

Investing in Water and Waste Management Technologies in the Mining Sector

4th Annual IWRM Conference

Gallican CYESA (SDMR)

21st March 2019

Kigali-Marriott Hotel

No Water, No Business

Nature of Mining Business



SDMR and Interventions

- Sustainable Development of Mining in Rwanda (SDMR) is a UK funded programme to respond to the need to address the barriers to the transformative potential of Rwanda minerals sector;
- Three years of lifetime from April 2017 to April 2020; It has the following interventions:
 - ❖ Mining Regime Review
 - ❖ Mineral Value chain Analysis
 - ❖ Access to Finance
 - ❖ Geological Management System Review
 - ❖ Mineral Resources Information Management System
 - ❖ Mining Services Aggregation Centers
 - ❖ Crosscutting

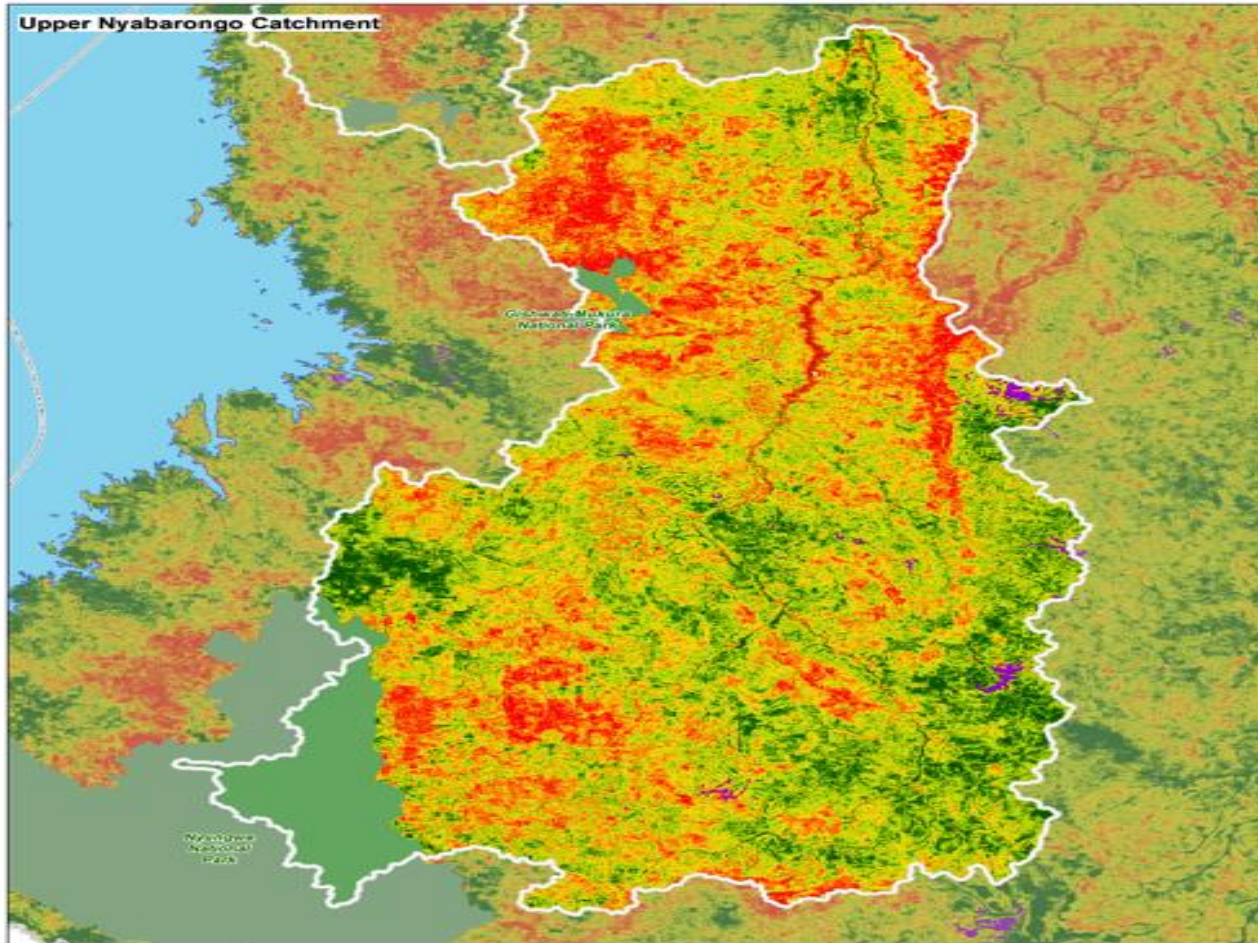
Mining-Water background

- Rwanda relies on traditional uses of land and water for its social and economic cohesion;
- Mining in Rwanda is characterised by a wide distribution of small-scale sites;
- Inefficient mining and processing practices, poor management of water and mineral wastes and an absence of effective closure and rehabilitation activities;
- Unregulated mining activity has negative environmental impacts on the land, soil and water resources of the country;
- These land-use activities, with water capture, use and discharge from mining activities have significant impacts on water quality and quantity for downstream users;

Mining-Water background

- High waterway sediment loads have been identified as a problem, due mainly to poor management of ore extraction and processing sediments;
- Catchment mapping/planning has identified landscape erosion being common where mining activity is recorded - degraded waterways, lost landscape productivity, gullies, etc;\
- Erosion and sediment transport and loading in water-bodies has positive and negative impacts to aquatic habitants and ecosystems

Mining Activity



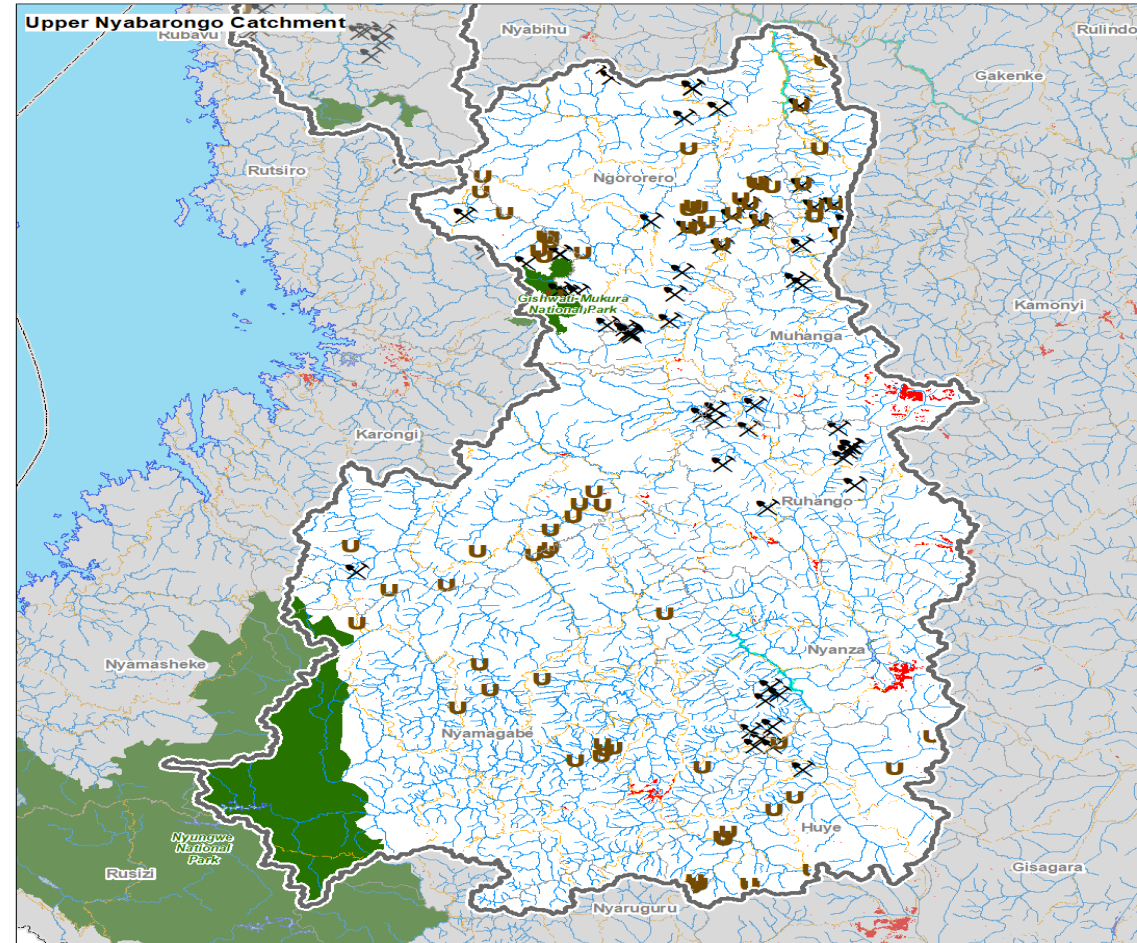
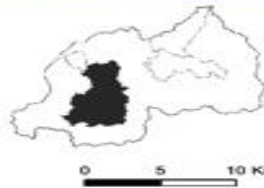
1. Soil erosion risks

Methodology: Revised Universal Soil Loss Equation (RUSLE)

- Demonstration Catchment
- Settlements
- Lakes
- National Parks
- Country

Potential Soil Erosion Risk in Rwanda

- Risk (t/ha/year)**
- Very low (0 - 5)
 - Low (5 - 10)
 - Moderate (10 - 25)
 - High (25 - 50)
 - Very high (50 - 100)
 - Extremely high (>100)



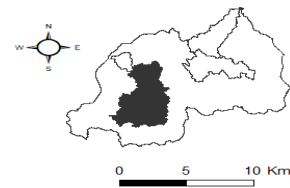
2. Other catchment degradation risks

Degradation (risks)

- Mining sites
- Gullies
- Roads on Slopes (>15%)
- Rivers
- Flood risk zones

Other map elements

- Demonstration Catchment
- Settlements
- Wetlands
- Lakes
- National Parks
- District
- Country

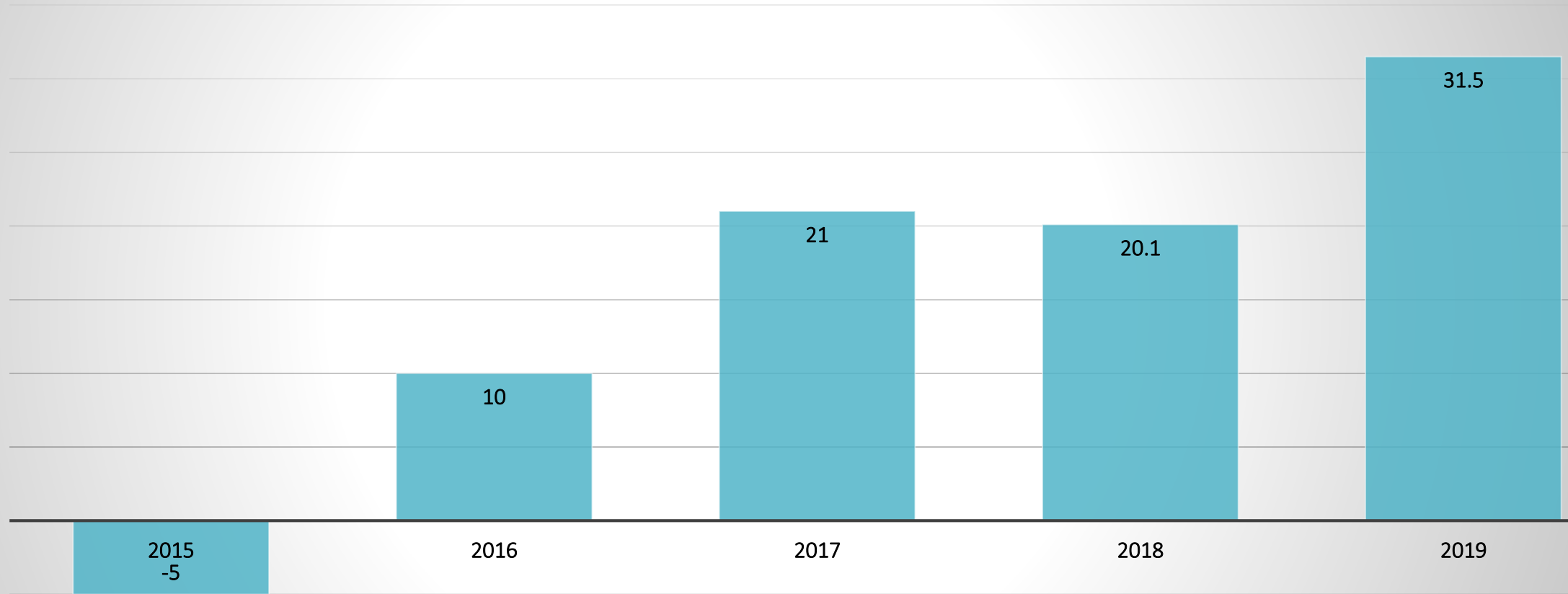


Economic Contribution of Mining Sector

- In 2013 the mining sector was ranked as the second largest exporter in Rwanda, generating circa USD 225 million of foreign exchange;
- But approximately 80% of mining activities are small scale, artisanal or unregulated;
- The contribution of the mining sector to export revenues has fallen every year in the three subsequent years - 2014 USD 203.3 million; 2015 USD 117.8 million; 2016 USD 86.4 million (2017 indicative figures indicate an increase to USD 125 million);
- Over the period 2013 to 2016 there has been a steady decline in the volume of mined minerals - Tin, Tantalum and Tungsten all showing a steady decline in average production volumes over the period 2013 to 2016

Economic Contribution of Mining Sector

Mining contribution on real GDP growth%



Source: BNR: Monetary Policy and Financial Stability Statement, 21st February 2019

Some of challenges

- Water experts warn of a serious global water shortage, the need for sustainable water management within the mining industry has become critical;
- The mining business is conducted in way that is water inefficient, erosion generating and unmanaged manner;
- Inadequate and insufficient financial resources as well as human resources to meet the IWMR and Environment management;
- Lack of involvement of surrounding community who are mainly affected by the impact of the related activities;

Some of challenges

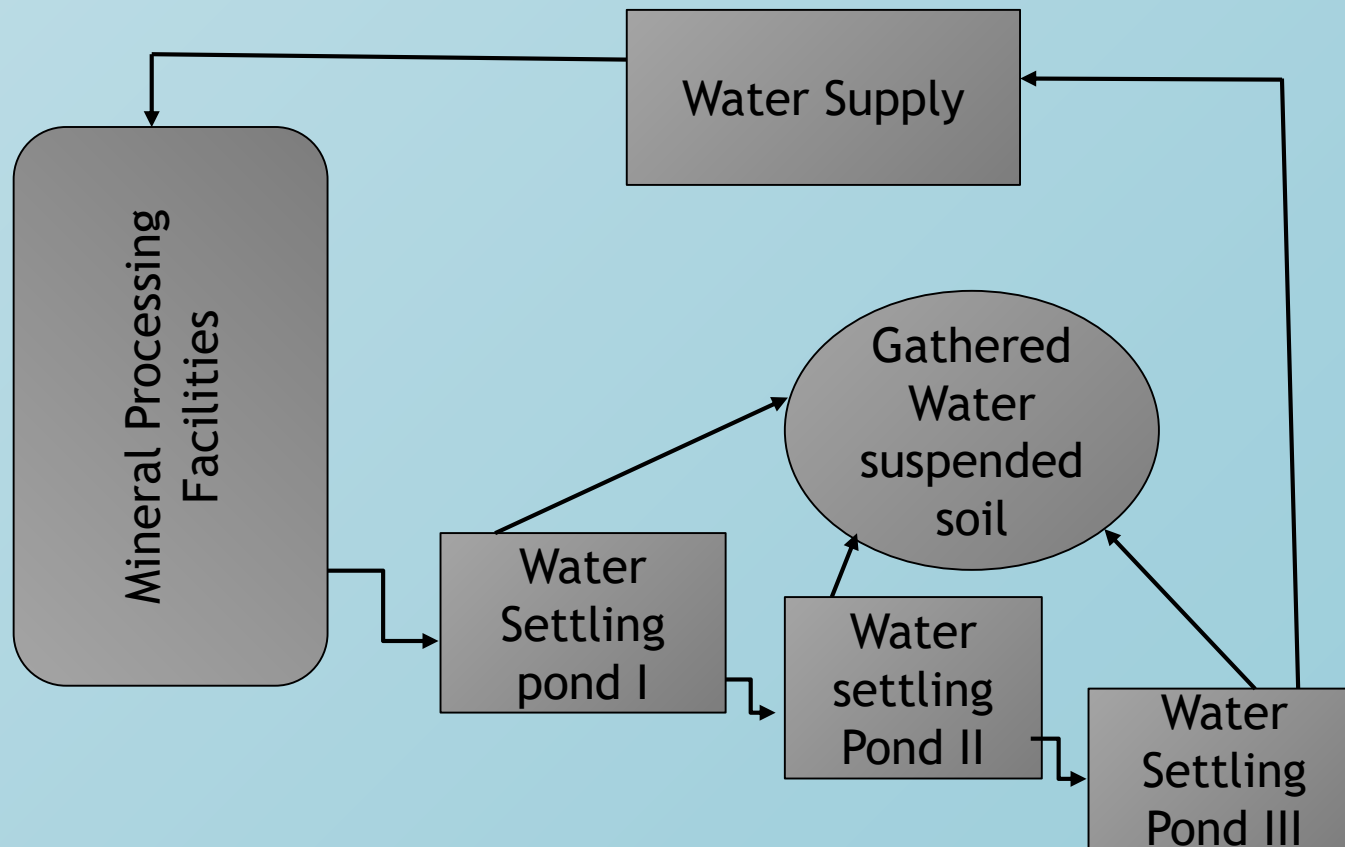


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Impact of inefficient mining and processing

- Impact on land use and quality through mining-related disturbance and unmanaged disposal of mineral wastes;
- Discharge of sediment-loaded processing water and ongoing erosion of disturbed land and mineral wastes from multiple mining sites;
- Leads to downstream contamination and loss of water use potential and water quality within the wider water catchment.

Water reuse in mineral processing



- ❖ Some mining companies have tried to create water reuse methods for production cost purposes;
- ❖ The systems are poorly built and inefficiently operating

MSAC2 and KKN Company

- Ongoing process to manage and improve water use, land restoration and waste management through the EPI fund for MSAC2 and KKN company operating in upper Nyabarongo catchment area;
- Demonstration projects, provide the best practices and ‘facts’ for water;
- Construction of water/sediments retention ponds;
- Construction of a water recycling system;
- Rehabilitation of mined area and closed mine sites;
- Involve the catchment community for water resources management and land restoration(land use);

Evidencing of success



September 2015



April 2016



MSAC2 and KKN Company

- IWRM & LR cost-sharing investments and best practices - in an MSAC2 and KKN Company in the mining sector could include:
 - *Water intake protection*
 - *Water pipe / channeling to water storage point(s) and return to river*
 - *Water storage facility (inc. tanks, ponds, rainwater harvesting, etc)*
 - *Water using processing technology (inc. mobile jigs, etc.)*
 - *Tailings storage benches*
- Demonstration landscape restoration activities that lead to the creation of detailed specifications for mine closure

Points of discussions

- Water efficiency improvements have to be made by adopting new technologies;
- More efficiency in processing, incorporating reuse, recycling and finding alternative sources of water;
- Centralizing the mining and processing operations from mining sites to improve water and waste management;
- Investigating methods of valuing water in mining, mineral processing and mining rehabilitation;
- Analyze water footprint from the point where ore is extracted through the production process, and on to its end use and disposal.
- Water stewards rather than water polluters

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Thank you!