproduced hereunder and discussed in this study had been established by a Namibian consultancy firm, Warmsley Consultants, for a graphite project located in north-central Namibia.
22. The Okanjande project aimed at producing from an open pit, 4, 200,000 tonnes per year of graphite ore and 20,000 tonnes per year of high quality graphite from a plant adjacent to the pit.
23. In the Warmsley model, the project life is divided in four phases:
- The Project identification phase;
  - The Project definition phase;
  - The Project execution phase; and,
  - The Project decommissioning phase.
24. During the project identification phase, as required by the Namibian 1992 Minerals Prospecting and Mining Act, a preliminary environmental assessment(PEA) was made. Such an assessment include indications on the environmental control methods the miner intends to use and measures he intends to take to rehabilitate mined-out sites.

# INTEGRATED ENVIRONMENTAL MANAGEMENT AND MINING OF NAMIBIA



The PEA is established simultaneously with the pre-feasibility study and moreover, it should be at the same level of details of that study. Users of IEM are of the opinion that this stage is the most important of the entire IEM process for the PEA is designed when the miner is developing and evaluating various mines development options in layout plans.

At Okanjande, the PEA identified the following project impacts on environment:

- ❖ Water pollution from the tailings dam, waste dumps and the open pit due to high concentration of pyrite and pyrrhotite in the ore body;
- ❖ Dust from the tailings;
- ❖ Impact on farm operations.

**Contacts were then made with local communities especially farmers to take into consideration their concerns and more important to establish lines of communication with them**

It should also be underlined that at this stage, recommendations for temporary and permanent rehabilitation of mined-out areas were also made and alternative models of tailings disposal (adoption of dry tailings disposals) developed.

25. During the project definition phase, a feasibility study including a pilot plan operation, production of samples and ongoing market, was carried out. At that time, a scoping study for EIA, **involving interested groups and affected local farmers was performed. Issues addressed by the study included social conflict, rehabilitation, dust, pollution.**

After approval of the study recommendations, a project quality plan (PQP) was drawn up with one of its sections including an Environmental Quality Control Plan (EQCP) on the basis of which future design decisions were taken.

Since most of the impacts had been already addressed during the previous phase, the EIA report at this stage focussed on the mitigation of measures already taken. Here it should be mentioned that :

- ❖ Impacts associated with the construction of the mine, plant and other relevant infrastructure were addressed separately;
- ❖ Report addressed also health and safety issues;
- ❖ Trials of revegetation were started on a pilot plant trailing dam to identify suitable vegetation to grow on the tailings.

26. The project execution phase started with the construction of the mine. It also included the commissioning of the mine and its ongoing operation.

During that phase, recommendations of the EIA were to be translated into practice. This is another important step- indeed the second one after the PEA- of the IEM process for it implies control of the implementation of measures taken to protect the environment. For that purpose, environmental control requirements should be included in the mining agreement and a person assigned for the day-to-day carrying out of the work on the mine site based on established control guidelines.



At that very stage, an annual environmental audit for the monitoring of progress in the implementation of the EIA recommendations was envisaged.

27. For the decommissioning phase, the IEM suggests that a plan of that phase should be established long before the mine closure to ensure that pre-emptive measures if necessary could be taken before it is late. Such a plan should address issues such as final rehabilitation, long term pollution control etc..
28. To conclude on IEM, it should be noted that for its developer, EIA is only one stage in the IEM which is a more integrated approach to environmental issues related to mining projects.

#### *V. Experiences from other developing countries*

29. Non African countries selected for this study include three Asian countries, Indonesia, Malaysia, and Philippines and Papua New Guinea. The choice of these four countries had been dictated by the facts that:
  - Issues regarding environmental protection are given high priority in their national development policies. Indeed except for Malaysia, concern for environment protection is explicitly expressed in the constitutions of these countries. For example in Indonesia, Article 33 of the 1945 Constitution of Indonesia provides the constitutional basis for environment pollution control and natural resources management policies.
  - Practice based on submission of EIA to address concerns for environment protection against impacts of mining activities is common and in some cases, dates back to the early 1980s.

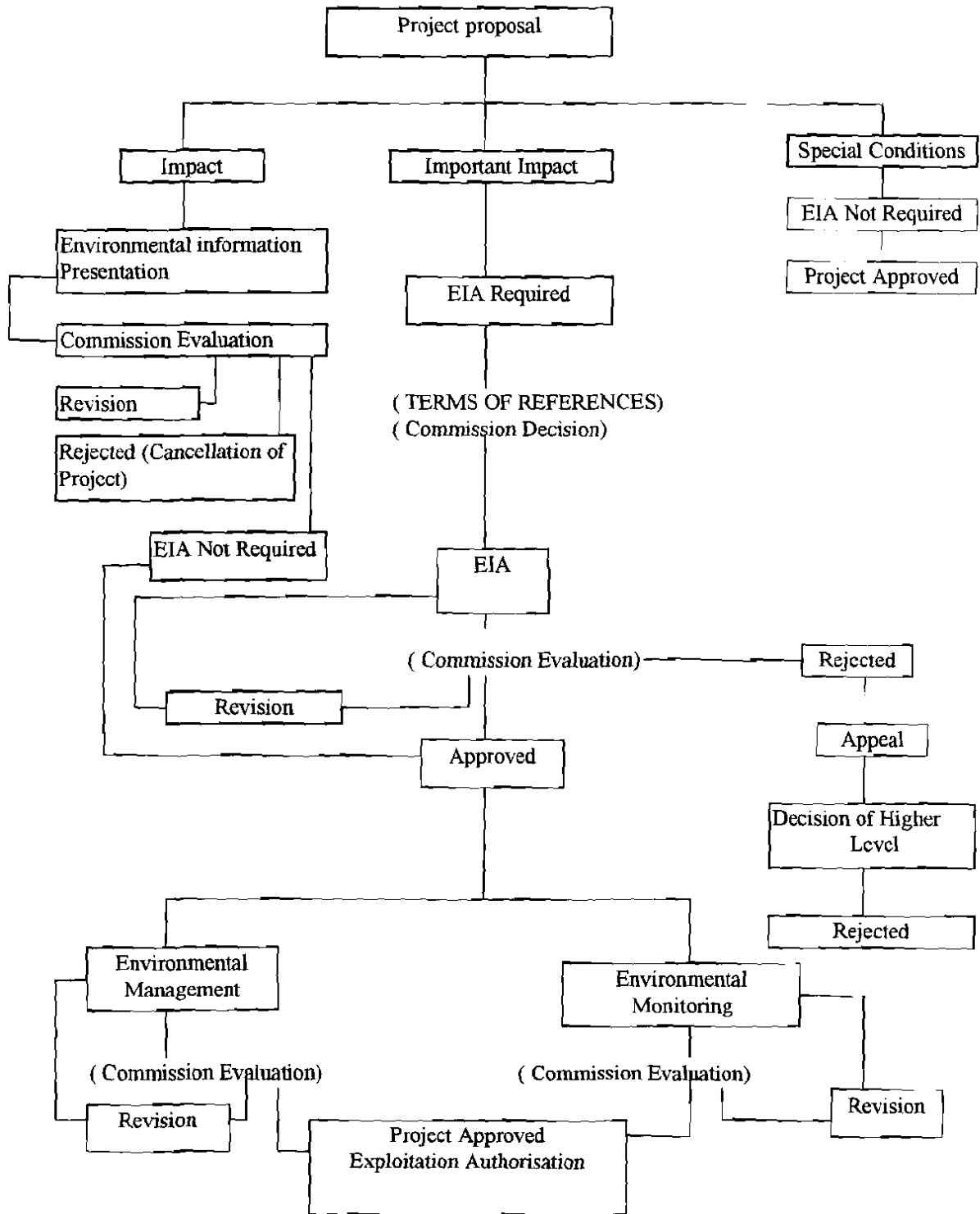
##### V.1. Case study of Indonesia

30. In Indonesia, there are several pieces of legislation regulating the operations and environmental aspects of the mining industry. These include :
  - Law No 11 of 1967 which is the basic provision on mining: Article 30 of that law stipulates that “ After completion of mining for minerals in any mine, the holder of the relevant mining authorisation is obliged to restore the land in such condition so as not to evoke any danger of disease or any other hazards to the people living in the surrounding of the mine”;
  - Regulation No 4 of 1974 on the management of operations and measures to prevent any adverse effects and pollution due to mining operations;
  - Presidential Decree No 4 of 1976 regulating mining operations with regard to agriculture, forestry, transmigration and public works;
  - Article 16 of Act N0 4 of 1982, the main enabling environmental law of that country which provides that for any plan which could be expected to create an important impact on the environment, **one should carry out an Environmental Impact Analysis**, the implementation of which is guided by government regulations. In respect to this,
    - A Central commission on Environmental Impact Analysis had been established at the Department of Mines and Energy;

- A Technical Commission on Environment Impact analysis had been created ;
  - Regulation 0185K/008/M.PE/1987 had been enacted to elaborate on the formulation , preparation and presentation of environmental information and environmental impact statements in the area of mining;
  - Regulation 1158 K/008/M.PE/1998 had been enacted to explain the formulation of environmental impact analysis statements for mines and energy undertakings;
- Article 6 (1) and (2) of Regulation 29 which state that the EIA is part of the feasibility study and that costs of environmental management are part of the normal project costs.
31. With regard to the implementation of the EIA , related administrative regulations provide that major impacts to consider should include :
- The total number of people affected;
  - The size of the area affected;
  - The length of time during which the impact will persist;
  - The intensity of impact;
  - The number other environment components affected;
  - The cumulative nature of impact;
  - Whether the impact is reversible or irreversible.

Table 2 shows a model of Environmental Impact analysis of Indonesia .

Table 2. Indonesia's Environmental Impact Analysis (EIA) based on Regulation NO. 29/1986



## V. 2. Case study of Malaysia

32. In Malaysia, each state of the two federal states has its own mining law. Anyway, the prevailing feeling with regard to protection of environment is that provisions of the majority of these laws on that issue are inadequate. As remedial measures,
- Following terms are incorporated in the mining lease:
    - Mining shall not be allowed within a certain distance from railroads , infrastructure, rivers etc...;
    - Rehabilitation of mined-out areas;
    - Waste water must be circulated;
    - Discharge of waste water and effluent into the river system is prohibited unless a license has been issued by the Department of mine;
    - Undertake steps to prevent soil erosion and water pollution; Land shall be filled and levelled upon completion of mining;
    - Land shall be stabilised upon completion of mining ;
  - EIA had been made mandatory since 1988 ( by Section 34 A of Environmental Quality (Amendment Act) Act 1985 ). Details of prescribed activities which require submission of EIA reports are provided in Environmental Quality Order 1987. With regard to mining, they include:
    - Mining of minerals in new areas where the mining lease covers a total area exceeding 250 hectares;
    - Ore processing, including concentrating for aluminium, copper, gold and tantalum;
    - Sand dredging involving an area of 50 hectares or more.

The EIA should be done during the pre-feasibility stage and the report should be prepared by the project proponent through a consultant accredited or registered by the national Department of Environment.

A technical committee within that department reviews the report.

## V. 3. Case study of Papua New Guinea

33. In Papua New Guinea, Mining Act 1992 is the principal piece of mining legislation. The Act among others mentions that mineral resources should be explored and mined to the maximum practicable extent consistent with environmental legislation and ... most important consistent with modern technical concepts adapted to cultural setting of the country. In addition, Chapter 195 A of the Act deals with provisions on mining safety.
34. Another piece of law relevant to mining is the Environmental Planning Act 1978, which is the principal environmental legislation of the country. That law requires that an

Environmental Plan (EP), a kind of report on initial plans that the investor intends to adopt to ensure protection of the environment from identified impacts of the project be submitted to the Department of Environment and Conservation.

35. General guidelines for environmental plans of Papua are annexed to this report. It should be noted that the government of that country initiated in 1994 the formulation of guidelines for the integration of Social Impact Assessment and Social Monitoring as part of the larger process of environmental planning and monitoring. This initiative came as a consequence of the Bougainville crisis.
36. Procedures for their implementation include consultations among the project proponent, the Department of Environment and Conservation, relevant provincial governments and local communities based on an environmental inception report. Such a report among others, identifies sensitive areas and proposes programmes for environmental study at the pre-feasibility level. Another report of the kind is also prepared by the project proponent at exploration phase.

#### V.4. Case study of Philippines

37. In the Philippines, mining activities are governed by Presidential Decree NO 463( PD 463) of 17 May 1974 and many other pieces of legislation among which :

- Mines Administrative Order No 20, series of 1997 (26 July 1977) which lay down to the detailed environment policy for mining areas relative to:
  - Environmental protection in mining areas;
  - Surface mining;
  - Underground mining;
  - Mill waste tailings disposal and water conservation;
  - Socio-economic development;
  - Restoration and rehabilitation of mined-out areas;
  - Establishment of an Environmental Protection and Enhancement unit in every mine.
- Presidential Decree No 1198 (19 September 1977) which “ mandates all individuals, partnerships or corporations engaged in exploration, exploitation of natural resources or in the construction of infrastructure projects to restore or rehabilitate areas subject thereof or affected thereof to their original condition”;
- Presidential Decree No 1251( 28 November 1977) known as Mine Waste and Tailing Fees . Decree 1251 imposes on mining companies fees to compensate landowners for damages caused by the proximity of mine waste, mill tailings and for other purposes;
- DENR Administrative Order No 82, series of 1990, and DENR Administrative Order No 82-1 , series of 1990 which among others requires applicant to mining title to undertake an Environmental impact Assessment.

37. In addition to the above mentioned laws, miners are, since 1977 obliged to prepare an EIA studies. **The results of these studies are presented in public hearings.**

38. The legal framework of that EIA is implemented by Presidential Decree (N0 1586 ) which is supported by subsidiaries laws, rules and regulations, the most important of which is Proclamation N0 2146 . That Proclamation defines the EIA coverage to an environmentally critical projects and projects located on environmentally critical areas through an enumeration of projects and ares for which an EIA should be submitted.
39. Other practices regarding environment protection in that country include:
- An obligation for miners to post performance bonds, surety bonds and an Environmental Guarantee Funds;
  - Environmental monitoring by the miner himself .

## VI. Concluding remarks

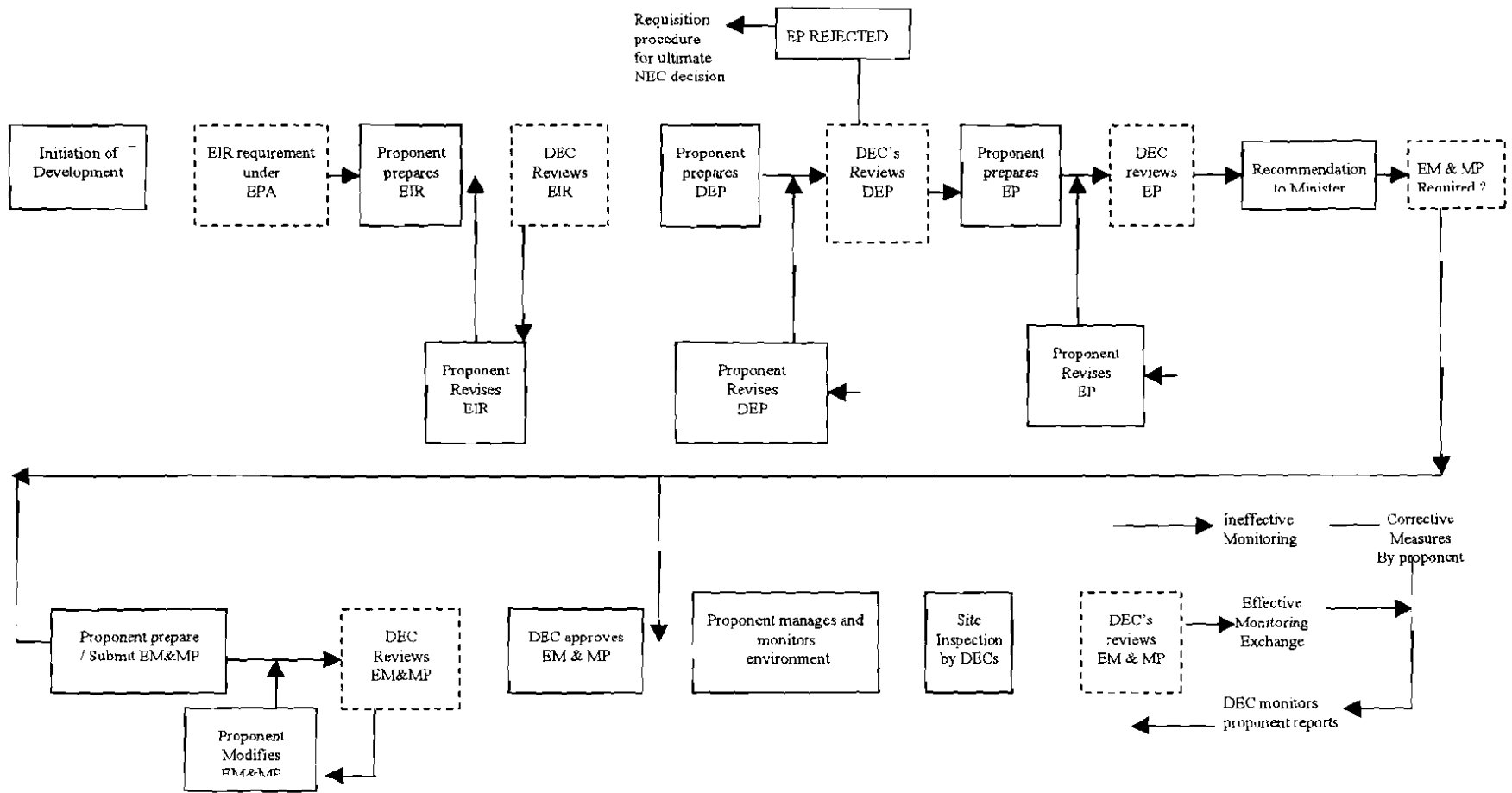
40. In some African countries, steps have been taken to establish a specific mining environmental legislation, especially through the inclusion in mining codes of provisions on mining and protection of environment. However, even in those countries efforts are yet to be made to match these laws with the importance of environment protection.

Indeed, the following shortcomings of these specific mining environmental laws should be addressed:

- Vagueness of the formulation;
  - Non technical feasibility of some remedies especially with regard to mined-out areas rehabilitation ;
  - Non discrimination between large and small scale mining, especially with regard to rehabilitation of mining sites.
41. Fortunately, these shortcomings can be offset by the adoption of practices such as the Environmental Impact Assessment and the Integrated Environmental Management and Mining. However, if general guidelines had been formulated in other developing countries such as Indonesia, Papua New Guinea just to cite those two, in Africa, guidelines of the few EIA had been established and are attached to specific projects.
42. To provide African countries with more information on environmental guidelines as well as on the outline of an EIA report, samples established respectively by UNDTDCD/DES and the World Bank are annexed to this report.
43. Another issue which springs to mind after reading the experience in the selected Asian countries is the issue of implementation of programme environmental management. While in African countries it is understood that this responsibility falls on Mining Authorities, it should be noted that countries such as Indonesia and Philippines had established specific national and local bodies to cope with the difficult task of implementation, enforcement and monitoring of environmental management plans. Especially with regard to the enforcement, as mentioned before, except for Malaysia, the Asian countries dealt with in this study had incorporated in their constitution provisions on environment protection. This not only highlights priority given to that issue or concern, but also provides a clear mandate to appropriate authorities to enforce the laws.

44. Finally, although issues of social impacts of mining are not dealt with in African mining codes with provisions on environment, a trend shared by other developing countries, it should be noted that in the framework of establishment of EIA reports and Programme Management Plan, some African countries such as Guinea refer to some related aspects such as land settlement, indigenous people moving away from traditional business and joining mining enterprises .

Annex 1 : PAPUA NEW GUINEA : ENVIRONMENTAL PLANNING PROCESS





**Annex 2: World Bank outline of an EIA report**

1. An executive summary (a summary of significant findings and recommended actions);
2. Environmental regulations (policy, legal and administrative framework related to the project);
3. Project description (detailed description , including technical, geographic, economic, social and temporal context and off-side investments required: pipelines, roads, power plants, water supply, housing, storage);
4. Baseline data (area dimensions; description of relevant physical biological and socio-economic conditions);
5. Analysis of alternatives, including no alternatives (potential environmental impacts, capital and recurrent costs, institutional capacities, training, monitoring requirements for all design, site, technology and operational alternatives );
6. Environmental impacts ( positive and negative impacts likely to result from the proposed project, dealt with in the project);
7. Mitigation plan (feasible, cost effective , mitigation measures that may reduce adverse impacts on the environment to acceptable levels; compensatory measures if mitigation cannot be implemented);
8. Monitoring plan (plan, monitoring agency or individual , cost estimates and other pertinent information such as training);
9. Appendices
  - Personnel and organisations involved in the environmental assessment;
  - Persons and organisations contacted , including their addresses and telephones);
  - References.( written material used in study preparation);
  - Record of interagency/forum meetings.

**Annex 3: Environmental Guidelines for Mining Activities**

<b>Environmental Guidelines for Mining Activities</b>	
1.	Environmental management should be given a high priority, during the planning of mines, during the licensing process, and through the development and implementation of environmental management systems. Environmental management includes early and comprehensive environmental impact assessments, pollution control and other preventive and mitigate measures, monitoring and auditing activities, and emergency response procedures.
2.	Environmental accountability within industry and government rests with the highest management and policy-making levels.
3.	Employees at all levels have an individual responsibility for environmental management. Management must ensure that adequate resources, staff, and requisite training is available to implement environmental plans.
4.	Effective management requires the participation and dialogue with the affected community and other directly interested parties on the environmental aspects of all phases of mining activities.
5.	Environmentally sound mining technologies and practices should be adopted in all phases of mining activities. There is a need to increase the transfer of appropriate technologies which mitigate environmental impacts, including those from small scale mining operations.
6.	Best current practices should be adopted in all mining projects to minimise environmental degradation, notably in the absence of specific environmental regulations.
7.	Infrastructure, information systems, service, training and skills in environmental management needs to be reinforced in relation with mining activities.

Source : UNDTCD /DES International Round Table on mining and environment, Berlin, 1991.

## Reference

### Countries

#### Angola

Law on Geological and Mining Activities( Mining Law): Law No 1/92 of 17 January 1992.

#### Côte d' Ivoire

Code minier : Loi No 95-553 du 18 juillet 1996, Ministère des Ressources Minières et Pétrolières.

#### Guinea

Act L/95/036/ctm Relating to the Mining Code of the Republic of Guinea.

Nimco: Projet minier des Monts Nimba: Evaluation environnementale de 1990(Bceom).

#### Mali

Le cadre réglementaire du secteur minier et les opportunités offertes aux investisseurs privés au Mali.

#### Namibia

Minerals (Prospecting and Mining Act) 1992: Government Gazette of the Republic of Namibia No 564, Windhoeck, 31 December 1992.

Abstracts of Conference on Mining investment in Namibia, 17-19 March 1993, Ministry of Trade and Energy.

#### Niger

Niger fiscal and legal aspects of mining investment, Ministry of Mines, 1997.

#### Senegal

Actes du Forum-Séminaire sur le secteur minier au Sénégal, 11-13 Avril 1996, Dakar, publiés par le Ministère de l' Energie, des Mines et de l' Industrie.

#### Uganda

Opportunities for mining investment, The Republic of Uganda, 1996.

**General**

1. Environmental Aspects of Selected Non Ferrous Metals(Cu,Ni, Pb, Zn, Au) Ore Mining, A Technical Guide UNEP/IEPAC, 1991.
2. Environmental Legislation for the Mining and Metals Industries in Asia, UNCTAD/COM/40, 8 March 1994.
3. Management of commodity resources in the context of sustainable development: Social impacts of Mining , UNCTAD/ITCD/COM.5 21 August 1997