

Stewardship of sustainable mine closures – thinking beyond relinquishment before commencement

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ABSTRACT

The concept of sustainability planning rather than closure planning is presented as the new paradigm for the mining industry in this paper. The outcomes of the socioeconomic baseline studies and consideration of other land uses such as conservation, renewable energy, carbon sequestration and innovative agriculture are described. The need to consider these alternatives from the onset and skills required to form partnerships to ensure success are outlined.

Currently, closure planning and the associated closure costs usually only include the rehabilitation of mining facilities and the adjacent disturbed landforms. These facilities and landforms are most likely to include tailings storage facilities, waste dumps, pits, processing plants, mechanical maintenance areas, camps and access roads. Creating stable landforms and replanting native vegetation is broadly considered as the leading practice rehabilitation standard.

However, thousands of mine sites have been abandoned across many countries with poor or no rehabilitation. Even most leading practice sites have not taken surrounding community desires or land use requirements into account. So do we need to start thinking about closure planning from a different perspective? An operational mine should consider its activities as part of a continuum of land use that will change over time. Instead of trying to recreate the original landscape, or alternatively abandon the site when it becomes too difficult, the post-closure land uses and potential owners or partners should be considered at the mine approval phase.

This paper examines the case study of a large gold mine in Indonesia, which has been closed for ten years. This site completed socioeconomic baseline studies prior to closure to understand and incorporate community needs and land use pressures into the planning. Post-closure land uses that are compatible with environmental requirements and alternative non-mining income opportunities are presented in this case study.

INTRODUCTION

Case study – PT Kelian Equatorial Mining (KEM) operated a large gold mine in the West Kutai District of East Kalimantan, Indonesia (refer to Figure 1). The mine initiated production in 1992 and operated for 12 years while enduring numerous community disputes and disturbances from local villagers and artisanal miners. A mine closure engagement process commenced in 1999 and evolved into the Kelian Mine Closure Steering Committee (MCSC) with four working groups.

The agreement on rehabilitation and decommissioning activities, post-closure land use as a protected forest and long-term governance arrangements was finalised after three years of quarterly stakeholder negotiation meetings. Key decisions on all aspects of mine closure were made by consensus in accordance with traditional Indonesian customs. The decisions were signed off by all parties at the end of each meeting and distributed to villagers surrounding the mine. Activities agreed by the MCSC commenced in 2004 following exhaustion of the ore reserves and processing of low-grade ore stockpiles.

The Kelian Mine Closure Plan (MCP) documented all the decisions and agreements reached during this process and were prepared in accordance with Indonesia regulations and Rio Tinto requirements. The overall goal of the MCP was to implement of an orderly closure, ensure the sustainability of community programs and to protect the permanent landforms, surrounding forests and rivers in perpetuity. Novel post-closure land uses and governance arrangements were a key aspect of the negotiations required to mitigate long-term risks.

METHODOLOGY

A key aspect of the success of the KEM novel post-closure solutions was the collection of current and detailed, village socioeconomic baseline data. The KEM data was analysed to prioritise ‘at-risk’ villages prior to designing post-closure community programs and determining land use and long-term governance options.

For each of the 80 villages the history, population, institutions, forestry, hunting and gathering, cropping, livestock, fishing, food security, health, education, assets and infrastructure, community development, employment, wealth, communications and key community issues were recorded during focus group meetings and documented on survey forms. The social and economic calendar; religious and secular events, cropping, hunting, fishing and gathering, cycles of human, animal and plant pests and illness were also discussed and documented.

While it was anticipated that the ethnography of survey villages would largely conform to recognised organising principles of village societies in other parts of Indonesia, some survey results required limited ethnographic fieldwork in certain villages for clarification purposes.

Key village measurements

The key measurements that were recorded and tracked over time were the following:

- changes in population, identity, institutions, infrastructure and development
- changes in agriculture, fishing and food security, resource competition and depletion; threats from both nature and humans; changes in forest, marine and river resources
- changes in cash sources and dependency, consumption, wealth, existing and emerging social and economic inequalities
- debt within and between groups, the company, government and other key players

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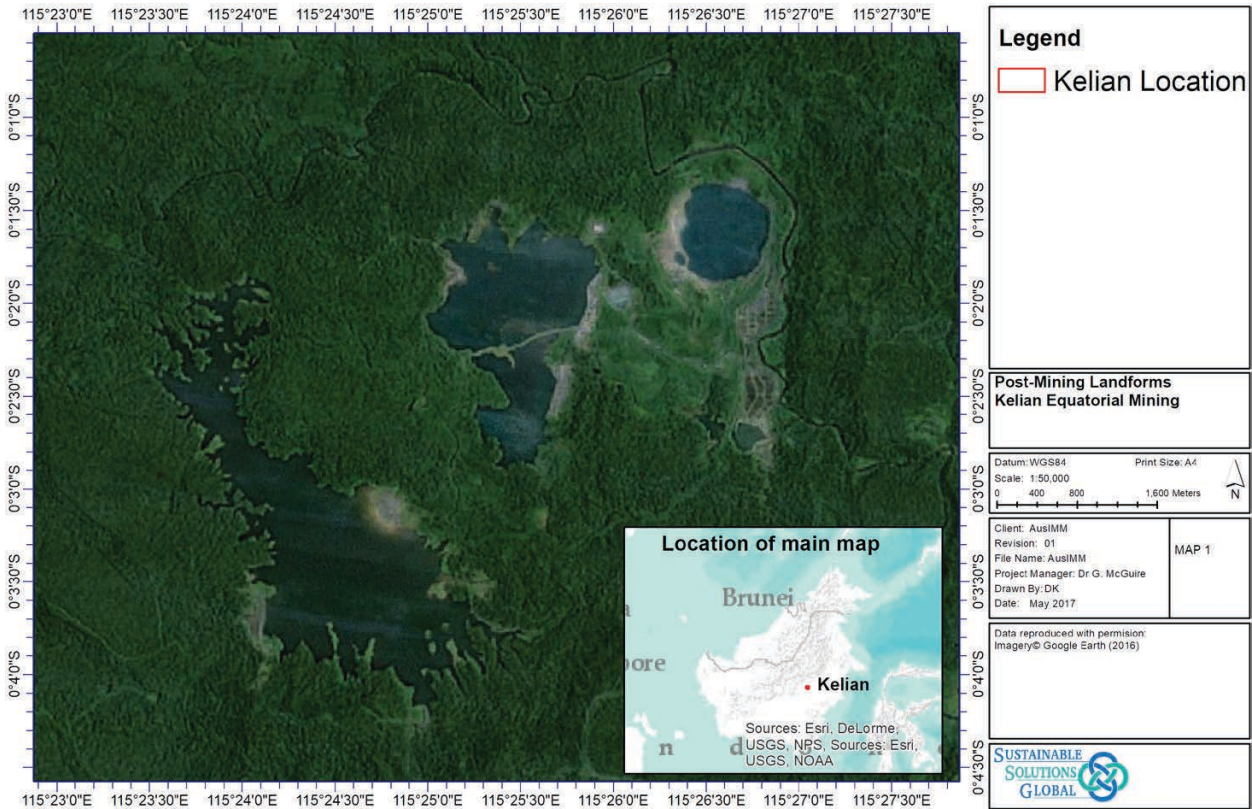


FIG 1 – Post-mining landforms Kelian Equatorial Mining, East Kalimantan Indonesia.

- capacity of individuals and groups to engage in social and economic life, acquire land and other resources, employment, assistance, benefits and entitlements
- changing impact of project employment, contracts, assistance, benefits and entitlements on households and village life
- key community concerns about village life
- knowledge about the project and its life-of-mine plans.

RESULTS AND DISCUSSION

The main outcome achieved by undertaking the socioeconomic baseline prior to closure was the ability to classify the various villages into those not at risk or those at risk by the closure or changes in the project cycle. Each village was classified into communities and groups that have either been largely unchanged by the project and are unlikely to be at risk to changes in the project; or more importantly may be at risk to the project. Other communities and groups that may be at risk from the project with changes in the project cycle were identified. Furthermore, due to the history of conflict in the region, it was critical to identify communities and groups that may present a risk to each other during changes in the project cycle.

The data collected during the baseline provided the evidence required for intervention or transition programs implemented by the company. The 17 at-risk villages were selected as a priority from the surrounding 80 villages of approximately 80 000 inhabitants. Due to the complex nature of perceived and material wealth, a well-being index was developed (measured as a perception of wealth) in these priority villages and this was tracked from 2000–2013, with understanding that the following critical events occurred over this time period:

- 2000–2004: uneven community development – mine incomes and programs, mine closure planning including impact remediation programs
- 2003: end of mining, first redundancies, start of implementing social remediation programs

- 2004: volatility in community relations as project approaches closure
- 2005: finish processing stockpiles, MCP approved, decommissioning, start of rehab, mitigation programs
- 2006: second redundancies, ongoing closure program, remediation programs take effect and reveal normalisation in community relations
- 2008: final redundancies, start of five year monitoring period; normalisation in community relations
- 2013: end of five year monitoring period; community relations at premining level.

Wealth perception monitoring results (Figure 2) of these villages before, during and after closure interventions has provided the observations outlined in the following section.

Key observations enabled by the socioeconomic survey

The main observations from tracking the perception of wealth was the understanding that standards of village wealth shifted over time. So what was perceived as an ‘average’ standard of wealth in 2000 may be considered ‘below’ standard in 2013. As consumption patterns and identities changed over time, the way that people defined signifiers of wealth also changed from material possessions during mining to family well-being post-mining. Villagers’ perceptions of wealth did not always equal ‘actual’ observable material wealth as villagers combined physical and existential measures of wealth in calculations.

Perceptions of inequality and community relations were generally more volatile in villages that employed more mine workers and received greater project benefits. In addition, villagers often increased or reduced wealth categories (above, average, below) to express community dysfunction, resentment or tensions. When relations were sound, villagers placed more in the average wealth category. When relations were poor they placed more in the above or below category. This was evidenced by data from 2006 where there was little apparent shift in actual wealth from 2004 but community relations in the two years had improved significantly as a consequence of mine closure.

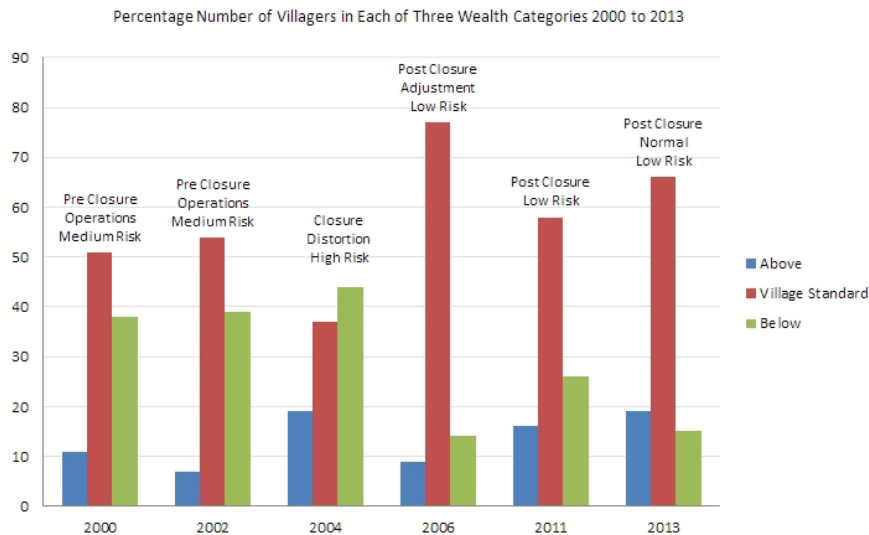


FIG 2 – Perceived wealth and inequality risk measurements in 17 'at-risk' villages from operations to post closure.

Closure inventions

The socio-baseline data collected prior to and during closure at KEM revealed that many villagers considered that they were living below the average wealth of the village. The implications for the project areas was the high likelihood that these people would enter the lease area to search for remaining gold, disturb rehabilitated areas and destabilise permanent structures such as tailings storage facilities and waste rock dumps.

The closure inventions were focused both on providing alternative agricultural-based livelihoods for these at-risk local communities as well as securing the site as a protected forest after closure. The land tenure and the post-closure governance institution, PT (HLKL) Hutan Lindung Kelian Lestari (Kelian Sustainable Protected Forest), were agreed during the stakeholder engagement and have been implemented accordingly. Consequently, the closure completion criteria for water quality and rehabilitation standards were designed to reflect the final overall land use of a protected forest, not a production forest or agricultural land use.

Further land use developments following the closure of the mine have been the installation of a microhydro scheme to supply renewable energy from the on-site waste rock dam. The power generated from this system is sufficient to supply all the power requirements of the remaining protected forest rangers camp and office facilities. Another recent development has been a partnership with conservation agency World Wildlife Fund (WWF) to protect the very rare Borneo rhinoceros. The secure land tenure and ongoing active protection of the site by local forest rangers has enabled PT HLKL to take on the important task of actively protecting the 15 remaining wild rhinoceros.

CONCLUSIONS

Considering all options for post-closure land uses that also meet goals to sustainably protect permanent structures enables local community and government stakeholders to fully participate in closure planning. This should be undertaken as early as possible to identify suitable third-party partnerships and fully anticipate the full costs of closure and relinquishment.

This may be an iterative process as new opportunities and technologies such as conservation areas/sanctuaries, renewable energy and carbon sequestration evolve. The example at KEM with the partnership between PT HLKL and WWF to save the rare Borneo rhinoceros demonstrates that considering all options and establishing a third party as the relinquishment authority enables a smooth transition from mining into other beneficial land uses.

Planning for sustainability beyond the life of the mine will enable other sites to examine all possible scenarios in the context of the current socioeconomic baseline information. This will ensure that the most needy or at-risk community are given priority and that positive long-term legacies are given due consideration.

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