



# **CAPACITY BUILDING IN ASM IN AFRICA**

**SEAMIC-Tanzania**

**9<sup>th</sup> CASM CONFERENCE**

**Maputo, Mozambique**

**September 10, 2009**

# INTRODUCTION

- Background
- Training of Trainers
- Training of Trainees
- Fields of specializations relevant to ASM
- Institutions in Africa relevant to ASM
- Sustainability of ASM
- Environmental protection issues in ASM
- Concluding remarks

# BACKGROUND

- ASM practitioners in the southern and eastern Africa sub region have developed from liberalization of mineral trade
- Low level of educational status of ASM
- Mining by ASM based on trial and error
- Non-sustainable business venture
- Most ASM have a very poor knowledge in minerals business fields before commencing their activities

# BACKGROUND

- A number of ASM entrepreneurs have attempted to purchase equipment and even to improvise some of the processing machines in order to improve mineral production
- However, the performance of the improvised machines is relatively poor due to
  - design factors and
  - poor operational knowledge

# BACKGROUND

- **Poor performance mostly due to:**
  - poor financial returns,
  - business uncertainty,
  - lack of credibility from some of stake holders especially financial lending institutions
  - Loss of business opportunities
  - Environmental degradation
- ❖ **Capacity building is therefore important to reverse the situation**

# TRAINING OF TRAINERS

- Number of persons involved in ASM is relatively very large in each country compared to the number of experts in the field and therefore:
- There is a need to introduce the training of trainers in **basic mineral exploration, extraction and beneficiation** areas
- This will later facilitate delivery of outreach capacity building activities to ASM practitioners in respective countries

# TRAINING OF TRAINEES

- A large proportion of ASM stakeholders do not have the necessary and sufficient knowledge on mineral exploration, extraction and beneficiation
- This results in poor and inefficient mineral production and often loss of business opportunities
- Environmental damage is also a result of lack of proper knowledge in the impact of mineral production activities to the environment

# TRAINING OF TRAINEES

- Therefore a need for introduction of human resources capacity building activities in the technical and financial management fields in order to arrest the problem and improve mineral production.
- **A properly informed human resources is a potentially powerful and productive development resource.**



# **FIELDS OF SPECIALIZATIONS RELEVANT TO ASM**

- Mining business development and management skills
- Mineral production techniques and beneficiation skills
- Operational requirements of mineral recovery systems
- Mineral development and environmental protection and remediation
- Provide consultancy on the role and importance of mineral service providers and stakeholders to ASM.

# **INSTITUTIONS IN AFRICA RELEVANT TO ASM**

- Geological Surveys and Commissions of Mines in respective countries.
  - Issue of ownership licenses for mineral claims
- Mineral service providers
  - Laboratory scale testing and analysis of geological materials for resource evaluation
  - Mineral beneficiation studies and advisory services
- Mineral consultancy institutions
  - Consultancy and advisory services
- Financial lending institutions
  - Project financing

# INSTITUTIONS IN AFRICA RELEVANT TO ASM

- Legal advisory institutions
  - Legal rights
- Equipment manufacturers and suppliers
  - Supply of appropriate mining and processing equipment
  - Equipment servicing and maintenance contracts
- Environmental regulatory institutions
  - Monitoring of projects' environmental compliance

# SUSTAINABILITY OF ASM

- Given the huge mineral endowment in our countries, ASM has the potential of becoming
  - very important national income contributor and
  - the **future medium and large scale mining industries** in the sub region.
- Increased **commitment** by respective countries
  - provision of conducive and favorable policies pertaining to the ASM sub sector

# SUSTAINABILITY OF ASM

- Provision of technical assistance in basic mineral development techniques as **national investment** for the positive future of ASM sector
- Institution of regulations and milestones for ASM development practices
- Institution of regulations for continued education for ASM practitioners during the lifetime of their projects
- Institution of incentives for improved technology practices
- Institution of incentives for environmental compliance practices

# ENVIRONMENTAL PROTECTION IN ASM

- Mineral production activities are environmentally unfriendly
- This is markedly noticeable in ASM activities and caused by
  - lack of knowledge in environmental hazards resulting from mining activities and
  - neglect of environmental hazards caused by mineral extraction in favor of profits arising from sales of mineral products.

# ENVIRONMENTAL PROTECTION IN ASM

- Dissemination of knowledge on environmental aspects of mining is needed in order to arrest the situation
- Regulations must be instituted for ASM practitioners for protection of the environment during the lifetime of their projects

# Tanzania (Case study)

Mine shafts along a quartz reef





# Tanzania (Case study)



Note the exposed quartz reef

# Tanzania (Case study)

## Timbering of a mine shaft





# Tanzania (case study)

Manual winding shaft for haulage of ore from pits



# Tanzania (Case study)

Ore upgrading area with ponds to recover process water



# Tanzania (Case study)

## Applied ore processing procedure

- Crushing and grinding to liberate locked gold particles
- Pre-concentration of milled ore by sluicing
- Extraction of gold through amalgamation
- Recovery of amalgamated gold by squeezing
- Burning the gold amalgam to obtain raw gold

[Crushing](#)

[Ore grinding.mpg](#)

[Sluicing](#)

[Sluicing 2.mpg](#)

[Amalgamation](#)

[amalgam squeezing.mpg](#)

[amalgam burning.mpg](#)

# Tanzania (Case study)

Grinding of ore in diesel engine driven intermittent mills





# Tanzania (Case study)

Pre-concentration of ore through sluicing



# Tanzania (Case study)

burning of the amalgam





# Tanzania (Case study)

Raw gold obtained after burning of the amalgam –  
*ready for sale*



# **CONCLUDING REMARKS**

**“KNOWLEDGE IS THE  
DRIVER OF DEVELOPMENT”**

**A knowledgeable human resources is  
a potentially powerful and  
productive development resource**

**Therefore strengthen and implement capacity  
building programs aggressively**