The Gold Mining Company of the Future

Nick Holland, CEO Gold Fields

Gordon Institute of Business Science, Johannesburg | 28 October 2015
The global Gold Industry has failed to realize full value over the last decade due to 6 headwinds.
The global Gold Industry has failed to realize full value over the last decade due to 6 headwinds.

Geological inflation is driving double-digit cost inflation.

Today it takes an average of 18 years from discovery to first production versus 10 years a decade ago.

The average grade of gold mined has fallen 3% p.a. since 2000.

Clashes with local communities rose 22% p.a. in the last decade.

Governments seeking greater benefits from mining operations.

Gold prices have declined by 36% since the peak.

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1 includes grade degradation, processing recoveries and tougher operating conditions.
Even though prices are up 3x since 2000, costs have risen squeezing margins

Average annual gold price and cost, US$ per ounce

WHERE ARE WE TODAY?

1 All In Sustaining Costs = total cash cost + sustaining capex

As a result, shareholder value has been destroyed by between 50-80% since 2007.

WHERE ARE WE TODAY?

Invested capital including Goodwill and other intangibles

Source: McKinsey Corporate Performance Analysis Team, Capital IQ, Annual reports, McKinsey analysis

1 Invested capital including Goodwill and other intangibles
We are still relevant and important to the global economy, particularly in developing countries.

What about gold as a commodity?
Gold mining is critical to the people it employs as well as the local community... especially in developing economies...

**Investment in people...**

- **4.2M** people employed
  - (1M directly)
- **90%** local employees

**Impact beyond the mine...**

- **US$284M** invested in socio-economic development
- Significant **infrastructure spend** on road, power, water facilities and educational and health facilities
- **Focus** on healthcare – eg. HIV/AIDS, TB, malaria

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1 2014 data for: Gold Corp, Newcrest, Barrick, Newmont Mining, Gold Fields, AngloGold Ashanti, Kinross
2. 1% of total expenditure
3 2013

Source: Press search, company annual reports
**WHAT ABOUT GOLD AS A COMMODITY?**

**...to the global economy**

**Contribution to global economy...**

- **US$171.6Bn**
  - total GDP contribution, (direct contribution = 49 percent)

- **77%-90%**
  - of operational expenditure remains in the host country\(^1\), \(^2\)

- **60%**
  - of the top 30 gold producing countries are low or lower-middle income

**... and a safe haven around geo-political crises**

Gold price, US$/oz

- **Peak post financial crisis**: 1,670
- **Soviet/Afghanistan war; Iranian revolution**: 615
- **Oil shock**: 161
- **Black Monday**: 446

1 2014 Press search
2 2014 data for: Gold Corp, Newcrest, Barrick, Newmont Mining, Gold Fields, AngloGold Ashanti, Kinross
3 2013 World Gold Council

Source: Press search, Company annual reports
WHAT ABOUT GOLD AS A COMMODITY?  
... and is still an industry worth investing in

<table>
<thead>
<tr>
<th>Trend</th>
<th>Long-term price impact</th>
<th>Trend</th>
<th>Long-term price impact</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demand</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Jewelry</td>
<td>Increase in Chinese and Indian middle classes</td>
<td>Investment</td>
<td>Development of new Far East investment platforms to stimulate local demand for gold</td>
</tr>
<tr>
<td>Investment</td>
<td>Portfolio diversification; Protection against inflation and sovereign risk</td>
<td>Central banks</td>
<td>Central banks continue to be net purchasers</td>
</tr>
<tr>
<td><strong>Supply</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipeline</td>
<td>Exploration spend has more than halved from 2012 to 2014 – reduced mine supply from 2006/17</td>
<td>Productivity</td>
<td>Short term cost reduction and efficiency improvements largely implemented</td>
</tr>
<tr>
<td>Pipeline</td>
<td>Average reserve life has fallen from 18 years to 13 years</td>
<td>Mining inflation</td>
<td>Implementation of cost reduction programmes and leaner production methods have mostly been implemented</td>
</tr>
<tr>
<td>Grade erosion/depletion</td>
<td>No short-term technology advancements</td>
<td>Secondary supply</td>
<td>Increased secondary supply from 2017 onwards in line with price recovery</td>
</tr>
</tbody>
</table>

Source: CPM Group, SNL Metal Economics Group, McKinsey Global Institute, Press Search, Gold Fields
In the future, our industry will look vastly different from today.
A new recipe is needed for Gold for Gold to be viable

What does the future look like?

Requires new recipe for success

- Optimise major operational risks (e.g., labour, grade, ore complexity)
- Access new reserves or create value from previously unmined reserves
- Drive disciplined capital spending – better return for the dollar
- Deliver productivity and throughput increase with same resources
- Develop new approach to manage key stakeholders
- Willingness to enter partnerships to ensure sustainable operations

Gold industry needs to shift from reactivity to proactively shaping the gold industry of the future

Source: Company annual reports and investor presentations
The gold industry of the future has four focus areas:

### Operating practices & technology
- New exploration trends
- Mechanised, automated and digitized operations
- Technical advances through collaboration with OEMs and IT firms
- Greater energy efficient operations
- Reduced environmental impact

### Talent and leadership
- More technical skills – strong analytics and decisions based on empirical evidence
- High specialisation
- Local talent development
- New type of CEO

### Partnerships
- Governments – contributing equity
- Partnerships and Shared Value with local communities
- Risk-Reward relationship with employees
- Strategic partnerships and JVs to share benefits and manage risks
- Stakeholders will demand commitment to socio-economic and environmental factors

### Responsibility & transparency
- Close involvement of investors with greater transparency and access to operational data
- Knowledgeable investors will demand stringent corporate governance and adherence to world-class frameworks and standards

Source: Gold Fields
The “big operational issues” confronting gold mining...

- **Embracing digital mining** and full integration of big data, advanced analytics and new software technologies
- **Mining on demand** and ability to run agile production schedules
- Converting outstanding **conventional** mining practices to **mechanisation & automation**
- **Improving the economics** of:
  - Low grade ore bodies
  - Residual ore bodies
- Embracing **energy and water efficiency** with significantly reduced impact on the **environment**
## OPERATING PRACTICES & TECHNOLOGY

### For some of our challenges... Exploration

<table>
<thead>
<tr>
<th>What challenges need to be addressed</th>
<th>What technologies could address this</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size and qualities of discoveries are declining</td>
<td>Airborne Gravimetry - Electromagnetic surveys that provide greater coverage and depth</td>
</tr>
<tr>
<td>Reducing the cost of exploration</td>
<td>3D Seismics – High-resolution 3D geology model</td>
</tr>
<tr>
<td>Increasing the chance of exploration success</td>
<td>Directional drilling – drilling holes from a single site in different directions</td>
</tr>
<tr>
<td>Deeper ore bodies without surface outcrops</td>
<td>------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>

**Exploration**
For some of our challenges… Mining and Extraction

<table>
<thead>
<tr>
<th>What challenges need to be addressed</th>
<th>What technologies could address this</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased mining depth</td>
<td>Advanced analytics and modelling</td>
</tr>
<tr>
<td>Narrower ore bodies</td>
<td>Geographic Information Systems</td>
</tr>
<tr>
<td>Improved safety</td>
<td>Real-time tracking of equipment/people</td>
</tr>
<tr>
<td>Grade reduction necessitates high volumes</td>
<td>Advanced mine planning – understanding the dependencies</td>
</tr>
<tr>
<td>Increased remoteness of mining operations</td>
<td>Precision drilling</td>
</tr>
<tr>
<td>Rising labour costs</td>
<td>Back-filling of waste to boost extraction ratio</td>
</tr>
<tr>
<td>Escalating energy costs</td>
<td>Automation</td>
</tr>
<tr>
<td></td>
<td>In-pit crushing and conveying</td>
</tr>
<tr>
<td></td>
<td>Remote hauling trucks and loaders</td>
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<td></td>
<td>Hard-rock, non-explosive continuous mining</td>
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<td></td>
<td>AI and Robotics – learn from the military</td>
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<td></td>
<td>Underground technologies: Remote pillar mining; Large-scale block caving; Raise boring</td>
</tr>
</tbody>
</table>
For some of our challenges... Processing

<table>
<thead>
<tr>
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<tr>
<td>Refractory ore bodies</td>
<td>In-pit crushing and conveyance</td>
</tr>
<tr>
<td>Lower grades, which reduce recoveries</td>
<td>Predictive equipment maintenance monitoring</td>
</tr>
<tr>
<td>Increasing environmental controls</td>
<td>High pressure grinding rolls</td>
</tr>
<tr>
<td>Increasing water scarcity</td>
<td>Transmission sorting of ore through X-ray, density assessment</td>
</tr>
<tr>
<td>Increasing electricity costs</td>
<td>High pressure leaching – when conventional leaching does not liberate the metals</td>
</tr>
<tr>
<td></td>
<td>Environmentally friendly bio-leaching</td>
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<tr>
<td></td>
<td>Real-time, accelerated rock sorting technologies</td>
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<tr>
<td></td>
<td>Flexible closed-belt conveyor – adaptable to bends and changes in elevation</td>
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</tbody>
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## OPERATING PRACTICES & TECHNOLOGY

### For some of our challenges... Energy

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<tbody>
<tr>
<td>Rising energy costs</td>
<td>Increased energy efficiency</td>
</tr>
<tr>
<td>Energy supply constraints and disruptions</td>
<td>Use of renewable energy forms</td>
</tr>
<tr>
<td>Carbon emission standards and regulation</td>
<td>Underground water treatment systems – no need to pump water to surface</td>
</tr>
<tr>
<td>Stringent water emissions standards</td>
<td>Water treatment solutions (eg. RO plants)</td>
</tr>
<tr>
<td>Increasing water scarcity</td>
<td>Energy storage systems</td>
</tr>
<tr>
<td>Mine closure and rehabilitation</td>
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</tbody>
</table>
Mining companies are making strides forward on the digital journey – remote control centres and remote equipment increasingly common

**Rio Tinto**

remote center at Perth

“Oct 18 – Controlled from the Rio ops centre in Perth, 1 200km away, the first two mines in the world in Pilbara region started moving all of their iron ore using fully remote controlled trucks. It is now operating 69 driverless trucks across these mines. The trucks can run 24 hours a day, 365 days a year, without a driver, which has industry insiders estimating each truck can save around 500 work hours a year. Rio plans to fully automate its trains by the middle of next year.”

**BHP**

remote center in Perth

“Remote centre brings improved productivity through improved volume flows through our existing sets of equipment by improving availability, utilization and rate”

**Boliden**

remote center at Aitik

“Although the proportion of metal found at the Aitik copper mine is low, less than 0.3%, it is a highly profitable mine because it is run so efficiently”
Co-operation with OEMs

Partnering with OEMs will become increasingly critical in future to harness best-of-class technologies.

<table>
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<tr>
<th>Exploration</th>
<th>Co-operation with OEMs will become increasingly critical in future to harness best-of-class technologies</th>
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</thead>
<tbody>
<tr>
<td>Drilling</td>
<td>▪ Computer algorithm automatically detects patterns in exploration data indicative of mineralisation</td>
</tr>
<tr>
<td>Blasting</td>
<td>▪ All major OEMs offer products with various level of automation</td>
</tr>
<tr>
<td>Loading</td>
<td>▪ Other firms specialize in retrofitting existing drills for automation</td>
</tr>
<tr>
<td>Hauling</td>
<td>▪ The charging process can be automated, with the required amount of explosive being entered beforehand</td>
</tr>
<tr>
<td>Other support equipment</td>
<td>▪ OEMs developing autonomous excavators</td>
</tr>
<tr>
<td>Underground equipment</td>
<td>▪ Komatsu and Caterpillar have commercial offerings of remotely operated hauling equipment</td>
</tr>
<tr>
<td></td>
<td>▪ Hitachi running field trials</td>
</tr>
<tr>
<td></td>
<td>▪ All major OEMs are developing remote solutions for support equipment like dozers, shearsers, etc.</td>
</tr>
<tr>
<td></td>
<td>▪ OEMs have developed, tested and implemented a number of automated drilling products, for UG and surface use</td>
</tr>
</tbody>
</table>

Source: Press search
Partnering with technology companies to drive operational change will become increasingly critical and common.

Gold Fields has established partnerships with...

...to implement technological advances...

- Rugged sensors
- 3D vision and mapping software

...with multiple applications

- Mapping and inspection
- Operator safety: Advanced obstacle detection and warning
- Stockpile monitoring
- Geological monitoring
- Enhanced tele-remote
- Fleet tracking: Real time monitoring underground

...leading to...

- Safer operations
- Increased productivity
- Improved cost efficiencies

Source: Gold Fields
St Ives has both aerial and underground drones working today to produce visual data for machine learning and mining software.

Through the use of drones and UG censors...

Gold Fields now can...

- Capture visual images and convert them into data files for use in mine software
- Use the software to analyse the data for various mining applications
- Change the way we capture and process data for geology, geo-technical, material movements and reconciliation

and the application of visual analytics...

In the near future Gold Fields will be able to automate geology mapping, ground support design and LHD controls, amongst others.

Source: Gold Fields
With Cyest we are looking at innovative ways to economically optimise South Deep through advanced analytics & simulation

**Overview**

- International advisory and technology company founded and based in SA
- Combines data analytics, technology solutions and industry understanding to boost ROCE
- Work scope for South Deep comprises:
  - **Determine Maximum Potential** - *Scientifically* determine the *capacity* of the mine’s *full* value chain
  - **Formulate Improvement Plan** - Assist in the development of improvement *initiatives*
  - **Generate Stakeholder Buy-in** - Develop an advanced visualisation of South Deep, that conveys the complexity of the mining process, and helps communicate and catalyse the right action at all levels

**Capabilities & solutions as applied to South Deep**

- **Discreet Event Simulation** – Advanced simulation of the sequence of activities and equipment interactions simulating the underground value chain.
- **Carbon14** – Validate and improve the medium and long term mining schedule by modelling the interaction of different mining activities as a function of mine layout, efficiencies and other factors.
- **Value Driver Tree Modelling** – Modelling of how operational drivers link to value to guide and demonstrate what interventions need to be pursued to achieve the required financial results.
- **Advanced Visualisation** – Using an advanced gaming platform to create a high fidelity visualisation of the ore body and the associated mining methods
South Deep’s mechanisation journey: 2010 - 2017

**Challenges**
- Economically exploiting the world’s 2nd largest gold ore body
- Very limited global experience of deep-level mechanised gold mining
- Shortage of necessary skills in SA
- Optimisation of machines & technology
- Safety of mining ops

**What we are doing**
- Rebasing the mine so it can be mined cost-effectively & mechanically
- Investment in local skills training and recruitment
- US$1bn investment in world-class infrastructure
- Heavy investment in machinery & technology
- Using global expertise (GTB)
- Large-scale destress mining

**The outcome**
Aiming for fully mechanised mine with:
- Safer operations
- Low-cost, long-life gold production
- Strong cash flows
- ‘Last mine standing’ in SA gold sector
- Skilled workforce
- Engaged employees and communities

Source: Gold Fields
Destress mining at South Deep

- Optimal extraction of orebody through bulk mining methods in de-stressed zone
- Replicates ~1,200m stress conditions at ~2,600m below surface
- Allows mechanised bulk mining at depth

- Reduces vertical virgin stresses from ~75Mpa to vertical field stresses of ~35Mpa
- Makes use of low profile trackless equipment to minimize exposure to high field stresses
- Makes use of backfill
- Backfill reduces the attenuation of rock mass response to dynamic loading and reduces energy release rates in the proximity of the face

Source: Gold Fields
Key takeaways on operating practices and technology

In the short term extraction and exploration will see the biggest advances through automation and digitisation.

Technology will give us the edge to fundamentally change our cost structures and make our mines safer.

Partnerships with OEMs and IT companies will be critical if mining is to benefit from the latest technologies.

Human resource and mine management will have to change to reflect new operating practices and technologies.

Source: Gold Fields
The gold industry of the future has four focus areas

<table>
<thead>
<tr>
<th>Operating practices &amp; technology</th>
<th>Talent focus and leadership</th>
<th>Partnerships</th>
</tr>
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<tr>
<td>▪ New exploration trends</td>
<td>▪ More technical skills –</td>
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<td>▪ Mechanised, automated and</td>
<td>strong analytics and</td>
<td>▪ Partnerships and Shared Value with local communities</td>
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<tr>
<td>digitized operations</td>
<td>decisions based on</td>
<td>▪ Risk-Reward relationship with employees</td>
</tr>
<tr>
<td>▪ Technical advances through</td>
<td>empirical evidence</td>
<td>▪ Strategic partnerships and JVs to share benefits and manage risks</td>
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<tr>
<td>collaboration with OEMs</td>
<td>▪ High specialisation</td>
<td>▪ Stakeholders will demand commitment to socio-economic and environmental factors</td>
</tr>
<tr>
<td>and IT firms</td>
<td>▪ Local talent development</td>
<td></td>
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<tr>
<td>▪ Greater energy efficient</td>
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<tr>
<td>operations</td>
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<tr>
<td>▪ Reduced environmental impact</td>
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Responsibility & transparency

▪ Close involvement of investors with greater transparency and access to operational data
▪ Knowledgeable investors will demand stringent corporate governance and adherence to world-class frameworks and standards

Source: Gold Fields
The workforce will be highly skilled, specialised and trained

**TALENT FOCUS**

**Today**

- **Miners**
  - Manual, non-specialised frontline work
  - Decision making information limited and not real-time
  - Most workers **transported in**

- **Supervisors**
  - Most time spent with their teams
  - “Wholesale” skills development for the frontline

**Tomorrow**

- **Automated machinery requiring specialists**
- **Mine-wide, real-time information available** for decision making
- **Skills development for local communities**

- **Skilled IT specialists**
- **Remote monitoring and communication**
- **Individual skills development**

**Mines, governments, universities & technical institutions will need to work together** to develop and train the miner of the future.

**Ability to create a thriving local economy that does not rely directly on mining employment or the provision of core services to mines** will be critical in developing countries.

*Source: Gold Fields*
Role of the CEO and organisation design will be different

**Shareholders**
- Manage expectations on returns
- Operational accountability
- Operational transparency

**Government**
- Facilitate private public partnerships
- Support infrastructure and social investments
- Common purpose

**Communities**
- Shared value
- Socio-economic upliftment
- Community procurement
- Provision of non-core services and products

**CEO**
- Manages and engages stakeholders
- Collaborative decision-maker
- Influencer and coach
- Integrated thinker
- Portfolio manager

**Activists**
- Drives to be more environmentally responsible
- Closer alignment and relationships with NGOs

**Portfolio of mines**
- Manage JVs with other mining companies
- Devolve operational accountability to the mines
- Industry training initiatives

**OEM and technology partners**
- Contractor mining
- Partnerships on advanced R&D and technology
- Partnerships to mutually improve business outlook

Lead time information availability

Source: Gold Fields
Key takeaways on talent focus and leadership…

CEO of the future will need to be a portfolio manager, consultant, strategist and coach rather than a full-time manager.

The skills we need will be vastly different and will require partnership with governments, universities and training colleges to redefine curricula.

We will employ far fewer people and will need to find a new model to provide benefits to communities…

Source: Gold Fields
The gold industry of the future has four focus areas:

**Operating practices & technology**
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Source: Gold Fields
New partnership models in developing countries will focus on joint ownership, risk management and shared benefits.

- Contributing equity position
- Policy certainty and competitive rates
- Partners in infrastructure development
- Shift from re-active concessions to pro-active shared value
- JVs with other mining companies to achieve economies of scale, diversify risks and/or address capacity constraints
- Partnerships with Universities to research new technology and train the miners of the future

Source: Gold Fields
### Partnerships that will shape the future mine

<table>
<thead>
<tr>
<th>Mechanisms used</th>
<th>What we offer</th>
<th>What the partners provide</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Government</strong></td>
<td>▪ Payment of taxes and royalties&lt;br&gt;▪ Contributing equity position&lt;br&gt;▪ Infrastructure PPP&lt;br&gt;▪ Job creation and skills development</td>
<td>▪ Competitive investment environment&lt;br&gt;▪ Regulatory consistency and stability&lt;br&gt;▪ Basic infrastructure and support (education, health, utilities)</td>
</tr>
<tr>
<td><strong>Communities</strong></td>
<td>▪ Employment and skills development&lt;br&gt;▪ Greater shared value&lt;br&gt;▪ Local infrastructure PPP</td>
<td>▪ Social license to operate&lt;br&gt;▪ Stable local business environment&lt;br&gt;▪ Provision of procurement and services</td>
</tr>
<tr>
<td><strong>Other mining companies</strong></td>
<td>▪ Diversification of technical risks and sharing of technical know-how&lt;br&gt;▪ Shared financial burden and risks as traditional sources of funding are drying up&lt;br&gt;▪ Reduction of costs and overheads&lt;br&gt;▪ Creation of economies of scale</td>
<td></td>
</tr>
</tbody>
</table>

Could this lead to formal consolidation/mergers of companies?

Source: Gold Fields
Clashes with local communities have risen – 22% p.a. since 2002

Reported incidents of mining company – community conflicts have increased steadily

Number of incidents

<table>
<thead>
<tr>
<th>Year</th>
<th>Incidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>10</td>
</tr>
<tr>
<td>2003</td>
<td>13</td>
</tr>
<tr>
<td>2004</td>
<td>10</td>
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<td>2005</td>
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<td>2007</td>
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<td>2008</td>
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<td>2009</td>
<td>38</td>
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<td>2010</td>
<td>47</td>
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<tr>
<td>2011</td>
<td>65</td>
</tr>
<tr>
<td>2012</td>
<td>90</td>
</tr>
<tr>
<td>2013</td>
<td>89</td>
</tr>
</tbody>
</table>

70% of cases occurred in high risk regions

Alternative models of community engagement are needed

1 Of cases reported by the Business and Human Rights Resource Centre, based on country classification in the Fund for Peace 2013 Failed States Index

Community engagement methods in South Africa have led us to think differently about such topics

What we did at our South Deep mine

Multiple programmes were implemented ...

Ownership structures

- 3,500 SA employees own a significant stake in South Deep
- 3 community trusts that receive income/dividends

Initiatives

- Strengthen Community team at South Deep
- Implement independent community assessment plan
- Strengthen governance/payments of community funds
- Social investment alliance with Sibanye Gold
- Intensify community procurement initiatives
- Implement shared value projects at South Deep

… but there were important lessons learnt

- Set aside significant funds for ownership and community development
- Identify and implement programmes in close collaboration with the community, including the consideration of those outside the mine’s value chain
- Create appropriate financial management structures within the community
- Foster stronger relationships and engagement with the key ‘gatekeepers’ in the community
- Not all available funds in trusts have been spent – strengthen delivery and governance systems

Source: Gold Fields
A template for engagement and investment in the communities around Cerro Corona, Peru

What we did in Peru is serving as a template for our other mines

PARTNERSHIPS AND SCRUTINY – SOCIAL DEVELOPMENT

**Socio – economic impact**

- **1100** local contractors used in the construction of the mine
- **80%** increase in local milk production following on investment in community agricultural projects
- **30%** of their employees are from local communities
- Aiming for 90% provision of potable water to impacted communities
- PPP with government on community market project
- Construction of modern health centre in adjacent city of Hualgayoc

**Why this worked well…**

- **Understood** the community’s context, priorities and needs
- **Collaborated** with key stakeholders in the community and identified areas for support
- **Co-created** sustainable development projects within the community

**… where we can improve**

- **Greater** sourcing of goods and services from local communities
- **Practices by “old-style” mining companies** can impact on our reputation

Source: Gold Fields
Gold companies will enter into many partnerships:

- With OEMs and Universities for joint research and skills development
- Other Mining companies to diversify risk and leverage competitive advantages
- Equitable resource rent and government development partnerships could become more common in developing countries
- Mines to earn their social license to operate from local communities

Source: Gold Fields
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- New type of CEO

**Partnerships**
- Governments – contributing equity
- Partnerships and Shared Value with local communities
- Risk-Reward relationship with employees
- Strategic partnerships and JVs to share benefits and manage risks
- Stakeholders will demand commitment to socio-economic and environmental factors

**Responsibility & transparency**
- Close involvement of investors with greater transparency and access to operational data
- Knowledgeable investors will demand stringent corporate governance and adherence to world-class frameworks and standards

Source: Gold Fields
We will need to focus on responsible and transparent operations

Operational transparency

- Investors will require real-time operational, financial and sustainability data
- **Transparent cost and earnings reporting**

Corporate governance

- Evolving and more stringent corporate governance standards
- Transparency in dealing with governments

Integrated thinking

- Seeks to ensure sustainability of companies through value creation for all stakeholders (not only investors)
- Embed formal management processes that link all parts of the business (operational, financial and sustainability)

Integrated reporting

- Ensure greater transparency to improve trust deficit
- Entrench adherence to reporting and sustainability frameworks

Source: Gold Fields
Mining companies will need to follow global standards of reporting since investors are demand more transparency and clearer mandates.

<table>
<thead>
<tr>
<th>Future non-negotiables – Adherence to leading reporting frameworks. These include:</th>
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<tbody>
<tr>
<td><strong>EITI</strong> Extractive Industries Transparency Initiative</td>
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<tr>
<td><strong>Global Reporting Initiative</strong></td>
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<tr>
<td>UNGC</td>
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<td><strong>ICMM</strong> International Council on Mining &amp; Metals</td>
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<tr>
<td><strong>Integrated reporting framework</strong></td>
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<td><strong>IFRS</strong></td>
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Source: Web Search, Integrated reporting framework website, EITI website
Conclusion

Where is Gold Fields on this journey?
The gold industry needs to proactively shape its own future

Continue on the **mechanisation, automation and digitisation** journey

Work with **OEMs and tech companies** to gain access to world-class technology

Partner with **other mining firms** to share risks and achieve economies of scale

Work with **educational institutions** to train hi-tech skills

Create incremental value for **employees, governments and communities**

Adopt evolving **corporate governance and reporting** standards

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Gold Fields has started this journey … but significant challenges lie ahead

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Conclusion
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