

# Achieving Sustainable Outcomes of Mine Closure in Developing Countries through Inclusive Agribusiness

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## Abstract

*As part of the mine closure process, one of the most important legacies a mining company can leave a local community that has productive agricultural capacity is linkages to a commercial market, independence from the mining company, and the governance structure to be scaleable and self-sustaining. This paper aims to build knowledge on the potential role that Inclusive Agribusiness can play in the mining industry's community development programs. It proposes that establishing an Inclusive Agribusiness as part of the partnership dynamic between the farmers, buyers and the mining company is a means to ensuring the sustainability of the mining company's community investment once the mine closes.*

*An Inclusive Agribusiness benefits poor farmers by providing access to markets, services and products in ways that improve farmers' livelihoods, while being a profitable commercial venture in and of itself. Business for Development has worked with a number of mining companies to develop Inclusive Agribusinesses for communities impacted by the mines, founded on its Long-term INclusive Commercial (LINC) enterprise model. The paper will outline the value of the LINC Model in developing non-mine related businesses, and provide case studies regarding how mining companies have implemented the model to develop new enterprises in complex social and economic landscapes.*

## 1. Introduction

Many developing countries are endowed with mineral resources. It is in their interest to maximise the exploitation of their resources in order to generate income for the country, and provide benefit to the local communities that are proximate to the mineral deposit. Mining companies have both the expertise and funding needed to extract and process these resources, and deliver the end product to the international market. Through careful planning and implementation, such activity can also deliver benefits to the host country, particularly the impacted local communities. Recognition of the interests of all stakeholders is critical for the long-term success of such mining ventures.

Most mining companies have three key concerns when running a site: safety, volume and costs (PwC 2013). Communities that benefit from the mine pose less risk to these three. To benefit from mining, communities need to see improvements in the basics: food security, water, health care, infrastructure, education etc. They also need to be able to benefit economically. This is where many mining companies struggle with their being limited jobs for unskilled people.

The LINC Model helps mining companies manage this risk by addressing local interest, knowledge, expertise and resources and generate sustainable employment through Inclusive Agribusiness. This paper focuses on strategies which aim to not only establish local community agribusinesses during the course of mine operation, but also how best to ensure self-sustainable performance once the mine has ceased operation. Establishing an Inclusive Agribusiness, which is standalone to the mining venture and brings requisite knowledge and skills, training, financial resources and viable linkages to broader markets beyond the boundaries of the local community, is the basis for continued viability once the mine has ceased operations. This link between agriculture and the markets is the key to long-term sustainability.

## 2. Impact of Mine Closure

Establishing a mining venture in a developing country involves many activities which impact on local communities. This includes the building of roads, water supply, power supply, waste disposal, as well as employment. Local communities may gain mutual benefit from these facilities and many benefits will remain once the mining company has departed the area. The viability and usefulness of these residual impacts must be explicitly addressed as part of the process of shutting down a mine. Complete rehabilitation of the mine site, leaving it in a safe and non-polluting condition, is critical to the local community. It is not just the environment that must be considered, but also the economic and social impact the mining company leaves.

For example, the mine's operations may have provided employment for the local community. When the mine closes, this labour force is no longer required, and securing alternative employment for these people may become an important part of the mine closure process. Mine closures without a post-mine economic plan may result in a significant and immediate decline of local economies. The flow-on effect is a decrease in the local population, subsequently affecting social services, schools, labour markets, employment, housing prices and other impacts (Kemp et al 2006).

The key to a successful outcome following mine closure is to have established industries which are viable independently from the mining venture; and developed through support from the mining company. This should be the aim of all stakeholders in their efforts to help local communities shift themselves from small, family-oriented farming activities to a cohesive market-oriented Agribusiness. Beyond the mineral resource, for some communities its greatest assets are the land and its people, and the LINC Model leverages these assets to enable the community to achieve independence from the mining company.

Mine closure is often viewed as an expense which has no financial return, when really it should be considered an investment – an investment into the business' reputation, ensuring a smooth exit from the community, reducing social and environmental risk, and improving the business' social license to operate.

## 3. The Opportunity for Mining to Facilitate Agricultural Development

Given the close proximity of most mine sites to smallholder farmers in developing countries, there is clearly potential for both the agriculture and mining industries to work together to alleviate local poverty. Cross-sectoral partnerships between mining and agriculture are being recognised as virtually a prerequisite for creating positive mutual benefits from their activities (International Mining for Development Centre 2014).

The reality with agriculture is that most farmers in developing countries are smallholder and subsistent. Subsistence farming means to produce enough food and fibre for the needs of the farmer and their family only (Spedding, 1979). If agriculture had stronger returns and links to market, it would be a more attractive proposition. Typically there are four key impediments to smallholder farmers becoming profitable producers:

- **Lack of access to credit and finance** – Finance is needed to access better tools and technology, to smooth and normalise income, and to enable better market access.
- **Lack of connection to markets** – Less than 10 percent of smallholder farmers are aggregated into producer or other organisations that effectively connect them to markets (Wiggins & Keats 2013). Farmers are often reliant on local middlemen to sell their product – these middlemen usually take a high margin and offer low returns. Major barriers to the rural poor participating in formal markets are low farm gate prices, insufficient focus on high value crops, high input costs, and poor productivity and yields.
- **Lack of diversification** – These farmers often lack the knowledge, land and resources to diversify, and do not take advantage of unused/under-utilised land and/or resources to diversify risk. Many grow unsustainable crops, purely because they have been grown for generations.

- **Lack of access to inputs and agronomic training** – Most farmers achieve poor yields due to poor use of inputs and outdated farming practices. Few farmers have adjusted their farming strategies in response to climate change, owing to limited resources and capacity.

When a mining company is considering agriculture as an investment area, especially with line-of-sight to closure, each of these barriers needs to be addressed. Importantly, expertise on how to resolve these impediments can be harnessed through partnering with inclusive agribusinesses, that are driven by long-term sustainable commercial opportunities.

#### 4. What is Inclusive Agribusiness?

Inclusive Agribusiness is a strategy aimed at improving the subsistent agriculture sector by creating positive impact partnerships in the private sector, as this sector is well-positioned to play a significant role in poverty alleviation (Woodhill 2016). It also recognises that the support of donors, Non-Government Organisations (NGOs) and organisations such as mining companies, can be used as a catalyst to execute strategies for poverty alleviation, by achieving scale through the pragmatic use of market solutions.

Inclusive Agribusiness goes beyond philanthropy and corporate social responsibility. It aims to integrate inclusive approaches into the core commercial operations of an agribusiness. It recognises that smallholder access to broader markets is the key to tackling rural, developing country poverty and inequality, while also creating opportunities for business growth (Woodhill 2016).

Business for Development has been involved in applying Inclusive Agribusiness strategies in developing countries for the past ten years. The “Long-term Inclusive Commercial” enterprise (LINC) Model specifically aims to align the interests of the three key stakeholders – namely the mining company, the farmer and the buyer of the farmed product(s).

#### 5. What is the LINC Model?

The LINC Model combines a “for purpose” social enterprise model with a “for profit” Inclusive Agribusiness strategy. A farmer-owned social enterprise (LINC enterprise) is created to interface with private sector partners, who are pursuing Inclusive Agribusiness engagement with low-income communities.

What is unique about the LINC Model is that projects are designed to empower aggregated smallholder farmers to engage more effectively as a single commercial entity. It seeks to significantly improve farmer income and thus take farmers out of poverty on a long-term sustainable basis. The result is a LINC enterprise, which is ideally 100 per cent farmer-owned.

The LINC Model also reviews the value chain and assesses who are the middlemen, what value do they add, where the margins are between each middlemen, and how they can be potentially skipped by selling directly to the main buyer. As a result, a bigger margin is reaped at the farm gate.

Purchasing costs for each farmer is often high. The LINC Model involves grouping farmers to form a cooperative, so they can not only reduce the cost of input purchases but also aggregate sales into a broader market base, improving loan facilities and utilising better technical expertise. This assists farmers with economising on their transactions costs and gives them greater influence in decision-making.

#### 6. How does LINC help with mine closure?

When building community development programs near mine sites, it is important to develop both mine-linked businesses (e.g., catering and cleaning) and independent businesses that will last beyond the life of the mine. The LINC Model is designed to establish independent agribusinesses by incorporating the following principles: design the project based on community need; utilise a well-planned financial model; build the business small, then monitor and evaluate; align with strong partners; link to the market; create a robust governance structure; develop ownership of the project with farmers; complement existing government-led

programs; ensure the process and planning for the LINC enterprise starts as early as possible; make the LINC sustainable once support from the mining company ceases.

## **6.1 Design the project based on community need**

Understanding community perceptions is essential to managing expectations (Kemp et al. 2006). To develop an accurate understanding of farmer needs, a two-pronged approach is utilised. First is an agronomic assessment of the region (e.g., soil testing) to provide hard data on which to base decisions, to ensure the most efficient and effective economic inputs are implemented. The hard data coming from the agronomic analysis must be augmented with softer insights on farmer habits and motivation through an ethnography analysis. Experience in working directly with farmers shows that rational argument based on quantifiable data is rarely enough to ensure engagement and uptake. Understanding the drivers of adoption and perceived risks in new initiatives is critical to the process.

From this information, modelling is used to understand the dynamics of the various agricultural value chain participants, and a review is conducted to determine which value chain participants have the potential to create the greatest impact for smallholder farmers. For example, a lack of capital may have historically held farmers back. Modelling may show that increased lending by banks may have the potential to unlock farmer productivity, subsequently attracting other value chain participants to support these farmers.

The use of modelling also assists with optimising outcomes across multiple facets – the commodity selected is the one likely to have the biggest uptake by farmers, as well as being the most profitable based on farmer capabilities. The right training is provided, the optimum governance structure is implemented to meet the community's social and cultural requirements, and therefore programs are more likely to achieve the desired scale and impact.

### **6.1.1 Case Study: Harmony Gold, Papua New Guinea**

Harmony Gold's Hidden Valley operation employs about 2,000 people directly and another 1,000 people indirectly as a result of the mining company's activity. Harmony Gold is conscious of providing an alternative income stream for these people when the mine closes. As there is little economic activity around the mine, Harmony also wants to establish sustainable agriculture programs for villages that border the site, so that other programs that have been established by the mining company (e.g., education and health) are sustained.

Coffee is currently grown in the district so there is some production knowledge, but farmers only harvest beans when money is needed. Productivity and commercial farming are viewed as Western concepts. One of the key barriers for farmers moving from subsistence farming is culturally driven, and the program design must take this into account to be successful.

The project involves slowly introducing a new mindset to the community. Communication is key, as is building an understanding of the benefits of planning for the future (a foreign concept to many who live from day to day). With a strong hierarchical culture, the project is designed so that it is open and encourages participation from all in the region, not just those at the top of the hierarchy.

## **6.2 Utilise a well-thought-out financial model**

Starting any enterprise is difficult. Starting a LINC enterprise in a remote rural region in a developing country is a lot more difficult. Robust financial modelling is essential to forging a path to sustainability and financial independence. Sustainability through modelling is achieved when the yields and returns are used to determine which are the right activities for achieving the desired results, and how the business should be developed. Financial modelling also assists with risk management, so that potential surprises can be identified beforehand and mitigated where required.

### 6.3 Start the business small, then monitor and evaluate

Farmers are generally wary of trying new things. Demonstration plots are critical for training farmers in optimal crop management. For these demonstration plots, it is best to select farmers who are entrepreneurial and demonstrate that they are *positive deviants*. The term 'positive deviance' refers to 'a departure from the norm' which results in a positive outcome (Spreitzer & Sonenshein, 2004). These are the people or groups who are willing to try new approaches and also invest the time needed to make a crop work. These positive deviants can be used to demonstrate to the rest of the community that they too can generate greater earnings if they adopt the new approach/crop.

It is important to test crops, to determine ideal seed varieties and demonstrate to the buyer the community's capacity to commit and produce a high-quality product that meets the buyer's specifications. Although developing a proof-of-concept takes longer, it does enable mining companies to engender the trust needed from all stakeholders, including the government. By also applying a robust monitoring and evaluation approach, the program designer can understand how to improve the design for impact before it goes to scale.

### 6.4 Align with strong partners from the value chain

The World Bank and International Finance Corporation (2002) highlights that "if partnerships have been developed and implemented during (mine) operations, then the opportunities for handling assets for community use and for maintaining social services successfully after closure will be greater." Modelling can reveal relevant stakeholders to partner with across the value chain. It is important to understand the strategies, issues, and needs of each stakeholder; to develop a value proposition which aligns with their interests while also meeting the community's needs.

#### 6.4.1 Case study: Ok Tedi Development Foundation, Papua New Guinea

Ok Tedi Mining Limited's (OTML) mine is in the Western Province of PNG, and currently the only major economic entity in the region. The mine is likely to close within the next ten years. The Ok Tedi Development Foundation (OTDF) is the legal entity that manages community development benefits from OTML's operations on behalf of the 147,000 residents spread across 158 villages throughout the Community Mine Continuation Agreement (CMCA) corridor in PNG.

OTML started over 40 years ago and most of its community funding was put towards a number of annual compensation packages. With the establishment of OTDF as an independently operating foundation in 2010, one key objective is to shift the community's mentality from reliance on the mining company to the vision "*to improve self-sustainability and quality of life of Western Province communities*". A key part of achieving this is shifting the cultural attitude from one of minimal food security to building long-term capacity to develop economic security through commercial agriculture practices. OTDF is investing in those who are willing to sweat, take control of their lives and actively participate in its rubber, rice, agar wood and poultry projects.

OTDF has established a LINC enterprise as part of its strategy for achieving sustainability. Key to the LINC enterprise are partnerships across the value chain. OTDF has partnered with commodity trader Olam with respect to rubber production and purchasing. Olam (2018) has agreed to apply its Livelihood Charter to the project, and provide assistance and guidance to OTDF to promote and develop the rubber production in Western Province. For rice, OTDF has sought technical assistance from Trukai Industries, a leading supplier of rice in PNG, and Innovative Agro Industries to develop a holistic agribusiness master plan. Other partners across the value chain include government agencies, NGOs, private sector service providers, bilateral and multilateral development agencies, universities and research organisations, all of whom are working towards building resilience.

## 6.5 Link to market

Many community development teams at mines build agriculture capacity by focusing on increasing production. This approach works well if the primary concern is food security and if a buyer is readily available for any surplus (e.g., a mine's canteen). However, increasing supply often only works for a limited period, with local markets becoming oversupplied. Rapid oversupply in the market leads to falling prices and reduces farmer income. Lack of attention to markets and their dynamics frequently results in farmers being left with unwanted produce that they are forced to sell at low prices.

Community programs are more likely to be sustainable if the mining company's investment is the catalyst to establish other non-mine-related income sources. An important way of achieving this is to foster market linkages between communities and external partners. The LINC Model achieves this by ensuring that poor farming communities are connected to the supply chains of buyers (e.g., multinational food and retailers) who are seeking to become Inclusive Agribusinesses. Connecting farmers to markets on an equal footing requires trusted intermediaries, as well as sustainable and scaleable business models that generate sufficient wealth for the farmers. The LINC Model addresses this by ensuring that farmers and buyers mutually benefit from growing their businesses together.

By building strong buyer relationships, farmers are more likely to generate good business and growth, create a new source of income, and secure market demand. To achieve such outcomes, farmers often need better tools, training, credit, and improved quality of inputs. All these elements can be supported by a mining company who has a vested interest in building community capacity to meet commercial buyer requirements.

Buyers seek to generate strong business growth, expand into new markets, and reduce their supply chain risk and/or cost. The LINC Model can support the buyer's Inclusive Agribusiness through improved supply chain efficiency, via the disintermediation of non-essential middlemen, improved quality, and a long-term partnership with farmers based on mutual benefit.

## 6.6 Create Good Governance

Being an owner of a business gives people motivation and a stake in its success. The LINC Model achieves this through developing an owner-shareholder structure. The choice of which shareholder structure to apply depends on the specifics of the scenario, such as: (i) negotiations between communities and companies (one community may be interested in an equity stake, while another may prefer a different arrangement); and (ii) considerations concerning commercial viability, which may vary from crop to crop (Paglietti & Sabrie 2013).

The LINC enterprise trades commodities from a group of farmers to a buyer. The dividends are paid either in profits to the farmers and/or reinvested into farm and community programs. The model is scaleable and grows organically by engaging new farmers – new farmers can join the LINC enterprise as suppliers with the same rights as existing farmers. The model is designed to be sustainable through sale margins, negating the need for ongoing benevolent funding.

The LINC enterprise's Board can consist of farmer representatives, commercial experts from the buyer, agricultural advisors, and NGO representatives. Sometimes the mining company takes on a Board role to support governance and capability development.

### 6.6.1 Case Study: Base Titanium, Kenya

Base Titanium Ltd (BTL) commenced mining operations in Kwale, Kenya in 2013. BTL engaged Business for Development to design a community development program that would outlast the life of the mine.

Initially the project involved 20 farmers who grew a combination of cotton and potatoes. Since then, a strong long-term buyer has partnered with the project – namely Cotton On Group (a multinational retailer). Sorghum is also produced by the farmers which is purchased by Diageo, a multinational alcohol producer. By 2020, the project aims to impact 10,000 farmers; however, to achieve this, a strong governance structure is needed.

The LINC enterprise is called the Pamba and Viazi Cooperative Society (PAVI) and is owned by the farmers. PAVI has appointed a CEO, Administrator, Accountant, Technical Manager and Field Extension staff – all local staff have a vested interest in the cooperative succeeding. PAVI farmers subscribe to membership by paying a membership fee and purchasing minimum shares. PAVI has a Board comprised of Kenyans, who have the knowledge and capacity to guide the cooperative. The Board is also supported by a committee made up of key funders and stakeholders.

The PAVI cooperative is being guided along a path towards independence, and the ultimate goal is for the project to be self-sustaining within a five-year period. This means that a livelihood micro-economy will have been established which will outlast the life of the mine and will continue to impact thousands of community members for decades to come.

## **6.7 Develop ownership of the project with the farmers**

Increasingly, mining companies are looking to communities to own the post closure projects and be the key instigators in the development of their goals (International Council on Mining and Minerals 2008). It is their energy and ownership that will drive sustainability and profit from the projects when the mine is closed.

To establish farmer ownership of the project, a participatory approach should be utilised. The Asian Development Bank (1996) states that “participatory development is a process through which stakeholders can influence and share control over development initiatives, and over the decisions and resources that affect themselves.” Development expert Freire and Freire (1994) argues that people who engage in an approach where they are active participants, link knowledge to action and work to actively change their societies.

Enabling participants to build/grow something for themselves can lead to the ‘IKEA effect’ (Norton et al 2012), a cognitive bias in which people place a disproportionately high value on products they partially created. As many mining companies can attest, when a company builds, for example, a water pipe for a community, often it can be viewed as the company’s pipe; when it breaks, it is seen as the company’s responsibility to fix. However, if the farmers were involved in building the pipe and are taught how to fix it, they are more likely to feel a sense of pride and take more care in looking after it.

Farmers also need to contribute towards the purchase of inputs (e.g., seeds, fertiliser, tools), so that they place a greater value on the outcome. This is known as the ‘endowment effect’, which is the hypothesis that people ascribe more value to things they view as their own (Beggan, J K.1992). Farmers participating in the project may be offered ‘soft loans’ so they can access high-quality agricultural assets to increase their incomes, while ensuring that they also own the end results. They repay these loans by deducting repayments from the sale of the harvest – a percentage of the harvest goes to the LINC enterprise or a percentage of farmer yield is paid to the LINC enterprise for member activities, e.g., training. The capital for the loans is raised either through donor funding (e.g., the mining company), seed capital, a revolving fund, farmer contribution or a dividend from sales from the enterprise(s).

## **6.8 Complement existing government-led programs**

It is typically not possible to replace the economic benefit of a mine completely once a mine closes (World Bank & International Finance Corporation, 2002). To mitigate the impact, it is important to co-create any program with the regional government, and design programs that complement their existing policies and strategies. This not only secures a social license to operate, but it also reinforces the likelihood of the government adopting any initiative developed by the mining company post mine closure.

## **6.9 Ensure the process and planning for the LINC starts as early as possible**

To build a farmer enterprise which has links to a sustainable Inclusive Agribusiness and is also commercially viable takes time. If a mining company is planning to create a social business when it is close to mine closure, it is probably too late. A mine closure plan is usually developed at the time of mine licensing. It is at this point when a mining company can take into account longer-term social and economic considerations (e.g., the size

and location of townships and other infrastructure), and how this can be used once the mine closes (World Bank & International Finance Corporation 2002).

Often over the life of the mine, the people that were employed at the start of the project are not the same people who are employed when the mine closes. As a result, community programs can be plagued by short-term thinking, when long-term impact should be the priority. To achieve this, a value proposition that meets the community's needs is required. This provides the focal point needed to ensure that year on year, a small number of projects are developed, resulting in greater impact and sustainability over the longer term.

### **6.9.1 Case Study: MMG LXML, Laos**

As part of its community development plan, MMG LXML (MMG) worked in Sepon in Laos at the local level, to achieve development outcomes for important issues such as poverty, food security, health, education and the wellbeing of women and girls. Over time, as the mining operations in Laos matured, the company looked to transition its approach from supporting these essentials programs to focusing on long-term economic development that was not solely reliant on MMG. MMG wanted to work with communities to be resilient and sustainable beyond the life of its mines.

After preliminary research, it was identified that many farmers in Laos struggled to grow enough rice to feed their families. Growing citrus was recognised as a way of providing farmers with an approach to exiting poverty for good, as it would net a tenfold increase in income over traditional crops. A partnership was established with Ironbark Citrus, an Australian grower, who was looking for counter-seasonal opportunities.

The project currently impacts 80 farmers but it did not achieve the reach and scale that was initially intended, as citrus takes a minimum of four years before any commercial fruit comes to bear – too long for farmers to survive without an income. Although the project is still having a profound impact, had MMG started earlier, it would have meant that the project would have had a chance to achieve scale and sustainability.

## **6.10 Make the social enterprise sustainable**

To be an Inclusive Agribusiness and work with a social business, a project will typically not succeed unless all three of the following elements are addressed. Firstly, it is important to ensure that you have the right value proposition that resonates with all stakeholders involved; that the right crop has been selected for the situation (agronomics, culture, etc.), in order to achieve the greatest outcome. Secondly, if the value proposition is 'right' but the approach taken towards achieving the mission is ineffective or inefficient, then the model is unlikely to succeed. Finally, the right people must be embedded within the governance structure; people who are passionate and have the knowledge and capacity to execute the project strategy.

## **7. Conclusion**

Even though mining companies are not solely responsible for addressing the socio-economic impacts of mine closure, there is no question that they are the key player with significant power, influence and resources to impact a community's future livelihood. All four case studies in this paper highlight the challenges associated with developing regional economies and cohesive communities in remote areas, and how they have overcome these challenges by systematically designing commercial LINC enterprises.

The LINC Model provides a framework for developing a scaleable, sustainable agribusiness that is founded on evidence-based data analysis, blended with the local social and cultural dynamic. A LINC enterprise builds upon success to support smallholder farmer development that is clearly linked to external markets. This provides a level of certainty in what is a difficult and potentially risky enterprise.

Mine closure and creating social legacy in developing countries requires creativity, cooperation and leadership. Although implementing the LINC Model can be complex, it is a long-term and effective solution to developing a sustainable post-mine closure economy. As a result, mine closure will not be seen solely as the end of mining activities, but also the fulfilment of the social stimulus needed for communities in remote regions to engage in Inclusive Agribusiness, that will lead to long-term economic security and sustainability.

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