

2016 SUSTAINABILITY REPORT

BALANCE

WEIGHING PRIORITIES IN A RESPONSIBLY MANAGED ENTERPRISE



FIRST QUANTUM
MINERALS LTD.

ABOUT FIRST QUANTUM

Established in 1996 to develop the Bwana project in Zambia, First Quantum Minerals Ltd. has grown steadily to become an international leader in mineral exploration, development and mining. Following the acquisition of Inmet Mining Corporation in 2013, First Quantum is one of the leading global producers of copper, with a diversified portfolio of operations and development projects on four continents.

PRINCIPAL PRODUCTS: copper, nickel, zinc, gold, platinum, palladium

COPPER PRODUCTION: 428,229 tonnes (2015)

SALES REVENUES: \$2.698 billion (2015)

COMMUNITY INVESTMENTS: \$24.1 million (2015)

PAYMENTS TO GOVERNMENTS: \$355 million (2015)

EMPLOYEES: 15,525 (2015)

CORPORATE OFFICES: Vancouver (headquarters), Toronto, London, Perth, Johannesburg

OWNERSHIP: publicly traded company

STOCK EXCHANGE LISTINGS: TSX: FM



ABOUT THIS REPORT

We believe that the most effective way to explain First Quantum's approach to corporate sustainability is to describe in detail how specific programs are designed and implemented. Therefore this year's report once again highlights specific stories from First Quantum operations around the globe to illustrate the kind of positive impact we strive to create everywhere we do business.

Although this report is not explicitly organised into Global Reporting Initiative (GRI) categories, all salient information correlates to the indicators required for GRI compliance. Please visit first-quantum.com to review complete GRI performance data. All amounts in this report are expressed in U.S. dollars unless otherwise noted.



Content development and writing: Doug Dolan (dougolan.com)

Principal photography: Adam Patterson (adampatterson.net)

Concept and design: **THE WORKS DESIGN COMMUNICATIONS** worksdesign.com

INSIDE

OUR SCOPE OF OPERATIONS PAGE 2 | CHAIRMAN & CEO'S MESSAGE PAGE 4



HEALTH

Healthy Returns: Working to improve community-based health care services in Zambia. **8**

WORK

- Hand-crafted Success:** Trident's sawmill project. **20**
- Social Fabric:** Women entrepreneurs in Mauritania. **24**
- Local Talent:** A Turkish workforce at Çayeli mine. **30**
- Learning to Change:** Employment training in Spain. **34**
- Rewarding Initiative:** Inspiring local entrepreneurs. **38**
- The Bank Next Door:** Grassroots finance in Zambia. **42**



HOME

- Road to Tomorrow:** Opening the smelter road at Kansanshi offers area residents a new beginning. **48**
- Changing Perspectives:** A progress report on resettlement efforts at the Trident project in Zambia. **54**
- Moving Days in Panama:** An update on community resettlement around the Cobre Panamá project. **60**

WATER

- Every Drop Counts:** In the harsh desert of Mauritania, water is the lifeblood of a community. **70**
- Deep Down:** For the Çayeli mine, disposing of tailings under the Black Sea is a sustainable solution. **76**
- Sharing Well:** Amidst sun-baked farms near Seville, Cobre Las Cruces manages a precious resource. **80**



NATURE

- Growing Possibility:** The vital role of agriculture in sustainability initiatives around Cobre Panamá. **88**
- Beyond the Horizon:** Preserving biodiversity requires a far-reaching perspective in Zambia. **96**

OUR SCOPE OF OPERATIONS

First Quantum has eight operating mines and two projects under development in eight countries around the globe.



COBRE LAS CRUCES, SPAIN

Sevilla Province
Ownership: 100%
Primary metal: copper
Employees (2015): 260



COBRE PANAMÁ, PANAMA

Colón Province
Ownership: 80%
Primary metal: copper
Employees (2015): 2,807
Development phase



HAQUIRA, PERU

Apurimac Department
Ownership: 100%
Primary metal: copper
Employees (2015): 82
Development phase



TACA TACA, ARGENTINA

Salta Province
Ownership: 100%
Primary metal: copper
Development phase



GUELB MOGHREIN, MAURITANIA

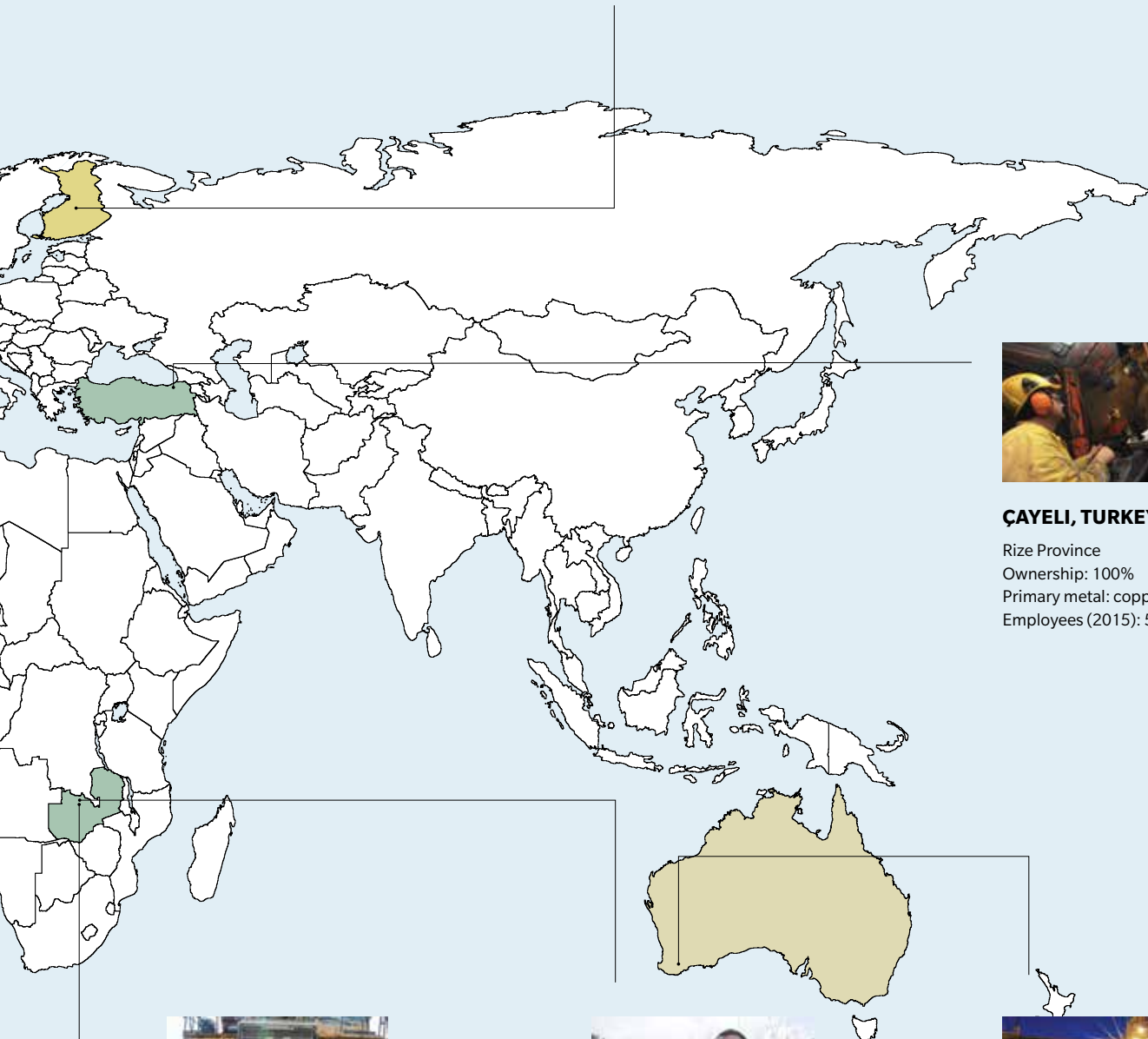
Nouakchott
Ownership: 100%
Primary metal: copper
Employees (2015): 1,137





PYHÄSALMI, FINLAND

Pyhäjärvi
 Ownership: 100%
 Primary metal: copper
 Employees (2015): 291



ÇAYELI, TURKEY

Rize Province
 Ownership: 100%
 Primary metal: copper
 Employees (2015): 507



TRIDENT, ZAMBIA

North-Western Province
 Ownership: 100%
 Primary metal: copper
 Employees (2015): 2,753



KANSANSHI, ZAMBIA

North-Western Province
 Ownership: 80%
 Primary metal: copper
 Employees (2015): 3,001



RAVENSTHORPE

Western Australia
 Ownership: 100%
 Primary metal: nickel
 Employees (2015): 267



A QUESTION OF BALANCE

Pursuing future goals while managing present realities. Driving growth while fostering conservation. Providing support while encouraging self-sufficiency. Operating responsibly while delivering value to shareholders. This is the perpetual balancing of expectations that defines our path to sustainability.

Every company is challenged with weighing different priorities and objectives – sometimes overlapping, often competing, both within the organisation and in response to a broad range of external stakeholders. The goals set out by management must be aligned with those of the Board and the shareholders it represents. And any agreed strategy has to take into account the varying perspectives of employees, customers and business partners, as well as governments, regulators and the communities where the company operates.

This process of constantly evaluating and prioritising is all the more complex for a global enterprise such as First Quantum. Our footprint spans diverse geographies, economies and cultures. And as a mining company, our business activities have a significant scope of impact compared to companies in other sectors – particularly when it comes to pursuing the goals of sustainability.

For a responsibly managed company in any industry, sustainability in its many dimensions – social, economic and environmental – can never come down to choosing one clear-cut priority to the exclusion of all others. As the cover of this report suggests, it's a matter of finding the right balance.

Following the precedent set with our last Sustainability Report, in these pages we once again showcase some of the challenges we wrestle with each day, and our efforts with a variety of partners to develop effective solutions.

All sustainability efforts, like the problems they try to address, are inevitably interrelated. But to highlight some specific areas of focus under the overarching theme of balance, we've organised this report into several sub-themes:

“Sustainability can never come down to choosing one clear-cut priority to the exclusion of all others.”

The opening section on Health reviews our efforts to ensure the well-being of employees, their families and neighbouring communities at the Kansanshi and Trident mines in Zambia. As we work to ensure our health investments yield the best possible return for all stakeholders, we’re constantly balancing the need for long-term education and prevention programs against the immediate demand for clinical care.

In the Work section we look at several initiatives designed to generate employment and foster new livelihoods. From skills training in Turkey and Spain, to developing entrepreneurship among Mauritanian women, to community-based banking for small businesses in Zambia, we’re committed to encouraging self-sufficiency and helping to diversify local economies everywhere First Quantum operates.

Under the sub-theme Home we offer an update on our resettlement initiatives at the Trident project and along the new smelter road at Kansanshi. We also have a progress report on resettlement in Panama, where the vast majority of indigenous families affected by the Cobre Panamá development have moved into their new communities, while a handful now express reservations over previously agreed terms.

We’ve focused on the topic of Water because of its vital importance to our mining operations and, of course, to social well-being in nearby communities, whether we’re protecting a sensitive aquifer in southern Spain or securing a sustainable water supply for desert communities in Mauritania. We also examine the use of undersea tailings disposal as an environmentally sound alternative to traditional tailings ponds at our Çayeli mine in Turkey.

Lastly, we look at several recent initiatives under the general category of Nature: the integration of agriculture into our biodiversity strategy in Panama, and our collaboration with conservation authorities in northwest Zambia to protect forest areas and reintroduce threatened wildlife species.

In all of First Quantum’s sustainability efforts around the globe, and indeed in every initiative we undertake as a company, we assess our strategic objectives relative to the varied expectations of our stakeholders. In many instances that means reconciling divergent interests and even identifying where tradeoffs may need to be made – all to yield the best possible outcome for the majority, reflecting their common goals and shared values. It’s a question of balance.

Philip K. R. Pascall
Chairman of the Board and
Chief Executive Officer





THE

“Of course we can always do better. But there’s a growing strength that will endure.”

LEITH

A responsible company supports the health and well-being of its employees and the communities where it operates. The challenge lies in finding the right balance between immediate clinical care and longer-term education and prevention.

(left) Entomologist Mulenga Musapa, an environmental health coordinator in Zambia’s North-Western Province, studies mosquito populations to determine malaria infection rates and help design effective control programs.

HEALTH



HEALTHY RETURNS

In Zambia, First Quantum's efforts to improve community-based health services while advancing disease prevention are framed by a broader vision of where corporate support can have the most impact.

For any mining company, workplace health and community well-being are inextricably linked. If employees are ill, productivity declines, as does morale. The same is true if employees are dealing with illness in their families. And if a broader health issue affects the entire community, it can have a severe impact on social stability, as well as people's willingness to move into the area – which in turn is detrimental to economic growth. First Quantum has therefore long made health care a priority in all of the communities where it operates mines. The challenge, especially in less prosperous regions, is where to draw the line between problems that the company has a responsibility to help address, and those that remain within the mandate of the public health care system.

In the town of Solwezi in northwest Zambia, the nearest large community to the Kansanshi mine, First Quantum's first health care initiative was an HIV awareness and prevention program. HIV has had a devastating impact across sub-Saharan Africa, and while the infection rate in Zambia has not been as acute as in some neighbouring countries, it's nevertheless among the highest in the world.





The First Quantum mobile health team hosts a malaria workshop in the village of Chisasa, about 30 km southwest of Solwezi in Zambia's North-Western Province. Area residents train to become part of the extended team so they can test and treat people in their home villages. Here Eunice Malaite and her sons, from nearby Yonga village, receive their blood tests from one of the volunteer trainees.



“Of course HIV is not technically a disease,” explains Anna Pascall, the company’s Health Coordinator in Zambia when the initiative was launched. “Rather, it’s a virus whose presence in the body may lead to disease. So you manage it by focusing on people’s living conditions, their nutrition, their access to health care – along with issues such as contraception, obviously, and the emotional aspects of sexual activity. In a broad-based initiative that’s focused on preventing illness rather than curing it, you can actually gain significant improvements for a relatively modest investment. That was our philosophy from the outset with HIV, and it has shaped everything we’ve done since.”

As First Quantum’s health strategy in Zambia has evolved, preventive programs targeting HIV, malaria and other challenges have been complemented by a number of bricks-and-mortar facilities providing primary care. The Kansanshi Mine Clinic in Solwezi serves employees and their dependants, as well as contractors – more than 20,000 people in total. Residents of the nearby Kabitaka community have a company-built clinic closer to home. At the Trident operation to the west, about 800 people receive care from the newly opened clinic in Kalumbila. And in the large commercial centre of Ndola, about 300 km southeast of Solwezi, the Mary Begg Community Clinic serves about 1,500 First Quantum employees and their families, along with many community members within a population of nearly half a million.

PART OF THE COMMUNITY

First Quantum takes a hybrid approach to managing its health commitments. Prevention and wellness promotion programs are developed and delivered by a corporate team; clinics, while benefitting from company subsidies, are operated autonomously by medical professionals and administrative staff. Any work-related injuries are naturally given priority at the clinics. However, for other health needs, employees and their families, while seen as key beneficiaries of the company’s support, must book appointments to ensure they receive prompt care within the general flow of patients.

“We’re part of the community,” says Gertrude Musunka, Health Programs and Projects Advisor. “That was the slogan we used for our first clinic, and it’s a message we continue to emphasise. Of course these are company-funded facilities, and we make sure the mine’s needs are attended to. But we try to keep the clinical environments independent, even as we’re looking for ways to integrate their services into the mine sites where it makes sense. So we’re constantly balancing those two goals.”

In contrast to government-run health care facilities, whose services are for the most part free, the clinics operate on a fee-for-service basis. The cost, however, is quite affordable for many families, and the company sponsors community outreach programs for those in need. “If you look at our average cost per appointment for the general

(above) At a seek-and-treat malaria workshop in the village of Chisasa, about 30 km east of the Trident mine development, a local girl waits to be tested by the First Quantum mobile health team.

THE BEGINNING OF A JOURNEY

“I began as an outside consultant, helping to define the scope of First Quantum’s health care responsibilities at Kansanshi,” recalls Anna Pascall, who served as Health Coordinator for all of the company’s operations in Zambia. “Of course we wanted to address the needs of employees, their families and, where appropriate, local communities around the mine. At the same time, we were there to complement, not replace, the services of direct health care providers. It was important to keep that distinction clear. However, when I subsequently arrived in Ndola with a young family, it really hit home how much had to be done if we were going to make this ‘we-don’t-do-direct-health-care’ approach work in a community with so many pressing demands.

“As if to underline the precariousness of the situation, during my first week on the job I received a call around midnight from one of the mine managers telling me he’d been coughing so hard it was causing blackouts. There was no ambulance service, my husband was away, and I didn’t yet know anyone I could ask to look after our children in the middle of the night. Fortunately, I’d gotten to know one of the doctors at the local clinic, and while it was closed – Ndola had no 24-hour clinics at that stage – he’d given me his personal phone number. And even though it was very late and he was in another town, he

very kindly asked for the details of the case, dispensed some advice, and all was well.

“So I learnt a few things that night – about the gaps in local health care and, more importantly, about the wealth of kindness and goodwill that you find in Zambia. I resolved then that while we might not provide direct health care ourselves, we had to ensure that anyone who did was properly supported to deliver the right services in the right way wherever they were needed. This was the beginning of a long journey...”



The new company-sponsored clinic in Kalumbila serves employees of the Trident mine and their families, as well as community members.



Close by First Quantum's travelling malaria workshop, the children of Chisasa take part in a school sports day. The prevention program has had a dramatic impact on public health across the region.



public,” Musunka says, “it’s about a quarter of what you’d pay in the capital, Lusaka. We’re in a remote area where people have less money for health care. But because it’s not too expensive, it’s something many people can manage. In my experience, Zambians are used to making choices and setting priorities within a personal health care plan.”

Cases of serious illness requiring surgery or more complicated treatment are referred to the public system. “We try to supplement their services where we can,” says Musunka. “For example, we’ve provided kidney dialysis to a number of acute maternity patients. We also facilitate a group of rotating surgeons at Solwezi General Hospital to ensure that surgical services are available. Overall, we have great relationships with the government-run facilities, especially because many of our clinic doctors work in both.”

THE HIV CHALLENGE

In 2006, the prevalence of HIV among workers at the Kansanshi mine site was about 10%. Nine years later, the infection rate had declined to just over 3%, compared to about 13% for Zambia nationally. To be clear, the encouraging numbers do not represent the elimination of HIV in those infected, but rather the dilution of its incidence across a rapidly growing population. “People are getting the message on safe practices,” Musunka explains, “and as a result, the transmission rate is lower.”

This positive change in part reflects the impact of First Quantum’s awareness and education programs, which include workplace training sessions on HIV prevention, along with strong encouragement for employees, their families and other community members to participate in voluntary counselling and testing. The company funds mobile testing and antiretroviral treatment units which regularly visit local communities around Solwezi, Kalumbila and Ndola. First Quantum also provides free condoms in work-site washrooms, as well as medication for employees who are HIV-positive.

Much of the company’s HIV efforts focus on changing social attitudes. A workplace program called “One Man Can” helps male employees recognise the major drivers of HIV infection in Zambia, including multiple concurrent partnerships, mobile lifestyles and the use of alcohol. Another program applies a behavioural-change model to help women who may be predisposed to HIV because of low social status or lack of assertiveness and effective negotiating skills. Other specialised programs target female workers, employees’ partners, couples, families and children.

“Participation in all of our HIV programs has been growing steadily over the past few years,” says Anna Pascall. “Under the leadership of Gertrude Musunka, the whole team has been doing a tremendous job.”



(top) Staff at the First Quantum-sponsored Kalumbila clinic provide both treatment and advice. **(bottom)** The company's mobile health team distributes antimalarial medications free of charge to all villagers who test positive for the mosquito-borne parasitic infection. **(opposite)** Although investment in longer-term prevention programs has been growing, about 80% of the company's annual health care expenditure goes to the delivery of clinical and community-based health services.

Still, for all of this progress, there is continued caution. HIV trends can change quickly with shifting economic conditions. The development of the Trident facility, for example, has increased in-migration to the area as older mines elsewhere in the Copperbelt region have shrunk their workforces. "There are thousands of people out of work and looking for opportunities," says Musunka. "We have to be careful, because we're seeing an influx from areas with a high prevalence of HIV."

To guard against a return to past infection rates, many industrial enterprises across the region have joined forces through the Zambia Health Alliance to coordinate activities. "Most of the major mining companies have strong, effective HIV prevention and management programs," Pascall says. "That probably goes in our favour. We also work closely with the national Ministry of Health, whose policies and procedures are well researched and designed."

Given this coordinated effort and the overall progress in raising awareness, Pascall remains optimistic: "I think we've shown that HIV is not an unmanageable problem. It doesn't take a lot of money – it just takes persistence."

THE COST OF MALARIA

Another First Quantum initiative that has contributed significantly to improving public health – and therefore reducing the cost of clinical services – is malaria prevention. A public-private partnership founded by the company works to bridge gaps in the national malaria program, inspiring communities to practise better malaria management and encouraging other private enterprises to lend a hand. First Quantum also sponsors research by the District Health Management Team and the Tropical Diseases Research Centre, including studies in entomology, insecticide effectiveness and the mapping of breeding sites.

The company regularly conducts targeted insecticide spraying – including indoor residual spraying (IRS) in people's homes – to eliminate likely sources of malaria. These efforts are coordinated with public sector spraying programs to ensure the agents deployed are compatible and will not inadvertently create more resistant species. Equally important, the First Quantum team monitors the impact of spraying efforts to determine which insecticides are more effective and track health improvements against baseline studies – paying particular attention to rural areas that are harder to reach with systematic spraying.

However, as crucial as spraying is for achieving immediate reductions in the incidence of malaria, over the longer term it's even more important to educate people about prevention. "You can have the best spraying program in the world," says Musunka, "but you still can't spray everywhere. So we work a

lot on education and sensitization, encouraging people to think about what they can do for themselves, their families and their communities to manage malaria. At the same time, we have to be realistic about changing behaviours. Everyone likes to sit by a campfire, even if there are insects about.”

Beyond the desire to keep people and communities healthy, First Quantum’s prevention program has had a dramatic impact on the cost of health care delivery. In 2014–2015, during the peak of the malaria season, the clinics in Solwezi and Kalumbila saw case loads reduced by 60% to 70% compared to previous years – allowing precious resources to be redirected to other challenges.

Reducing malaria also has a significant impact on mining operations. Left unmanaged, malaria at its peak can infect more than three-quarters of the workforce, with an average of three missed workdays per affected employee. Before the introduction of spraying and education programs,

“It doesn’t take a lot of money – it just takes persistence.”



a typical incidence of 650 uncomplicated cases per month was costing the company nearly \$185,000 at the Trident facility alone. After the malaria management program was implemented, average monthly incidence plummeted to just 30 cases, at a cost of about \$8,500. So clearly the \$300,000 spent annually on malaria prevention at Trident is well worth the investment.

GROWING STRENGTH

In the 2014–2015 fiscal year, First Quantum’s total annual expenditure on health-related programs in Zambia was \$12.5 million. Of this, approximately 80% was allocated to the delivery of clinical and community-based health services, with the balance going to prevention and education programs. Given the proven effectiveness of the latter – and their greater financial sustainability – the company’s long-term goal is to see the proportionate share of total expense shift accordingly. However, as Anna Pascall notes, “Because we’re a mining company, not a health ministry, we’ll always have an obligation to deliver what I would call ‘reactive’ as opposed to preventive care. But we’re working to improve the balance.”

For Pascall and her team, the pace of change within their programs is tempered by the same constraints that affect the public system: “Health care is developed over time. Higher and higher levels of care are achieved incrementally, according to the dollars that are available. It’s a natural evolution that I think we’ve pushed a little faster in some areas while taking care not to duplicate or sidestep what the government is already doing.”

There are still plenty of challenges, from raising public education levels to managing logistics in a region that lacks extensive infrastructure. “But the biggest challenge,” Pascall says, “is being patient enough to develop a system that works across the board. We’ve encouraged our employees to become more knowledgeable about health issues and take on leadership roles. And the programs we’ve created in communities around the mines are strong and independent; external audits confirm that they’re doing a good job of meeting expectations. Of course we can always do better. But there’s a growing strength that I think will endure. It’s like a gardening project – you plant a little here and a little there, and then you fill in the gaps.”



“It’s like a gardening project – you plant a little here and a little there, and then you fill in the gaps.”



From screening for infectious diseases to long-term preventive education, First Quantum's health care initiatives in Zambia are focused on ensuring the well-being of all community members – especially the new generation.



TWO

“Now I have work to do every day. With the money I make, I can provide a better life for all of us.”

IRK

Direct employment is one of the key benefits a mine delivers in return for community support. But far more important for long-term prosperity are skills training, entrepreneurial programs and efforts to foster local economic development.

(left) A Mauritanian woman displays her tie-dyeing skills as part of a training program in Akjoujt to help develop artisanal livelihoods. (right) A project to repurpose trees at the Trident project in Zambia includes a workshop where local workers learn carpentry and furniture-making skills.



“The hope is that locally recruited employees will take the skills they gain and apply them to other livelihoods.”

The Kalumbila Forestry Program, an independent enterprise within the Trident mine development, repurposes felled trees into a wide range of wood products, including posts and structural supports which are deployed around the site. Furniture crafted in the carpentry shop (above) is used in company offices as well as local schools.



WORK



HAND-CRAFTED SUCCESS

As forested land has been cleared to allow development of the Trident project in northwest Zambia, the trees are being reused for everything from pipeline supports to school desks, thanks to a unique company-run sawmill that also provides local workers with valuable new skills.

When Zambia's recently elected president, Edgar Lungu, arrived at Kalumbila in August 2015 to mark the official opening of the Trident copper mine, he was seated at a boardroom table whose history embodies the spirit of this landmark project. As his First Quantum hosts explained, the table was made by local Zambian workers who had learned their trade in the company's new sawmill – using wood from trees felled to make way for a vast mining and smelting operation that will ultimately create some 3,000 jobs.

In an earlier era, even such potentially valuable timber would likely have been hauled away and burned to speed up development. But as part of the Trident commitment to sustainability, all wood harvested from the surrounding forest – where clear-cutting has been kept to a minimum – is being repurposed in a range of products that are put to use around the site. At the same time, as the sawmill pursues its vision to become a self-financing enterprise, its 134 employees are acquiring hands-on experience in forest management, logging, timber processing and carpentry. The pride they take in developing these skills was only reinforced by President Lungu as he admired their handiwork around the Trident site – including the finely crafted cabinetwork that also graces the boardroom.



(above/opposite) Trainees hone their woodworking skills with guidance from expert craftsmen in the Trident carpentry shop. Among the many furniture items produced in the shop are student desks: by the end of 2015, over 2,000 had been distributed to regional schools, with the modest profits reinvested in various community initiatives. As the enterprise strives to be self-sustaining, it is also producing chairs, cupboards and bookcases for local classrooms, as well as bedframes for school dormitories.

RECYCLING INGENUITY

From day one it was understood that development of the Trident project would require a significant amount of deforestation – about 7,000 hectares of multispecies *miombo* woodland over five years. In the land use agreement negotiated with the Zambian government and the subsequent impact assessment approved by the Zambia Environmental Management Agency (ZEMA), First Quantum committed to co-founding the Joint Forest Management Program. Partnering with the national Department of Forestry, the company has helped to secure two reserves totalling nearly 140,000 hectares adjacent to the mine site. This commitment includes an extensive replanting program to offset the felling of trees during excavation of the open pit and development of the ore-processing plant. First Quantum has also spearheaded a public awareness campaign aimed at encouraging nearby communities to take a more active role in forest conservation and stewardship.

While these and other initiatives were implemented according to internationally recognised sustainability guidelines, there was no mandated solution for disposing of felled trees. Trident management knew only that taking a traditional slash-and-burn approach would send the wrong signal to local farmers, who were already being coached by the company's conservation farming experts to practise more sustainable methods of raising crops and managing their lands. What's more, burning perfectly useable timber was an unconscionable waste of resources.

The mine's environmental team hit on a novel solution: build a small sawmill and process felled trees on-site, using the timber in construction and other applications while creating more opportunities for local employment. The result was the Kalumbila Forestry Program, which operates as an independent enterprise within Trident, producing a range of wood products for use around the mine, including:

- fence posts for the 80 km of perimeter and security fencing added in 2015, extending the 30 km built the year before;
- supports for the pipelines carrying tailings and water to and from the ore-processing facility – about 21,000 in all; and
- wood chips collected during sawmilling and recycled around the site to fill in muddy work areas.

What makes this unique initiative even more unusual is its success in finding outlets for wood products beyond the mine. In addition to showpieces like the boardroom furniture, the sawmill's carpentry shop produces a wide selection of furniture items, most notably student desks. By



the end of 2015, well over 2,000 desks had been distributed to area schools through First Quantum's arm's-length Kalumbila Foundation, which reinvests the modest profits into community initiatives. The shop has also produced wooden chairs, cupboards and bookcases for local classrooms, along with more than 100 bedframes for school dormitories.

Another potential avenue the sawmill has explored is the production of high-quality hardwood for sale to commercial manufacturers in South Africa and other international markets. After an initial red flag from the Zambian government, which keeps a close eye on all exports of natural products, the sawmill resumed shipments abroad in early 2015. However, with revenue totalling only about \$20,000 for the year, this experiment may not represent a viable business proposition over the long term.

MEASURING SUCCESS

Where the Kalumbila Forestry Program has clearly had a positive impact, beyond finding creative ways to reuse waste timber, is in the training and development of a talented workforce. The hope is that locally recruited employees will take the skills

they gain and apply them to other livelihoods, whether in logging, construction or cabinet making – though at this point the sawmill offers such attractive compensation and benefits that few are inclined to seek jobs elsewhere.

After an initial investment of \$6 million to get the program up and running, First Quantum's priority going forward is to ensure it becomes self-financing as quickly as possible – particularly now that Trident's construction phase is complete and the facility has become fully operational. Wood products will still be required for maintenance and ongoing expansion, but it will take further innovation to keep up the momentum over the mine's projected lifespan of about 20 years – and true entrepreneurial vision to build a business for the longer term.

Still, as a model of environmental sustainability and local skills development, not to mention pride in craftsmanship, the Trident sawmill is a true Zambian success story.

WORK



SOCIAL FABRIC

On the edge of the Sahara in Mauritania, as First Quantum's Guelb Moghrein mine nears the end of its lifespan, a unique training program is helping the women of Akjoujt transform a time-honoured craft into a sustainable livelihood.

It's only mid-morning, but already the temperature is climbing toward 40°C (104°F). A woman makes her way along a narrow street in the heart of Akjoujt, her face averted to avoid the dust from a passing truck. The windowless walls of sun-baked brick intensify the vivid shades of blue in her mulafa – the long, flowing veil that Mauritanian women wear as an outer garment, drawing up one end to cover their heads. As she turns the corner into a wider street, several women call out greetings and cross over to join her. They too are swathed in multi-hued mulafas, the vibrant oranges and yellow and pinks in brilliant contrast to the monochrome beiges and browns of this ancient desert city.

The women's destination is a nondescript building just off the main square, a former office of the nearby Guelb Moghrein copper mine that has long been vacated. Still, the ramshackle building provides welcome refuge from the growing heat. Stepping inside, the newcomers are welcomed by a dozen other women, their voices echoing in a large, sparsely furnished ground-floor room. After taking a moment to catch up on the latest news, the group spreads out to resume various tasks – in a cluttered space filled with bolts of cloth, many of them knotted and twisted, others unfurled to reveal splashes of colour that mirror the basins of shimmering liquid set about the room.





The artisanal tie-dyeing workshop is part of a multifaceted livelihood program developed for women in Akjoujt and other communities around the Guelb Moghrein mine. The program focuses specifically on women who face difficulties in supporting themselves and their families.



(above/opposite) In addition to the traditional Mauritanian art of tie-dyeing, women in the First Quantum program develop their skills in sewing, pattern making and embroidery. The garments they create are sold in the local marketplace, providing these vulnerable women with much-needed income and a newfound sense of entrepreneurial pride, while also helping to boost the local economy.

This artisanal tie-dyeing workshop is part of a multifaceted livelihood advancement program implemented by First Quantum, which has owned and operated the Guelb Moghrein mine since 2004. The company invests in local employment training and entrepreneurial support in all of the regions where it does business, reinforcing a broader commitment to fostering economic development. In Akjoujt that commitment has gained added importance as the mine enters the second half of its operating life, with wind-down and ultimate closure projected for sometime in the next decade. And to ensure that resources are invested where they will generate the most value, First Quantum's sustainability team has focused on an especially vulnerable segment of the population: women who could find themselves struggling to earn a living once the town's main source of employment is gone and many mine workers – primarily men – leave to find jobs elsewhere.

CRAFTING INDEPENDENCE

The women's livelihood program was developed only after extensive consultations with the local community. The first step was to conduct a baseline survey among female residents of Akjoujt and the surrounding district. Women were asked to identify activities in which they would benefit from formal training and support. Those suggestions were then prioritised in terms of their social and economic sustainability, yielding a shortlist that included sewing, pattern making, embroidery – and the time-honoured Mauritanian art of tie-dyeing. From there a group of participants was selected according to two key criteria: (a) women had to be economically vulnerable, as heads of households with young children to support and no reliable source of income, and (b) they needed to be already engaged in a designated activity, with at least basic levels of knowledge and skill.

"We did an informal assessment of practical skills," explains Abeidy Brahalia, Senior Community Relations Supervisor at Guelb Moghrein. "But really it was more to assess motivation. We wanted to give this opportunity to women who were eager to learn, and to create sustainable livelihoods for themselves and their families."

With an initial supply of cloth, dyes and other materials subsidised by First Quantum, and with guidance from an experienced seamstress and clothing designer, the group began making traditional clothing for women and children. A single mulafa can be up to 5 m (16 ft) long; the light, muslin-style cloth is expertly twisted and tied to create "resists" where dye cannot fully penetrate the fabric. The result is a uniquely patterned

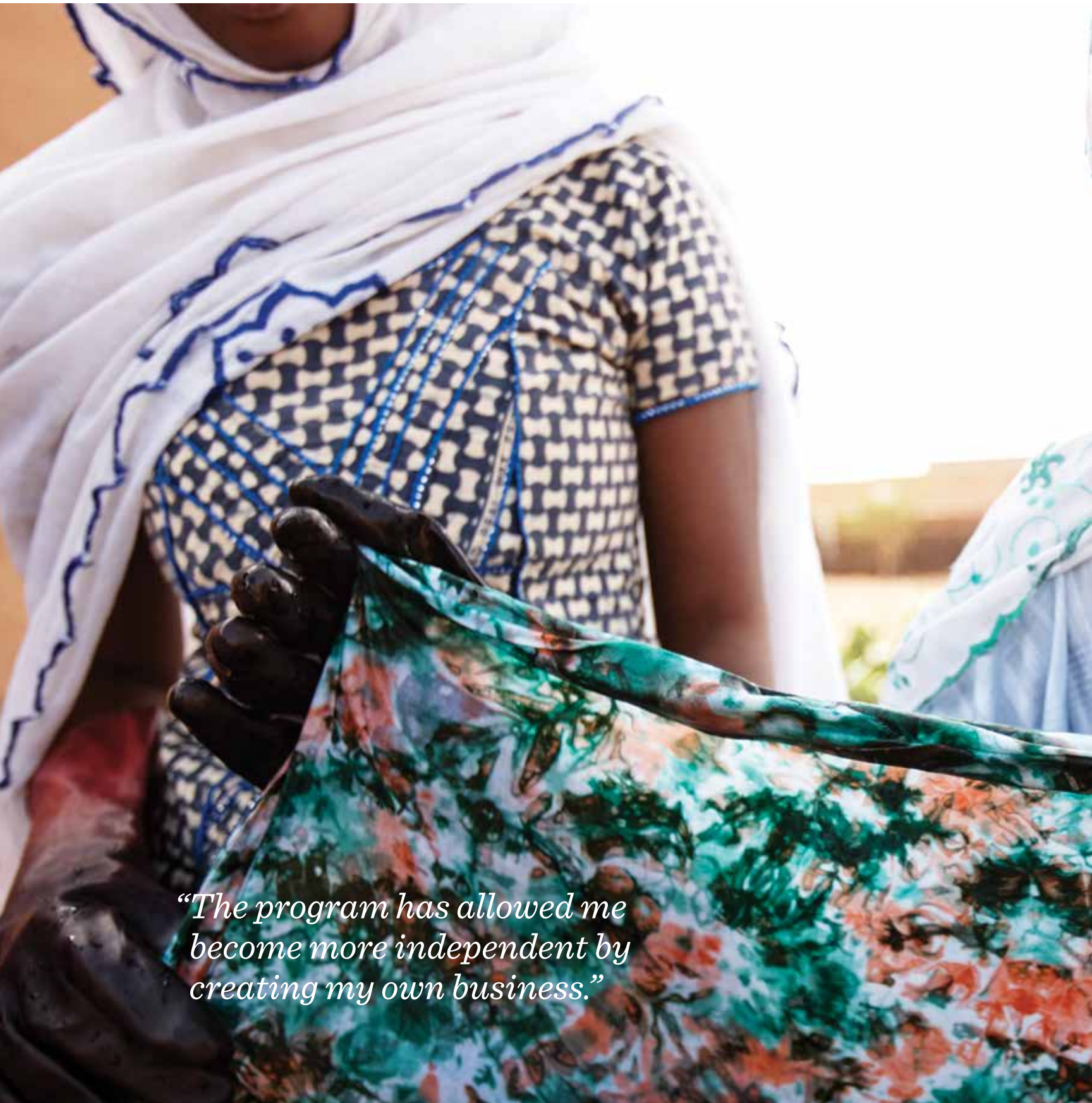
garment that reflects the ingenuity of its creator – and the taste of the woman who wears it.

The tie-dyeing program has been a huge success with makers and consumers alike. In the past Akjoujt residents had to do most of their clothes shopping in the capital, Nouakchott, about 250 km to the southwest on the Atlantic coast. Now they can buy them in the local marketplace, from women who are their neighbours, share their values and are helping to keep more money within the local economy.

As for the women who took part in the first training initiative, most are delighted with the advantages it has given them. “The program has allowed me become more independent and earn an income by creating my own business,” says Hawa Saeid. “I can buy material from the local market, make it into clothing and sell it to people. And I earn a great profit.”

“This is one of the most successful local economic development programs we’ve ever seen in this region.”





“The program has allowed me become more independent by creating my own business.”

As the Guelb Moghrein mine enters the final years of its operating life, the tie-dyeing program, by encouraging women to become small-scale entrepreneurs, is helping to reduce poverty, grow the grassroots economy and keep valued cultural traditions alive.



Those thoughts are echoed by Boy Traore, another of the program's successful graduates: "I learned a lot from the very experienced trainers, and now I have work to do every day. With the money I make, I can send my children to school, look after their health and provide a better life for all of us."

ENDURING VALUE

Initiated in October 2014, the program in its first year trained a cohort of 61 women: 41 from the Akjoujt area and another 20 from the village of Bennichab, about a two-hour drive to the west. With their newly honed skills – plus official diplomas attesting to their credentials – the vast majority of graduates are now successfully launched as solo entrepreneurs. Making clothes on such a small scale requires little startup capital, and the modest businesses are soon self-financing. First Quantum has donated two sewing machines to the cause, one in each community, and provides occasional support with items such as plastic containers for transporting goods to market. But otherwise the women are proudly independent, working from their homes and managing their own production, distribution and finances.

"This is one of the most successful local economic development programs we've ever seen in this region," says Mohamed Nour M'beirik, Communications Coordinator at Guelb Moghrein. "All of our stakeholders, including the company's senior management and officials in various levels of government, have come together to make this a success. We're now monitoring the outcomes from our first year and expect to implement a second phase in the near future."

The progress of this small group of women armed with fabric, dyes and the desire to create a better life will provide inspiration for future initiatives. It also reflects a larger story unfolding across Africa, as programs focused on small-scale entrepreneurs making crafts and other handmade goods have succeeded in creating jobs, reducing poverty and spurring the growth of grassroots economic networks. And they have the added value of keeping older cultural traditions alive.

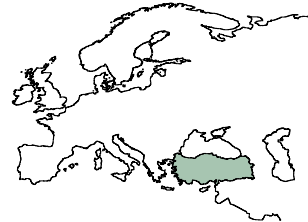
As Guelb Moghrein prepares for closure – a prospect still years away, but nevertheless on the horizon – this is the kind of capacity-building project that strengthens both economic prosperity and the social fabric. It will help to create an enduring legacy for a company committed to building sustainable communities and, more importantly, for a community with a proud understanding of the values that endure.



WORK

LOCAL TALENT

First Quantum's Çayeli mine is firmly rooted in its home region, recruiting most of its workforce from surrounding communities and fostering the advancement of Turkish nationals to key roles in all levels of management.



"In the past this place was perceived to be something of a fortress," says Iain Anderson, General Manager of the Çayeli mine in northeast Turkey. When the veteran miner arrived in 2009 to run the underground copper and zinc operation on the shores of the Black Sea, he saw immediately that people in nearby towns had little understanding of how this key local employer conducted business or made decisions that might affect their communities. It was a view perpetuated by the media, as well as some area politicians, with the result that even the hundreds of mine workers who lived in the region often felt their workplace was disconnected from the rest of their lives.

"So we reached out to our own people," Anderson says, "as well as to local communities, and started talking about some of the good things that were happening at the mine, along with the reasons

behind our decision making. And while it's taken a number of years, we've been able to restore trust and rebuild relationships. Today we're viewed much more positively than when we were staying under the radar."

A key factor in strengthening this vital support has been demonstrating that Çayeli is committed to hiring as many people as possible from neighbouring communities. "Many mining companies that have local recruitment policies find it difficult to stick to them," Anderson says. "We've always taken the approach that it's actually better to recruit people without experience and train them in our way of doing things, and our unique culture. We have a highly skilled training unit running programs for miners, electricians, mechanics – the full range of frontline roles."

(opposite/this page) At First Quantum's Çayeli underground copper and zinc operation in northeast Turkey, more than 85% of the mine's 450 employees come from the local area. The senior management team consists entirely of Turkish nationals.



Recruiting initiatives at Çayeli have focused in particular on vulnerable members of the community, especially families that lack significant income earners or are struggling with financial challenges. Candidates who don't have a high school education – officially a prerequisite for employment – can take a capability test to show that they nevertheless have the required literacy, numeracy and reasoning skills. "Over the past three years we've run a half-dozen capacity development programs to help less-advantaged people prepare for the workplace," Anderson says. "And pretty well all of them have subsequently found jobs at the mine, either directly with the company or through our contractors."

HOMEGROWN VALUES

Within Çayeli's total workforce of about 450 employees, more than 85% come from the local area. And the senior management ranks, which used to be dominated by expatriates, now consist entirely of Turkish nationals. "It's a pretty young team," says Anderson, a native Australian who has become a Turkish citizen. "But what they lack in experience they make up in drive and enthusiasm. You can always go out and get technical information or ask for expert help. What matters is having a team with a positive attitude and the right leadership skills."

Among the cultural values that Çayeli's leaders are keen to see embraced across the organisation is a concern for environmental impact. All new hires receive training on sustainability issues as part of their orientation. And once on the job, they're reminded constantly of the mine's zero-discharge policy. "We don't tolerate any discharges into the environment," Anderson says. "Anyone who observes a spill is responsible for isolating it and reporting to the appropriate managers. If you fail to do that, you're putting your employment at risk."

Even more important is the need to uphold the highest standards of workplace safety. "An underground mine can be a very hazardous working environment," Anderson says, "so expecting people to work safely requires not only a high level of vigilance, but also excellent training and communications." The centrepiece of these efforts is a set of seven simple "Life Saving Rules" that everyone in the workforce is expected to understand, respect and put into daily practice. From precautionary measures around even the most routine tasks to guidelines for handling specialised equipment and explosives, employees know exactly what's required to protect themselves and their colleagues. And here, too, any breach of protocol is taken very seriously.



“Anybody can make an honest mistake,” Anderson says. “But if someone intentionally ignores one of those basic rules or doesn’t follow safety policy, they don’t belong here. There’s just far too much at stake, and everyone who works in this mine needs to feel absolute trust in their co-workers – for their own sake, and for the sake of the entire community.”

LOCAL MEETS GLOBAL

Çayeli’s community commitment is also reflected in its local purchasing policy. Of more than \$93 million spent on goods and services in 2014, just over 73% was purchased from Turkish vendors – and of that, nearly a third was sourced locally, in the communities around the Black Sea port of Rize. The mine does business with well over 1,800 Turkish companies, including more than 400 in the immediate region.

“We have a lot of local success stories,” Anderson says. “For example, our haulage services are provided by a group of community members from the nearest town who’ve formed a cooperative and invested in a fleet of trucks. They’re responsible for moving all of our copper and zinc concentrate from the mine site to the coast.”

Such mutually beneficial partnerships, coupled with Çayeli’s dedication to nurturing the local talent pool, have earned the mine respect within Turkey, as well as recognition abroad – including a prestigious TSM Leadership Award from the Mining Association of Canada (see sidebar).

Looking out over a facility that inspires both regional and national pride, Iain Anderson recalls that one of his first decisions on becoming General Manager was to take down all English-language signs: “The vast majority of our employees are Turkish, and that’s the language we speak here.”

It was a move that reinforced the mine’s strong sense of national identity within a multinational family – another dimension of the balancing act that First Quantum maintains in coordinating the efforts of diverse, locally managed subsidiaries around the globe. “People don’t see us as fully Turkish,” Anderson concludes, “although legally we’re a Turkish company. At the same time, they don’t feel we’re a foreign company, either. We’re somewhere in between, a kind of hybrid – and I think that’s a good place to be.”

(above) At the Çayeli mine, everyone in the workforce is expected to follow a set of seven simple “Life Saving Rules” aimed at ensuring the highest standards of workplace safety.

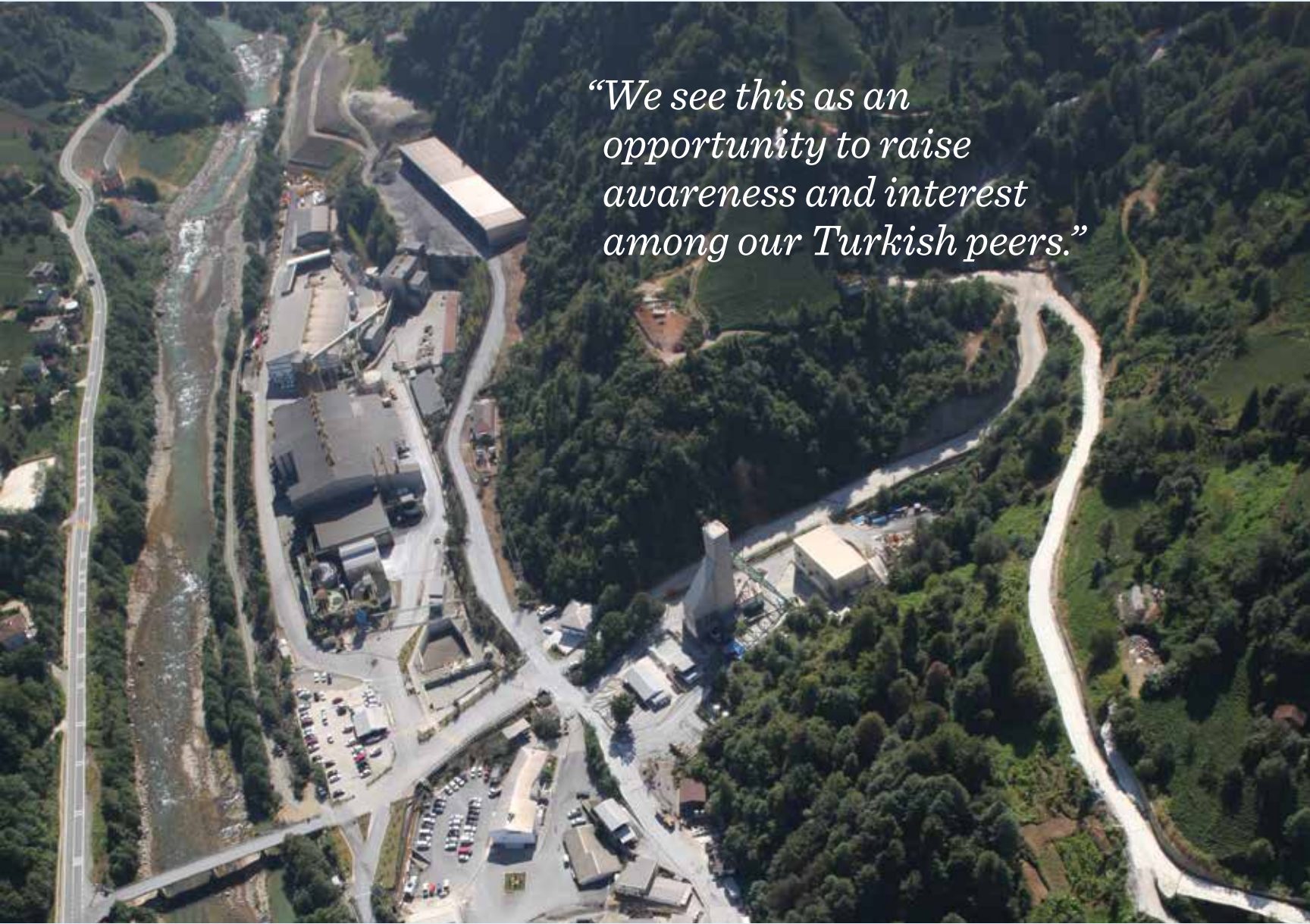
A SUSTAINABILITY LEADER

In September 2015, First Quantum's Çayeli mine was honoured for its sustainability efforts with a TSM Leadership Award from the Mining Association of Canada. This marks the first time that a non-Canadian operation has been recognised by the respected industry organisation as part of its Towards Sustainable Mining (TSM) initiative.

The award is granted exclusively to facilities that meet or exceed the top criteria in a rigorous process of self-assessment and external verification. The evaluation examines a mine's performance against six key TSM protocols: community outreach, crisis

management, safety and health, tailings management, biodiversity conservation, and energy use and greenhouse gas emissions.

"As TSM has become in effect an international standard, we're very pleased to be recognised for our efforts," says Iain Anderson, General Manager of the Çayeli mine. "More importantly, we see this as an opportunity to raise awareness and interest among our Turkish peers. Our hope is that a similar program can be developed to encourage the highest levels of sustainability performance among the hundreds of underground mines operating in this country."



"We see this as an opportunity to raise awareness and interest among our Turkish peers."

Located at the edge of the Black Sea, the Çayeli mine is set among steep forested slopes at the bottom of a river valley. In a region where conventional tailings ponds are not feasible, submarine tailings disposal has provided a safe, sustainable alternative.

WORK



LEARNING TO CHANGE

In a region of Spain burdened by chronic high unemployment, First Quantum's Cobre Las Cruces mine has launched a unique education program aimed at helping young people develop more marketable skills and broaden their scope of opportunity.

For decades Spain has been plagued by higher unemployment than most of its European neighbours. The problem only worsened following the global financial crisis of 2008–2009, when recession pushed the national unemployment rate above 20%. It has remained there ever since, at one point rising to nearly 27%. In the south of the country, where the economy is less diversified, the situation is even worse. Over the past few years, the region of Andalusia has had the highest unemployment rate in the European Union, ranging well above 30%. And as in all low-growth economies, the scarcity of jobs for young people is particularly dire: youth unemployment in Andalusia remained above 60% throughout 2015.

In this context, there are high expectations of any business operating in the region – and especially one as prominent as the Cobre Las Cruces copper mine, which directly employs about 800 full-time workers and contractors near Seville, the historic capital of Andalusia. For First Quantum, which has owned the mine since 2013, seeking opportunities to create employment is part of a broader commitment to regional economic development that applies wherever the company does business. But in this case even the most robust local hiring program can't begin to address the dramatic level of demand. What's more, the mine wrestles with same paradox faced by many other employers in the area: even when jobs are available, it's hard to find people with the skills to fill them.

"When we looked at the employment needs of industrial companies across the region, including more than 100 businesses that provide products and services to our mine, it was clear that we all faced the same challenge of finding qualified workers," says Juan Román Gallego, Human Resources Director at Cobre Las Cruces and Manager of the Cobre Las Cruces Foundation. "So we decided the best solution was to create a training school where unemployed people could develop skills that are easily transferable, increasing their opportunities to find good jobs in local industry."

A WELCOME INITIATIVE

In January 2014 the CLC Industrial School welcomed its first class of 20 students selected from four communities around the mine. Designed to augment existing programs offered by the Spanish government, as well as various training initiatives sponsored by trade unions and entrepreneurs' associations, the new school focuses on very specific areas of technical knowledge. The first class studied electrical instrumentation; two subsequent cohorts have specialised in environmental management and industrial plant operations.

While there are no formal academic prerequisites for applying to the CLC Industrial School, prospective students must take a general knowledge test as the first step in a



“The school provides generic training that is applicable to any industry.”

Technicians inspect the water treatment system that enables Cobre Las Cruces to operate sustainably despite its proximity to a major aquifer. Environmental management is among the programs offered at the CLC Industrial School.



(top) Laboratory workers at Cobre Las Cruces. **(bottom)** Miguel Muñoz is an operations supervisor at the mine. **(opposite)** Processed copper is prepared for shipping

rigorous evaluation process. The school has no defined age limit, but applicants tend to be young – and not surprisingly, given the unemployment rate, the competition is tough.

Once accepted, candidates begin their education with 250 hours of classroom learning led by professional instructors with firsthand industry experience. Topics covered range from lean manufacturing methods and automated control systems to industrial legislation and occupational health and safety. Upon completing this in-class phase – which is fully subsidised by the Cobre Las Cruces Foundation, a not-for-profit funded by First Quantum – students then enter a 300-hour apprenticeship program with a sponsoring employer.

“We work closely with other industrial companies and have a clear understanding of the kinds of skills we’re all looking for,” explains Gallego. “People in this region have welcomed an independent, private initiative that is more focused on industry realities.”

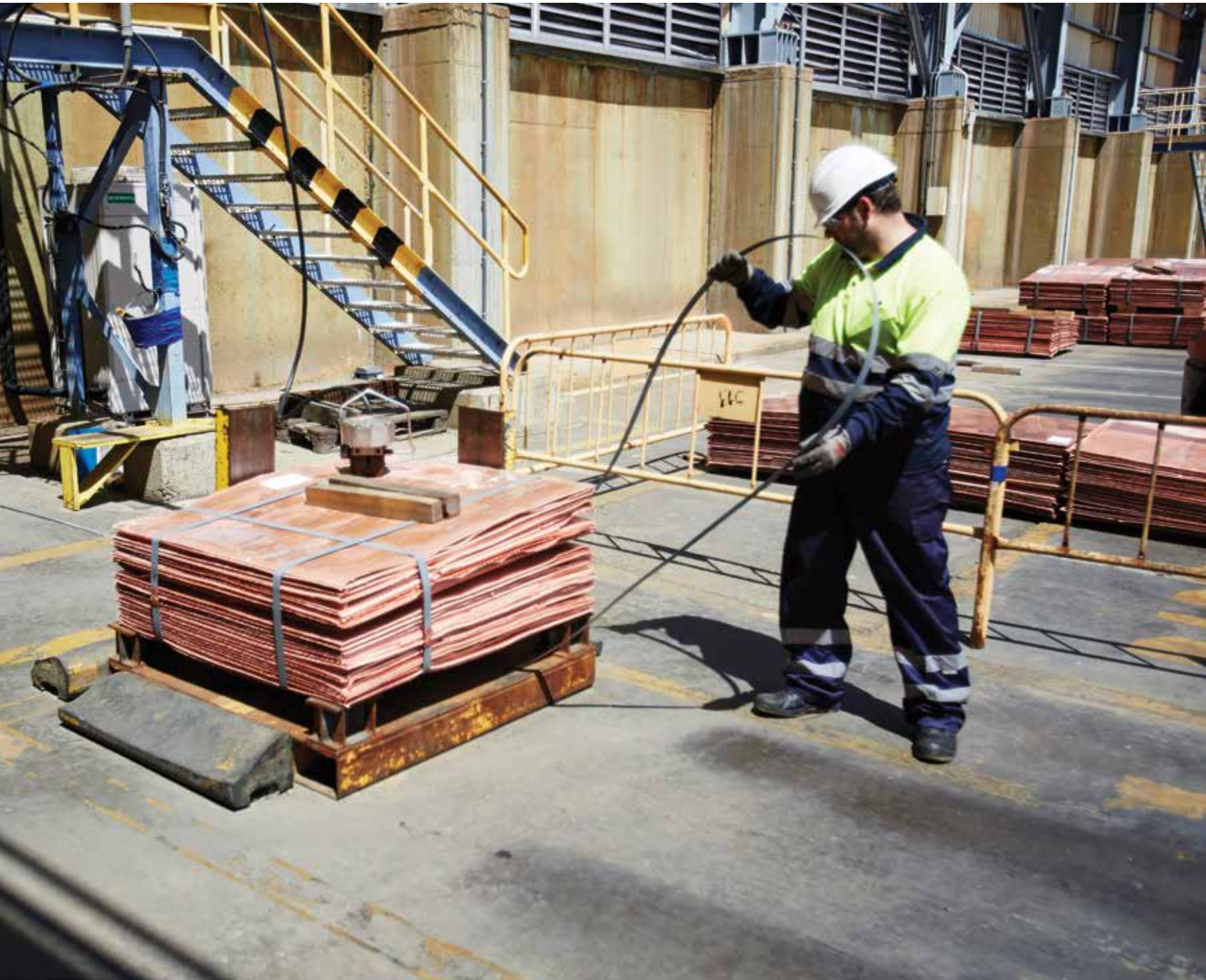
PARTNERS IN PROGRESS

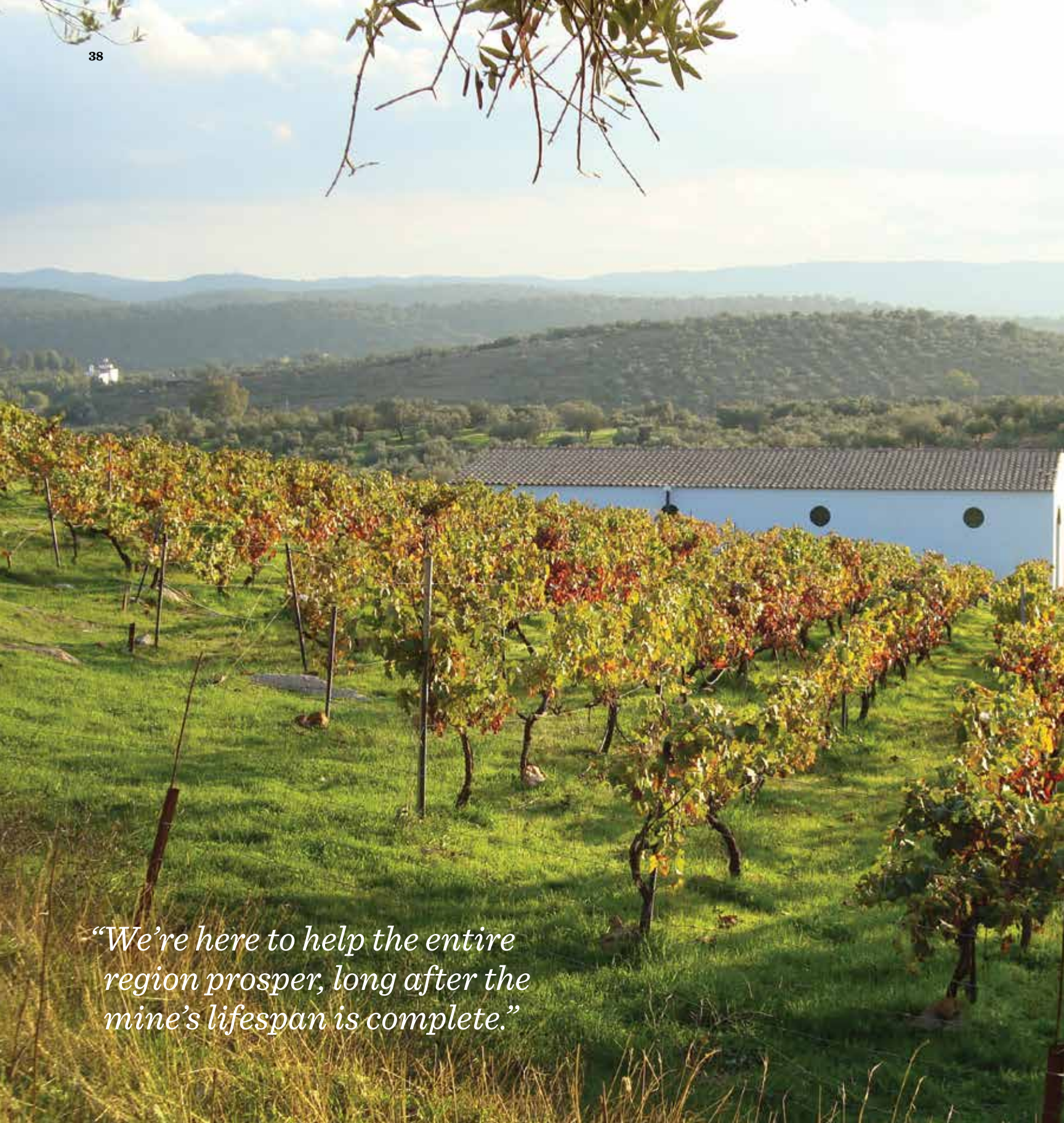
Notwithstanding the high profile of Cobre Las Cruces in creating and promoting the school, it has been important to make clear that this is not simply an entry-level training program for the mine. “If we have any opportunities for which graduates are qualified, of course we’ll consider them,” Gallego says. “But the fact is, the level of employment rotation in our company is very low, so we don’t want to frustrate people by giving them false hope. The first objective of the school is to provide generic training that is applicable to any industry.”

The school’s growing group of supporters includes a multinational brewer and a leading European automaker, along with regionally based companies specialising in aeronautics, chemical products and other types of manufacturing. Many of these companies have begun offering students grants to complement those provided by the Cobre Las Cruces Foundation. The long-term goal is to have the full cost of developing and delivering programs shared by a wider circle of partners – and potentially, as the regional economy recovers, to some degree by the students themselves.

“As with all of First Quantum’s corporate responsibility efforts, we want to help our communities prosper,” Gallego says. “At this point the CLC Industrial School has achieved an employment rate of 40% among more than 70 students. And we’re continuing to build a program that’s sustainable for the future.” Given the economic challenges facing the region, progress must be measured in small steps. But as the school’s first graduates go on to find meaningful jobs – around Seville, elsewhere in Spain and farther afield – all stakeholders can celebrate the power of learning to change lives.

“We’re continuing to build a program that’s sustainable for the future.”





“We’re here to help the entire region prosper, long after the mine’s lifespan is complete.”

The Bodega Tierra Savia winery won the 2013 Five Nines Award for its eco-sensitive approach to winemaking, producing only organic, small-lot vintages.

WORK



REWARDING INITIATIVE

As the Spanish economy struggles to regain momentum, a unique program sponsored by the Cobre Las Cruces mine encourages the efforts of local entrepreneurs – confirming that First Quantum’s commitment to regional development extends well beyond the mine gate.

It’s not hard to imagine enjoying organic goat’s cheese with a glass of sustainably produced wine. But what about a high-tech bicycle frame, or a bag of fertiliser made from composted municipal waste? And what do any of them have to do with a global mining company?

For people living in the Spanish city of Seville and nearby communities, the common thread is clear: these unique products are all produced by winners of the Five Nines Award, an annual competition established by First Quantum in 2011 to foster entrepreneurship and promote a more diversified economy around the Cobre Las Cruces mine.



(above) Quesos de Cabras Huerto del Cura, an artisanal organic goat's cheese company, won the first Five Nines Award in 2011 for its successful mix of traditional farming with new technologies to create a sustainable enterprise.

With a name that evokes the high quality of the Las Cruces copper ore – graded at 99.999% purity – the Five Nines Award program invites both established companies and startups to submit new business ideas that will create good jobs and boost local economic growth while being environmentally conscious. Candidates must present comprehensive proposals explaining their entrepreneurial ambitions, including technical specs and detailed budgets. Their submissions are reviewed by an independent jury of professionals, who award a €30,000 prize to the project judged to have the greatest potential for success, both as a stand-alone enterprise and in its broader impact on the regional economy.

The number of entries has grown steadily every year since the Five Nines Award was launched, with nearly 80 submitted for the 2015 competition. There is no expectation that business proposals will have a connection to mining. Indeed, the chief aim of the program, which is administered by the arm's-length Cobre Las Cruces Foundation, is to nurture longer-term economic prosperity in a region that has been challenged, like all of Spain, with chronic double-digit unemployment and sluggish growth.

SUSTAINABLE SUCCESS

“The program looks for business ideas that are realistic and have a high probability of success,” explains Juan Román Gallego, who helps to manage the Five Nines Award in his role as Human Resources Director at Cobre Las Cruces and Manager of the Cobre Las Cruces Foundation. “We don't want to recognise projects that are impressive today but in two years may prove to be unsustainable.”

All Five Nines participants benefit from the media attention around the awards, which have gained a high profile in Seville and throughout the surrounding region of Andalusia. Winning businesses take advantage of the program's well-organised publicity campaign to build interest in their products and services. And the relationship carries on long after the ceremony is over: representatives of the Cobre Las Cruces Foundation meet regularly with winners to see how they're investing the award money and generally monitor progress.

“In addition, we invite all of our Five Nines participants to attend various innovation events that we sponsor,” says Juan Román. “These are further opportunities to demonstrate the fundamental commitment behind all of our corporate responsibility efforts: we're here to help the entire region prosper, today and long after the mine's lifespan is complete.”

AND THE AWARD GOES TO...

Entrepreneurial ventures that have won the Five Nines Award

2011: Quesos de Cabras Huerto del Cura

An organic goat's cheese company run by two young brothers in Castilblanco de los Arroyos who blend traditional farming methods with new technologies to make their artisanal enterprise both sustainable and profitable.

2012: Compostgreen

A small-scale fertiliser manufacturer that has developed a unique process for converting municipal solid waste into rich, relatively odour-free compost for use in home gardens and in many of the region's public parks.

2013: Bodega Tierra Savia

A winery in the village of Alanis whose proprietors, while still students at university, developed an eco-sensitive approach to winemaking in response to the growing market for organic, small-lot vintages.

2014: Racormance

A manufacturer of high-performance bicycle frames founded by four young engineers whose patented basalt-fibre technology has attracted interest from professional cycling teams and also has potential applications in other industries.

2015: Piensos Apícolas

An innovative company that manufactures specialised food for domestically raised bees, providing the insects with vital nutrients that enable them to produce higher-quality honey in larger volumes.



Racormance won the 2014 Five Nines Award for its use of basalt-fiber technology to create high-performance bicycle frames



WORK

THE BANK NEXT DOOR

In villages around the Kansanshi and Trident mines in northwest Zambia, women empowered by First Quantum's community banking program are funding small businesses, improving financial literacy and changing traditional attitudes about gender roles.



Elizabeth Manjano had a dream. The mother of five young children wanted to help bring in more money for her family, adding to the modest income her husband was able to earn as a house builder. Her plan was to launch a small business buying and reselling second-hand duvets. But in order to build up her initial inventory – and extend credit to her customers (who typically would expect to choose a duvet and then pay for it once they'd saved enough from their wages) – she needed some working capital. And while the amount required was not large, even by the modest standards of her village, it was more than Elizabeth could easily set aside.

The answer was to take out a loan; though without a formal credit history, let alone assets to use as collateral, Elizabeth knew that no conventional bank would lend her money. Fortunately, she had an alternative: the recently founded Butemwe Community Bank, based in her village and run by a group of women she knew and trusted. After being welcomed into the bank's small pool of depositors, she was approved for a loan of 1,200 kwacha (then about US\$120), and her new enterprise was up and running.

The duvet business was an immediate success, and soon Elizabeth had sufficient cash flow to begin paying back her loan. She was also inspired to launch another home-based venture: making floor polish in a range of custom colours. This too proved popular with the community, adding another steady revenue stream – with the added advantage that people bought polish for cash, not on credit. In no time Elizabeth was debt-free and able to make significant deposits to Butemwe (the word for "love" in the local dialect), building up a nest egg for the future.

"With the money from my small business, I can help to support our family," Elizabeth says. "We're living in trying times – business has never been so tricky – but I will do whatever I can to keep my four children in school, and to have our youngest join them in a few more years." At the same time, the budding entrepreneur has another dream to pursue: "Finances allowing, and once the children are secure in school, I hope to start selling groceries."

Elizabeth's success story is just one of many unfolding in villages across this underdeveloped region, as community

(opposite) Elizabeth Manjano launched a small business making and selling floor polish with financial assistance from an informal bank created by a group of women in her village. The community banking program supports a wide range of modest enterprises in the region around First Quantum's mines in northwest Zambia. **(this page)** Anniva Chipweti Kafwamfwa received backing from the community banking program to establish the Riverstone Private School, which has students from the nursery level through grade one.



banks use microcredit to spark entrepreneurship and foster grassroots economic growth. What's more, the fact that all of these banks are funded and managed by women creates a tremendous sense of empowerment in the 50% of the population who are eager to expand their financial independence.

And helping drive all of this positive change is a unique economic development initiative launched in mid-2014: First Quantum's community banking program.

A SIMPLE MODEL

"We've experimented for 10 years with various livelihood-building strategies," says Bruce Lewis, Corporate Social Responsibility Manager for First Quantum's Kansanshi and Trident mines. "We've invested in projects ranging from fish farming to milling maize, and none have sustained momentum. With community banking, though, the response has been overwhelmingly positive – for a program that requires very little financial support beyond some modest infrastructure costs. Local people finance these banks with their own money. And we're realising that's precisely why they succeed."

The business model is simple. A group of about 20 community members comes together and decides on an equal contribution that everyone can afford. Once the bank has a pool of capital, the

investors invite their fellow villagers to submit small-scale business proposals. A few are selected that everyone agrees are promising and entail minimal risk. And the bank then extends credit on terms tailored to each borrower's circumstances.

Interest rates are not fixed and can seem extraordinarily high compared to those of the formal banking sector. But for solo entrepreneurs who just need a few kwacha to get a venture launched, paying back the principal plus a significant premium – even as high as 100% – can seem quite reasonable when the baseline numbers are so small. And the fact is, the people who benefit from these loans typically do so well, they're happy to pay rates that also reward the support of their neighbours.

On the banks' side, half the profits are returned to investors and the rest are reinvested as loan capital. Typically, a successful bank reevaluates contribution rates after the first year and finds that most members, having seen healthy returns, are keen to invest more. To secure funds not in circulation, First Quantum supplies a vault – a simple strongbox, triple-locked so that three key holders must be present for any deposits or withdrawals.

As for governance, each bank has a committee-like structure composed of elected (and unpaid) officers – usually a chair, a vice-chair, a treasurer and three auditors. “The level of oversight is more rigorous than you see in most companies,” Bruce Lewis says. “To maintain trust, they audit, audit again and then audit a third time, to reassure everyone that the system is operating properly and their hard-earned money is safe.”

And of course the fact that all of these self-financing banks are run entirely by women adds a unique dimension to their growing popularity among borrowers.

EMPOWERING WOMEN

First Quantum’s community banking program was inspired by a few small, homegrown banks in villages around Kansanshi that had quickly built a base of investors and borrowers. The microcredit model had immediate appeal, but the real key to these banks’ success was the fact that they were run by groups of women who were respected as informal community leaders. “These women were asserting themselves against tradition,” Lewis explains, “in a society where the concept of gender equality hasn’t been fully accepted.”

Women from these pioneering banks have been recruited by First Quantum to train interested groups in other villages. They share valuable knowledge and skills, and just as importantly they share their sense of pride in what they’ve achieved. And for the trainees, that glimpse of newfound prosperity is exactly the inspiration they’re looking for.

Indeed, the rapid growth of the community banking program reflects a broader wave of social change that has seen women across Zambia rethinking their roles. This eagerness to move past traditional constraints was more than evident at the Women’s Empowerment Conference held in Solwezi in June 2015. Sponsored by First Quantum as part of an ongoing effort to promote women’s financial independence, the two-day event was expected to attract 300 people and ended up drawing nearly a thousand. As delegates enthusiastically exchanged ideas and gained encouragement from various guest speakers, community banking was showcased as an example of true empowerment in action.

Not surprisingly, the banks’ success has sparked interest from the male population as well. But even as additional banks are founded in some villages to meet growing demand, these too are managed by women. “Some of the men feel upset,” Lewis acknowledges. “But we explain to them that after

assuming leadership positions in so many other sectors of society, they need to give women a chance in this one. They generally accept that – and now they’re discovering that women can indeed be leaders.”

BREAKING THE CYCLE

It’s expected that many of the community banks will evolve into more formal businesses. “We estimate it will take about four years to reach that maturity level,” Lewis says, “based on the progress of the original bank. They’ve already bought themselves a small truck, a photocopier and other office equipment. And their revenues are strong – close to 200,000 kwacha (US\$20,000) in 2015.” The banks see a remarkably high rate of repayment on loans; in the rare cases where borrowers have experienced difficulties, they’ve been asked to provide some form of collateral until payments can resume.

As the banks’ investors and customers see their livelihoods grow, they deepen their financial literacy, reinforcing First Quantum’s long-held belief that investing in education is the key to fostering self-sufficiency and building sustainable growth. In fact, most participants in the community banking program previously took advantage of a general adult literacy program sponsored by the company. And many have also benefitted from training in conservation farming as they seek new ways of leveraging their own capabilities to break the cycle of poverty.

The banking program is inspiring villages to come together and develop their own responses to poverty. By selectively investing in homegrown economic ventures, communities have a sense of responsibility that encourages both disciplined management and pride in accomplishing goals – essential features of any sustainable enterprise.

“Over the past decade we’ve seen various groups come into these communities and hold workshops on launching small businesses,” Lewis says. “But without a solution to the problem of financing, the specific points they’ve tried to teach really haven’t led to tangible outcomes. Now, with community banking, all of the pieces are in place. People can take out small loans, buy their inputs, grow their crops – with the high yields that conservation farming allows – and sell what they produce for a profit. As everyone involved becomes more aware of how to manage money and get it working for them, we’re seeing the potential for poverty reduction on a large scale.”



STILL GROWING

In Zambia, conservation farming continues to offer a path from subsistence to self-sufficiency.

First Quantum's support for self-financing community banks is a natural complement to the company's conservation farming program, as farmers who adopt sustainable techniques to grow more produce also seek microcredit to finance their inputs or the cost of getting goods to market.

With a few days of practical training, participants in the conservation farming program can expect to see an average fourfold increase in their yields, and in many cases the gains are even more dramatic. Launched in 2010 in communities around the Kansanshi mine and since expanded to the newer Trident project area, the program helps people put more food on the table, raise family incomes and feel the deep sense of pride that comes from achieving self-sufficiency.

By the middle of 2015 some 17,500 people from across the North-Western Province had been trained in conservation farming. Another 2,500 had taken advantage of the input support program, which provides seeds and fertiliser with a declining level of subsidy over five years (at which point sustainable practices should make fertiliser unnecessary).

THE CHALLENGES OF CHANGE

The success of conservation farming has led proponents to suggest further dimensions to the program. In 2015 a plan to help farmers around the mines raise poultry prompted the building of several chicken runs (at a cost of about \$50,000 apiece),

each to be managed cooperatively by a group of 50 community members. Unfortunately, allocating responsibilities in a spirit of trust proved to be challenging, and the project foundered.

Now, adopting the focus on individual responsibility that distinguishes conservation farming, the Corporate Social Responsibility team is offering a few chickens to each farmer who succeeds in growing his or her crops sustainably. Housed in small cages, the chickens can be moved easily around a plot of land, providing a ready source of manure. What's more, the cages are simple to strap onto the back of a bike for a ride to the nearest market, where eggs and meat will fetch higher prices.

Still, conservation farming is not for everyone. For some, working a bit harder now to ensure a sustainable source of food and income later makes perfect sense. But others are content to grow crops quickly using traditional methods, even if it means perpetually burning out plots of land and having to find new ones. And still others fall somewhere in between.

"Many people go through our training and then try to combine conservation farming with traditional approaches," explains Bruce Lewis, Corporate Social Responsibility Manager with First Quantum. "They end up with lower-quality crops, but it's still an improvement over how they farmed before. As with so many change efforts, it's an education process."

Vincent Sairunga grows maize, peanuts and other crops, applying sustainable techniques passed on from his father Brian and his mother Avanass, who both participated in First Quantum's conservation farming program.

“The programs we build together will carry on long after the mine’s lifespan is complete.”

IHO

TIME

Health, education, employment and overall prosperity – everything begins with a stable, comfortable home. For a mining company, helping to create strong, well-managed communities is both a social responsibility and a business imperative.

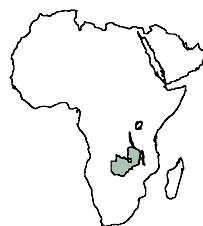
(left) After enrolling in a Cobre Panamá agriculture program, Miguel Perez has established a new livelihood as a farmer, growing peppers, papayas, pineapples and other produce. (this page) Mary Kapitawu and her baby Pronence live with Mary's parents and nine siblings in the new community of Kalumbila North in northwest Zambia. Her father works at the nearby Trident mine site.



“Traditional leaders play an important role in the resettlement process.”

Hired hand Henry Katenta helps work a plot of land provided to farmer Mercy Maureen Muyoya as part of the resettlement agreement to allow construction of a smelter road at the Kansanshi mine.

HOME



ROAD TO TOMORROW

Creating a direct link to the recently completed smelter at the Kansanshi mine in Zambia was vital to avoid congestion on existing roads and ensure the new facility ran smoothly. But just as importantly, people living and farming along the new road had to feel they were better off after it was built.

For Nosiku and Nandila Inonge, both in their eighties, this was by far the nicest house they'd ever lived in: brick walls, a proper roof, four windows and a floor of concrete rather than mud. Not to mention all the space, with two bedrooms in addition to the kitchen and living area. Still, the move to a brand-new home in their village outside Solwezi, in northwest Zambia, was a big change. Especially for Nosiku, who was blind and worried that she wouldn't be able to find her way around an unfamiliar place. Even the short walk outside to the toilet – another welcome addition to their lives – was daunting without her husband to lead the way.

"It was a frightening situation for her, so we came up with a simple solution," recalls Michael Longhurst, Resettlement Supervisor at First Quantum's nearby Kansanshi mine. "We ran a rope from the front door to the new toilet, and now Nosiku can confidently make her way there on her own."



Nosiku and Nandila are part of a small group of area residents affected by construction of an access road to the smelting facility that began operating in late 2014. The 114 people who experienced direct or indirect impacts agreed to a resettlement plan that includes upgraded homes for those obliged to move, cash compensation for farmland and any crops left behind, and a multi-tiered livelihood restoration program.

The smelter road agreement, which is framed by the broader Resettlement Action Plan approved for Kansanshi by the Zambian Environmental Management Agency (ZEMA), sets out detailed guidelines for all foreseeable impact scenarios. But the spirit of the process is summed up in the experience of Nosiku and Nandila: the resettlement team's goal is to balance the practical requirements of development at Kansanshi, which brings significant economic benefits to the region, against the individual needs of local villagers as they adjust to change in their day-to-day lives.

MAPPING THE IMPACT

"The main reason for building the road was to avoid an anticipated increase in traffic on the one existing route through Solwezi," Michael Longhurst explains.

"Most people who initially had issues could see an opportunity to improve their situation."

“There were risks in having heavy trucks travel through a large community of several hundred thousand people. Plus, from a First Quantum perspective, the new road would enable us to keep shipments moving quickly to and from the smelter on a more reliable schedule.”

To create the access route, the company proposed to upgrade and extend an existing road – badly in need of repair, and barely passable for most vehicles – leading off the main regional highway. The total length of the new, tarred road would be just over 9 km. And because it would cross farmland and pass close to two small villages, the first critical planning step was to reach out to everyone who might experience any degree of impact.

Construction projects such as roads – like railways, canals, pipelines and power corridors – require linear patterns of land acquisition that tend not to have a dramatic impact on any single landholder. The challenge, however, especially in rural areas with little formal development, is to identify all potential stakeholders in the process.

The smelter road resettlement team began by establishing terms of reference for the project in consultation with local leaders, who assisted in getting word out to the wider community. And from there it was a matter of walking the planned route on publicised dates in the hope of meeting as many people as possible who felt they would be affected by the road. Armed with cameras, GPS devices and old-fashioned tape measures, the First Quantum team followed a long line of surveyors’ stakes over open fields and through the bush. Accompanying them were representatives from the national Ministry of Agriculture, who played a pivotal role in engaging with the public and assessing whether land was under cultivation.

“It was easy to spot where someone was currently farming,” Longhurst says. “And our Ministry colleagues could identify the type of crop, when it was likely planted and so on.” In other areas, though, the only indication that a field had likely once been cultivated was the height of the vegetation. “Generally, if everything was below two metres, it was a sign that someone had put time and effort into agricultural work at some point and therefore was eligible for what we call the ‘land development cost.’”

What proved to be trickier was establishing land ownership in a community where individuals may not hold legal title but nevertheless have been granted farming plots by the local chief. “It’s a form of earned tenure,” Longhurst explains, “and this is where traditional leaders play an important role in the resettlement process. They keep records of everyone who has received land from the chiefdom. So if there is any disagreement over who owns a particular plot, we ask the local leadership to help resolve the dispute according to their customs.”



(top) The children of Justin and Muzhinga Kikumbi on the family’s new property near Solwezi – part of a resettlement agreement with First Quantum when their former home had to be cleared away for the construction of a road to the Kansanshi smelter. **(bottom)** The compensation package has allowed the Kikumbis to buy a grinding mill, which they use for their own crops and to earn extra income from local farmers who need their maize ground into meal. **(opposite)** Muzhinga takes a break from operating the mill. She and her husband have also invested in a car and now operate a village taxi service.



(top) When Mercy Maureen Muyoya received her resettlement plot, she also took advantage of First Quantum's conservation farming program, learning sustainable techniques to maximise yields. **(bottom)** Mercy's sister shows off a sample of their produce. **(opposite)** Mercy works her plot alongside the new Kansanshi smelter road, assisted by Henry Katenta and other young workers.

CHOICES WITH A FUTURE

While disputes inevitably arise when there are competing claims for compensation, the smelter road resettlement plan unfolded quite smoothly. "There's always some resistance," says Longhurst. "Anything new is often unwelcome at first. And then as people become more curious about what it could mean for them, they have a natural desire to get as much as they can from the process. But we stuck to our approach, sharing information and encouraging open discussion, and in the end most people who initially had issues could see that the company was offering fair compensation and an opportunity to improve their situation."

When the resettlement process was complete, all 114 people who were affected by the smelter road – 89 of them directly – had received 100% of the agreed compensation. Nearly 50 meetings were held to address specific concerns and resolve grievances.

People who were living directly in the road's path were given new properties a short distance away – with larger, higher-quality homes than those they'd left behind. Everyone who was farming along the route received compensation for their lost crops and, once ownership was confirmed, the cash value of their developed land. Farmers were also eligible for a year's worth of inputs – lime, fertiliser, ground nuts (peanuts) and maize seed – and those who enrolled in First Quantum's conservation farming program could count on a further two-year supply.

In addition to learning sustainable methods of increasing crop yields, resettled residents were invited to participate in financial training – part of all First Quantum programs that include monetary compensation – while those with entrepreneurial ambitions were introduced to company-sponsored community bankers. And people with lower levels of compensation were offered three-month casual employment contracts.

Taken together, these various facets of livelihood restoration reflect a fundamental belief at First Quantum: while resettlement should always be a last resort, in cases where there is no better alternative, it should be embraced as a unique opportunity to improve the local quality of life. And just as importantly, those affected should have all the information they need to take an active part in decision making.

"It can be frustrating when people focus on what they'll receive today rather than looking to the future," says Michael Longhurst. "But we try to show them that this is not just about right now – it's about sustainability." And ultimately, as with Nosiku and Nandila, it's about making a positive difference in people's lives. "They're a vulnerable couple who've definitely benefitted from resettlement. It feels good to be able to help."



*“This is not just about right now –
it’s about sustainability.”*

HOME



CHANGING PERSPECTIVES

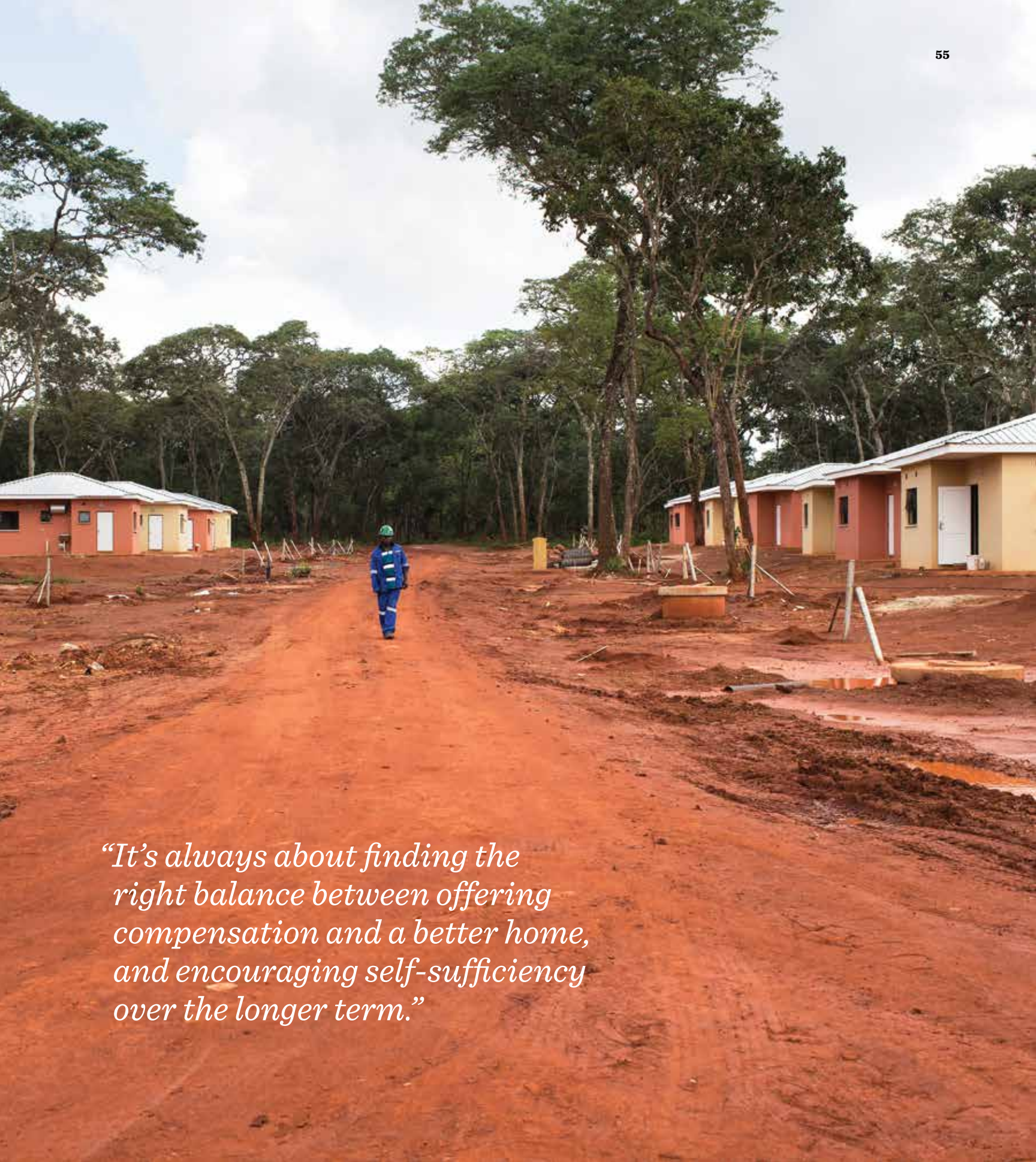
Q&A with Garth Lappeman

In October 2013, when Zambian authorities approved a resettlement plan for the massive Trident project, it marked the conclusion of a multi-year consultation process aimed at protecting the livelihoods of those most directly affected by the mine development. First Quantum's Garth Lappeman, who has played a key role in managing the resettlement, provides a progress report:

Q First Quantum's last Sustainability Report included an in-depth look at the impact of the Trident development on surrounding communities, focusing in particular on the comprehensive Resettlement Action Plan, or RAP. In the two years since the plan was approved, how are its various pieces coming together?

Garth Lappeman: As of November 2015, we've resettled 573 of the 579 families covered by the RAP. We've also provided full compensation to 1,384 of 1,452 farmers who were cultivating crops in the project area; there's just a handful we've been unable to locate, and we continue to look for them. Those are the main stakeholders. In addition, we've compensated 95 beekeepers through a livelihood program that includes training, hive upgrades and helping provide connections to the international honey market. And we're finalising agreements with 221 livestock farmers. So we've come a long way.





“It’s always about finding the right balance between offering compensation and a better home, and encouraging self-sufficiency over the longer term.”

Housing and infrastructure development in Kalumbila North. The community has been growing rapidly, attracting many younger people who prefer living near the bustling town of Kalumbila to living in a rural village.



(top) Martin Kifita moved to Kalumbila North with his brother in 2014. **(bottom)** First Quantum's commitment to social infrastructure development includes the building of several new schools. **(opposite)** Children in the village of Inkisu make the daily trip to school aboard a bus funded by First Quantum. Their new orange uniforms are being handmade by a company-sponsored women's group in Solwezi.

Q: Where have the families resettled?

GL: There are two resettlement areas – one just north of the town of Kalumbila, which community residents have named Kalumbila North, and the other a little further away to the south, which is traditionally known as Shinengene.

The latter area includes over 3,000 hectares of fertile farmland and was planned to support agricultural livelihoods. It was more attractive to people whose families have lived and farmed nearby for generations – particularly older residents who wanted to continue farming. Of the 177 families that have settled there, 123 have taken advantage of First Quantum's conservation farming program, and their crop yields are much higher than when they used traditional methods.

It's very quiet at Shinengene. Most households have not added structures to their residential plots. The local marketplace hasn't really developed – there are only a few shops. And as you drive through the community, you can get the sense that there are hardly any people living there. But that's because they're typically out working their farming plots, or perhaps off selling their produce at busier markets. Still, there's not been much of a population influx at Shinengene following the initial resettlement.

Kalumbila North, by comparison, is a bustling suburb that's experienced rapid population growth. Many younger people chose to move here, because the prospect of living close to a town was more attractive to them than being in a rural agricultural settlement. And you can see right away that it's quite different. A lot of houses have satellite dishes and vehicles parked outside, as well as additional structures on the property – all indicators of improved standard of living.

There's also a very active marketplace, and lot of informal enterprises are developing. In fact, additional people have arrived, hoping to launch small businesses or find jobs as the local economy expands around the mine.

Q: So other people have moved here along with the resettled families?

GL: Yes, there's quite a large group who've moved in from other communities across Zambia's Copperbelt region. When a lot of people are employed and have money to spend, it creates opportunities for entrepreneurs. So the population is growing very quickly.

Some of our resettled homeowners have built smaller houses on the same lots for themselves and are renting out their resettlement houses to new arrivals, including First Quantum employees and contractors. A few people have rented out their entire properties and gone to live in other villages in the chieftdom.

Q: Are there any measures in place to limit or guide the influx of people?

GL: Both resettlement areas fall within the jurisdiction of the government, but because there is limited local government presence – the nearest formal authority is the municipal council in Solwezi, about 160 km away – growth tends to be spontaneous. We’ve pegged out the resettlement plots and clearly demarcated service corridors, public spaces and areas devoted to infrastructure. And we try to sensitise community members to the importance of respecting these boundaries and planning parameters.

Also, as part of our corporate social responsibility program we’ve created a plan for the expansion of Kalumbila North and Shinengene. We’ve built extra roads and have marked additional plots that the council can sell to people who wish to settle in the area. Because in the long run, we don’t want to have simply created a community of households that were displaced by our mine. We want our legacy to be a thriving town with a mix of people – some who were resettled as Trident was built, others who chose to come from elsewhere.

Q: At this point have all the terms in the resettlement agreement been fulfilled?

GL: We had an independent consultant audit the RAP and assess where we were compliant, in progress, or non-compliant. There was one point on which we were found to be non-compliant, and that was the provision of bathrooms. Each house has a toilet – a latrine at the corner of the plot, which is customary in these communities. But a requirement was added for a separate bath, subject to approval by the authorities. The additional cost of providing baths for the whole community is \$1 million, and we hadn’t factored that into our \$13 million budget for resettlement. But we know it’s important and are moving on it as quickly as we can – in fact, we’re still far ahead of our schedule.

Q: Is that the only outstanding issue around implementation of the RAP?

GL: There is still some work in progress, such as helping resettled homeowners secure title deeds for their new properties. We’ve been working closely with the government on that and as a first step have conducted a formal survey of residential and



agricultural lands with the relevant government ministries. We'll also be paying the fees associated with obtaining title. In many resettlements people are given homes on customary or state lands, but they never get formal title. So we're in a very fortunate position, with the government's support, to be able to provide that peace of mind.

Q: Have there been any unexpected challenges during the RAP implementation?

GL: There's one sensitive area where we've learned a lot about local customs and expectations, and that's the issue of graves in the project area.

When we did the social and environmental impact assessments in 2010, we identified a few traditional burial sites within the footprint that we intended to develop. Zambian law is clear in this regard. Any graves that would be covered over by additional earth – for instance, behind the tailings dam – could remain where they were. But for any grave that would be disturbed when the pit was excavated, the remains had to be exhumed and moved elsewhere. And before we could obtain permits for either of those scenarios, we first had to identify the custodians of those graves – the next of kin or surviving relatives.

So we sought help from nearby communities to identify all of the apparent custodians and then applied for the appropriate permits in 2011. To ensure our conclusions were correct, we were asked in 2014 to conduct a verification process and recheck all custodian data, as well as the number of affected graves. After that survey, the total reported graves nearly doubled, and the number of custodians increased fourfold. So this has created a challenge as we work with the authorities to arrive at definitive numbers. A few people may have taken advantage of the fact that graves could not be verified. But we didn't argue, given the sensitivity of the issue, and paid compassionate allowances for all of the claimed graves.

Even more challenging – again, because the subject is so sensitive, especially in a region that has seen very few exhumations – was the subject of compensation. After lengthy negotiations with community members, assisted by government representatives, we reached an agreement on a compassionate allowance equivalent to the average cost of a funeral. We also agreed that before covering a grave or exhuming any remains we would support the custodians in performing an appropriate cultural or religious ceremony.

This long consultative process has been difficult for all concerned, involving more than 100 meetings with community members, chiefs, NGOs and representatives of the local, provincial and national governments over a four-year period. But at this point all of the custodians have received compensation and everyone appears to be pleased with the outcome. So now we're hopeful that permits will be issued and the next phases of mine development can get underway. Some people have pointed out that the law only requires us to give six months' notice to grave custodians before proceeding. But after working so hard with stakeholders to do this the right way, and showing concern for both individual feelings and cultural traditions, I really hope we can bring it to the best possible conclusion for everyone.

Q: Stepping back from that specific challenge, what has the company learned that can be carried forward to future projects?

GL: I think this experience has reinforced what we've seen around the globe: it's always about finding the right balance. Between respecting community values and completing a project that will bring welcome economic prosperity and growth. Between offering compensation and a better home, and encouraging self-sufficiency over the longer term. And, frankly, between helping some resettled families see their efforts pay off through conservation farming, and accepting that others will decide it's not for them and go back to their old way of doing things – or to some hybrid approach that doesn't require as much investment in labour and inputs.

And that's inevitable. We're committed to supporting resettled communities as they reestablish livelihoods in circumstances that are better than those they left behind. And they in turn take responsibility for sustaining those livelihoods. There's often pressure to keep on treating a displaced community as different, with its own unique needs and compensations. And it is different, at least while we're helping with the transition to a new way of life. But over time we hope to see a new community gradually return to its regular way of life, benefitting from our sustainability projects alongside other local communities. In the case of Kalumbila North and Shinengene, we've developed mutual trust – not without a fair number of challenges – and I would say we've become friends through the process. We communicate well and regularly, and we work together on overcoming problems. Sometimes we have tensions that are difficult to reconcile, but that's a challenge for both of us, the company and the resettled communities – to fulfill the immediate commitments we've made to each other while looking to the future and whatever changes lie ahead.



TRIDENT RESETTLEMENT PLAN

A brief progress report

As detailed in First Quantum's last Sustainability Report (available online at first-quantum.com), Zambia has no overarching legislative framework for resettlement, nor any mechanisms for agreeing on entitlements and compensation. The company therefore took a highly consultative approach to reaching an acceptable resettlement solution for the Trident development. The process was framed by the sustainability performance standards established by the International Finance Corporation (IFC), part of the World Bank – which in turn are aligned with the Equator Principles, a set of widely accepted guidelines for environmental and social risk management.

First Quantum established a multi-stakeholder forum comprising representatives of the affected communities, including their traditional chief; government officials from all relevant departments; NGOs that are active in the area; representatives of displaced communities, both men and women; and an expert on global best practices in resettlement. A series of working groups considered entitlement and compensation options across all areas of impact. The result was a 650-page Resettlement Action Plan (RAP), which was first submitted in September 2011 to the Zambia Environmental Management Agency, an independent regulator created by the government.

Over the next two years, the RAP was the object of extended deliberations. Company representatives met regularly with officials, NGOs, traditional leaders, academics, community members, lenders and investors to answer questions and clarify details of the plan, which embodied the basic principle that all replacement assets granted to resettled families would be of superior quality and scale to what they'd left

behind. In a separate comparative study, the company found that the value of entitlements in the Trident RAP averaged more than twofold – and as high as tenfold – the value of comparable elements in recently approved agreements with other mining companies in Zambia.

The RAP process systematically examined everything from housing and water access to health care and education – along with elements that were less easy to measure, such as social networks, gender issues and superstition – to ensure resettlement brought improved quality of life. While most compensation was in kind, taking the form of improved infrastructure and livelihood support, resettled farmers also received one-time cash payments for the value of crops already planted. The rates were determined by a government study funded by First Quantum and, on average, were the highest ever paid in Zambia. Recipients were provided with independent financial advice on how to invest the funds effectively.

As the various RAP terms were implemented, there were ongoing consultations with community representatives seeking enhancements. For instance, the company agreed to build local health centres at Shinengene and Kalumbila North to save resettled families long round trips (40 km and 10 km, respectively) to the nearest clinic. In the same vein, the plan for a new school was expanded to two schools, one at each resettlement site. "People saw that we were willing to be flexible, in some instances even accepting an overspend where a basic human right or need was not being fulfilled pre-resettlement," says Garth Lappeman, who helped to manage the process for First Quantum.

The RAP was approved in October 2013.

To mark International Women's Day, a group of female residents take to the streets of Kalumbila in a campaign to keep the new community clean.

HOME



MOVING DAYS IN PANAMA

Once a community located on a future mine site has agreed to be resettled, and the project has a green light to go forward – and after all outstanding concerns have been addressed and everything is about to proceed as planned – two last-minute barriers can arise: Someone who previously accepted the terms of the agreement may get cold feet. Or newcomers may arrive in the community, hoping to join the established residents in a subsidised move to new homes.

Both of these scenarios unfolded during 2014–2015 at Cobre Panamá, First Quantum’s copper mine development in the district of Donoso, about 120 km west of Panama City. Of the 86 households that had agreed to resettle in new communities just outside the project site, seven subsequently declined to leave their homes when moving day arrived. Meanwhile, dozens of additional families – previously unknown, and apparently recent arrivals to the area – presented themselves to the resettlement team, eager to be included in the transition plans.





“Resettlement is a logistically complex, culturally sensitive and often politically delicate process.”

The new school and teacher’s house in the resettlement community of Nuevo Eden, home to a small group of indigenous families who agreed to move as the Cobre Panamá site was developed.



“The same principle of fairness applies to the protection of residents’ rights and the reasonable limits of corporate responsibility.”

Resettlement is a logistically complex, culturally sensitive and often politically delicate process. The factual truth of agreed terms and official timetables sometimes collides with the emotional truths that people embrace as they contemplate a move to new surroundings. When those two perspectives are out of sync, a company can be tempted to invoke the authority of the formal agreement and seek support in requiring compliance. But such a response, even if directed at a very small group, risks eroding the overall spirit of cooperation that defines an effective resettlement plan.

Far better to engage all stakeholders in reinforcing the value of the agreement – to help the holdouts appreciate that what may seem to be an imbalance, in which the good of the many outweighs the concerns of the few, actually will yield the best outcome for all. Similarly, with respect to people who arrive in the community long after an agreement has been ratified, it must be seen that the same principle of fairness applies to both the protection of residents’ legitimate rights on the one hand, and the reasonable limits of corporate responsibility on the other.

This is the balanced understanding that First Quantum has worked to promote at Cobre Panamá.

A BRIEF HISTORY

The timeline of the Cobre Panamá resettlement, as detailed in First Quantum's last Sustainability Report (available at first-quantum.com), dates from 2007, when the project's previous owners began the original process of community engagement. A rigorous impact study concluded that just over 600 people would be physically displaced or have their livelihoods disrupted by the open-pit mine. Less than a third of those affected were *campesinos* who operated small-scale family farms or pursued artisanal gold mining in the jungle rivers. The remainder, comprising 54 households in all, were indigenous people who had moved into the Donoso district since the early 2000s from Comarca Ngäbe Bugle, a semi-autonomous reserve in western Panama. Settling informally on government land, these families shared a common Ngäbe heritage but established two separate and socially distinct communities, Chicheme and Petaquilla.

Following several years of intensive consultations on all aspects of the proposed resettlement – including eligibility criteria, compensation rates and specifications for new homes – the company tabled a comprehensive Resettlement Action Plan (RAP), which in turn would provide the basis for individual agreements signed by each household. After a thorough review by community lawyers, in May 2011 the final RAP was approved by representatives of the *campesino* families in four small communities, as well as by the indigenous residents of Chicheme. The people of Petaquilla, after seeking additional legal advice, also signed the agreement in October 2011. The two-phased RAP formed part of the approved Environmental and Social Impact Assessment for Cobre Panamá.

NEW HOPE

The 42 families from Chicheme moved into their new village of Nueva Esperanza ("new hope") in February 2015. From their large timber-framed homes, which many community members helped to build, they can look out across the treetops toward their former home – just 5 km away through dense rainforest – and reflect on how much life has changed. The village now has its own school, so the young children no longer have to walk miles each day. The new houses have metal roofs instead of thatch to keep out the endless jungle rains, along with raised wooden floors rather than unhealthy mud underfoot. And then there are welcome amenities such as a reliable supply of potable water, and solar panels generating electricity for much of the day.

Sadly, this welcome new energy source also produced the community's first disaster, when some young children playing with exposed wires sparked a fire that burned their house to the ground.



(top) The first resettled families arrive from the village of Chicheme, 5 km away through dense rainforest, to move into their new homes in Nueva Esperanza. **(bottom)** In contrast to the families' previous homes, the new houses rest on raised wooden platforms rather than unhygienic mud and have metal roofs instead of thatch to keep out the endless jungle rains. **(opposite)** Joel Becker, who lives with two-dozen members of his extended family, is happy with the new community school (and doesn't miss the three-hour daily walk to class in his former village).



(above) Members of the Abrego family make the trek through the rainforest from Chicheme to their new home in Nueva Esperanza. (opposite) Onesimo Abrego and his wife Betsaida Clara settle into their new house with baby Yezid.

Fortunately no one was hurt, as alert neighbours moved fast to rescue the children (who had been left at home without adult supervision). And the homeowner, with a little help from First Quantum and a few neighbours, soon rebuilt the family home – albeit on a more modest scale.

“When I saw this poor guy standing in the burnt-out plot with his house, his possessions, all of his documents destroyed, my heart went out to him,” says Alberto Casas, Director of Community Affairs and Environment at Cobre Panamá. “But he used the skills we taught him, and within six weeks he had a very comfortable home. Of course we wouldn’t wish a fire on anyone – but it was gratifying to see the kind of self-sufficiency that we hoped our construction program would inspire. Those practical skills have also helped a dozen people from Nueva Esperanza find jobs at the mine site, working in carpentry and erosion control. It underlines our belief that there’s a lot more to resettlement than new houses.”

NUEVA PETAQUILLA

Unfortunately, the resettlement of Petaquilla has not gone quite so smoothly. In February 2015 residents were told that their homes were ready to be occupied in the newly built community of Nuevo Eden. Of the dozen families who were part of the RAP, five moved the short distance upriver; the other seven chose to stay where they were, stating that the agreement should be reopened for further negotiations. They were joined by 24 new families who had moved into the area over the previous year. Despite a series of meetings involving community leaders, government officials, First Quantum representatives, and judicial and law enforcement authorities – all of whom concurred that the terms of the RAP should be upheld – discussions were deadlocked.

By the autumn of 2015, the number of newcomer families had grown as high as 41. Several government-issued deadlines had come and gone. Discussions remained tense, leading to occasional public displays of impatience and even anger. And while some of the holdout families had begun reconsidering their position, a core group remained steadfastly opposed to moving. Still, any suggestions that people be removed were rejected by all parties, First Quantum foremost among them. Such measures, however legally defensible, were bound to have a negative impact on social harmony – the last thing anyone wanted for these new communities.

WHAT'S THE ANSWER?

Impasses like the one at Petaquilla raise challenging questions. On the one hand, should a handful of people, however strongly they may believe in the rightness of their cause, be able to halt a major industrial project that has been endorsed by government, approved by regulators and welcomed by most of the local population – and Panamanians generally – as a major boost to economic prosperity? On the other hand, how can a company committed to social responsibility and building communities feel comfortable seeing people forcefully evicted from their homes?

For First Quantum, the key to tackling such challenges is to avoid having critical goals hinge on one specific outcome, particularly when it is a focal point for diametrically opposed views. Rather, progress can only be achieved through a series of incremental decisions that gradually reduce and simplify what can seem like a monolithic problem.

So as the Cobre Panamá story continued to unfold in late 2015, management was pursuing a number of parallel strategies designed to build community support while redirecting expectations.

“It was gratifying to see the kind of self-sufficiency we hoped our program would inspire.”





Cornelio Morales and his wife Benilda Garay take time to relax and enjoy their new home in Nueva Esperanza.



“The actions we’re taking along with our stakeholders are going to yield very good results.”

For example, a new trail was cut through the rainforest, giving residents of Nuevo Eden much easier access to Nueva Lucha, a larger community to the south. At the same time, travel through the mine property was restricted to nearby residents who were explicitly granted right of way under the RAP. This put significant constraints on those who had elected to stay in Petaquilla, as well as the new families who had joined them.

In a parallel move, the company renewed its communications to government officials and the local media regarding the effects of artisanal gold mining along the river near Petaquilla. About 30 illegal dredges have disrupted the natural water flow, threatening habitats with excessive sedimentation and compromising the livelihoods of people downstream. First Quantum has added its voice to those asking the environment ministry for strict enforcement of all applicable laws.

TRADITIONAL VALUES

Most significantly, First Quantum’s community affairs team has reached out to indigenous leaders, seeking their support in resolving the situation at Petaquilla. Alberto Casas travelled to the Comarca Ngäbe Bugle, where he expanded his understanding of Ngäbe culture and the traditional leadership’s views on social change. He also sat down with leaders of indigenous communities in the immediate vicinity of the mine, confirming their continued support for projects such as new bridge construction and the further development of potable water systems.

“They’re committed to being good partners,” Casas says, “and they’re extremely concerned that the actions of a few people should not affect all of their communities. The traditional leaders agree that our time and energy should be focused on making sure the region is being developed in a sustainable way and the programs we build together will carry on long after the mine’s lifespan is complete.”

From this perspective, it’s easier to see that moving a final few families who’ve had second thoughts about resettlement – and making the late arrivals understand that they will not be grandfathered by an agreement that was years in the making – represent containable and ultimately solvable problems. “I’m a very optimistic guy,” Casas says, “and I feel confident that the actions we’re taking along with our stakeholders are going to yield very good results. I see the light at the end of the tunnel.”

“Ensuring a secure supply of water is vital for local economic development.”

WVA

We need it to grow food, to generate power, to clean and bathe, and simply to stay alive. Water is equally vital for many industries, including mining. Of all the Earth’s riches, it’s the one we must take the most care to preserve and protect.

(left) Farmer Abdelaziz Kemal brings his camels to the communal watering hole in Akjoujt, Mauritania. **(right)** Children fetch drinking water for their families from a tank provided by First Quantum in the Mauritanian village of Matel.



WATER



“The story of water at Guelb Moghrein is a blend of technical ingenuity and social responsibility.”

Morning traffic at a watering hole in Akjoujt. Camels are a valuable asset in Mauritania, with animals that can breed and give milk selling for up to \$1,000 (nearly equivalent to the average annual per capita income).

WATER



EVERY DROP COUNTS

In the harsh desert environment of western Mauritania, water is the lifeblood of a community and a key source of hope for the future.

“It’s like sticking your head into an open oven door. Or when the wind comes up, it’s like having a blow-dryer pointed constantly at your face.”

This is how one First Quantum employee describes a typical summer day in Akjoujt, site of the Guelb Moghrein copper mine in western Mauritania, where daytime temperatures average above 40°C (104°F) and can soar as high as 50°C (122°F). Set in a vast, arid landscape at the edge of the Sahara, this small city of about 12,000 people has an annual rainfall of less than 100 mm (4 in) and often goes for months with no rain at all.

Not surprisingly, Akjoujt (often translated as “wells” from a Berber dialect) is a community defined by water – or rather by its scarcity. So when First Quantum acquired an existing mine property in 2004 and began expanding the facility, there was significant interest from residents of Akjoujt and the entire district of Inchiri, as well as from the nomadic herders who move about the region seeking enough scrub grass for their sheep, goats and camels to graze on. A modern mining operation required a significant and reliable water supply, and when that water reached Akjoujt, everyone would benefit.

The story of water at Guelb Moghrein is a blend of technical ingenuity, social responsibility and – with the mine’s operational lifespan currently projected to end in about seven years – troubling uncertainty over how best to sustain the community’s supply into the future.




RUNNING WATER

As redevelopment of the mine got underway a decade ago, the nearest reliable source of fresh water was determined to be 112 km to the west, near the village of Bennichab. Pumped from an aquifer beneath the desert, the water was suitable for use in the milling process and was also drinkable right from the pipe; no further treatment was required to meet potable standards. This was good news for everyone living in the area.

As part of a long-term agreement with the Mauritanian government, First Quantum provides community access to water in the vicinity of the mine and along the pipeline route from the aquifer. From the main pumping station at Bennichab, about 250 m³ per day is diverted to storage tanks for use by local residents. During the hottest part of the year, up to 600 m³ is drawn daily from 21 tap points by people living in nearby villages, as well as by nomadic livestock herders. And as the water reaches its final destination, about 1,400 m³ is pumped each day into Akjoujt's public storage tank for use by homes and businesses. The government-run water utility further extends distribution via private resellers using tanker trucks and donkey carts fitted with large bladders.

Once the mine commenced operations in 2006, the pace of production rose steadily. This put a strain on the water supply, as did the in-migration of jobseekers and small-scale entrepreneurs attracted by the new level of economic activity. It was soon clear that an alternative water source would have to be found. The solution again lay near Bennichab, this time in the form of a large saline aquifer. Non-potable salt water is pumped through a second pipeline directly to Guelb Moghrein, where it is used in ore processing and for watering roads and in other applications around the site.

The saline well field now supplies more than half of the mine's needs. Keeping the two systems running smoothly is a complex task that requires constant monitoring of the pipeline and pumping stations, with a deft balancing of flows to ensure there is no migration of water between the two sources. There are additional challenges at the back end of the milling process, when wastewater is decanted from the tailings impoundment and recycled within the plant. At some times of the year, the temperatures can be so high that most of this water evaporates before it can be recovered – in which case the incoming volume must be adjusted accordingly.



“The social programs in place today are helping to build a better foundation for tomorrow.”



Retired soldier Chedad Ould M'heimed grows figs, dates, carrots and other crops on his small plot near Akjoujt. The profits are enough to support his family, provided he has a steady supply of water from the mine pipeline. First Quantum has hired an agricultural specialist to advise farmers on how they can maximise yields sustainably.



(above) As part of a long-term agreement with the Mauritanian government, First Quantum provides water access to communities around the mine, as well as to farmers and nomadic herders and along the pipeline route. **(opposite)** Khady Droma, who farms a small plot of land in Akjoujt which she has owned since 1992, welcomes advice from First Quantum's agricultural specialist on sustainable cultivation techniques.

A new project is underway to improve the proportion of recovered process water. The decant pumping station is being shifted underground into a 12 m well, which will significantly reduce the exposure of water to the elements. By adjusting the water balance between the process plant and the tailings dam, mine managers hope to raise the recovery rate from 20% – typical for high-evaporation areas such as Akjoujt – to more than 70%.

ADDITIONAL SOLUTIONS

Ensuring a secure supply of water has been extremely important to local economic development at Guelb Moghrein. But as residents naturally come to take the water in their taps for granted, there are concerns about the system's long-term viability. The pumps along the pipelines are powered by gasoline, a non-renewable energy source that is in high demand across the region (leading, on occasion, to black market activity). The ongoing cost of fuel will become even more challenging as the mine nears the end of its productive cycle and management of the water system shifts entirely to the public utility.

One solution, spearheaded by First Quantum, is to equip the distribution network with pumps powered by the sun – obviously a reliable energy alternative in a desert region. As this report goes to press, 11 pumping stations have been converted to solar, and the company is working with local authorities to establish long-term maintenance and training programs.

Another key initiative has been the search for additional sources of potable water to avoid relying exclusively on the Bennichab aquifer. First Quantum has joined with the local and national governments in a coordinated effort to survey and re-drill boreholes that were serving the area prior to 2006, adding pumps and pipelines to connect these reactivated wells into the Akjoujt water network. Long-term plans also call for the drilling of several brand-new boreholes. The company supplies drill rigs and operators, while the Ministry of Water provides expert surveyors and water engineers, along with piping and pumps. A great success its initial phases, the project will potentially add between 400 and 600 m³ of water per day to the system.

WHAT HAPPENS NEXT?

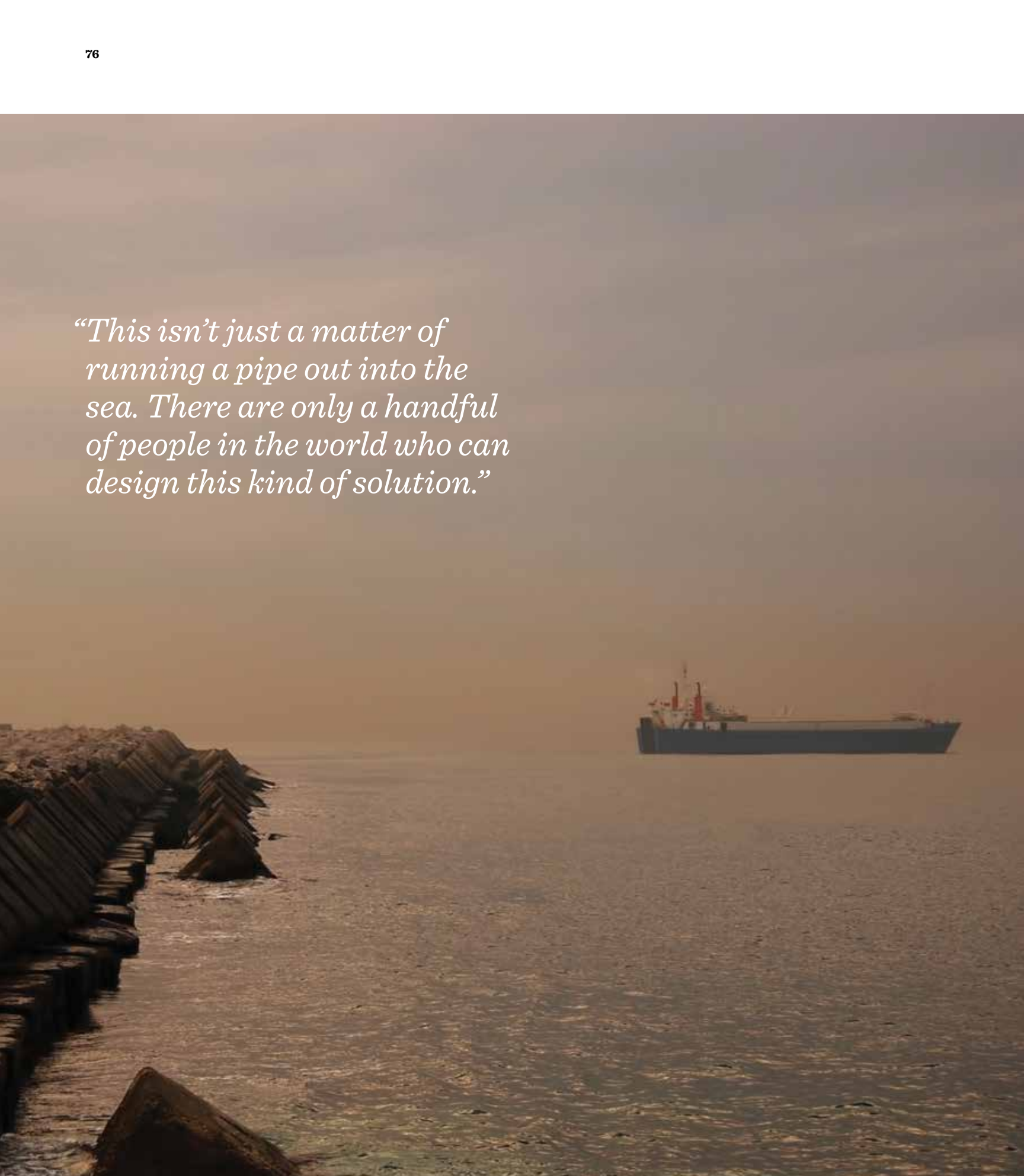
Water, however vital, is only one ingredient in building a sustainable future for a community faced with in-migration pressures on the one hand and the relentless threat of desertification on the other. In recent years First Quantum has invested up to \$10 million annually in a wide range of programs – from health care and education to housing, infrastructure and livelihood development – all aimed at strengthening the social and economic well-being of Akjoujt and the surrounding region.

There are constant challenges in an area that is impoverished by African standards, within a nation of only 3.5 million people that ranks among the poorest in the world. And while efforts to foster economic growth and self-sufficiency are integral to First Quantum's business strategy, it's nevertheless clear that when Guelb Moghrein finally closes down, many people will simply leave. Skilled workers will seek employment elsewhere, in the region's iron mines or perhaps in the capital. As ever, nomadic herders will

move wherever their livestock can flourish. And of those residents who remain, many will be vulnerable members of the community: the elderly, the uneducated and the infirm.

Still, the investment of time, energy and resources – and hope – by all concerned has the potential to carry this community forward after the mine gates close. The social programs in place today are helping in small but measurable ways to build a better foundation for tomorrow. Mine managers are working with local officials to coordinate sustainability efforts and streamline bureaucracy as both sides wrestle with the realisation that past solutions have not been good enough. And the company continues to share critical knowledge and skills around infrastructure management, particularly with regard to the water system. Because in a land where a fresh water aquifer hidden beneath the sand ultimately has more value than even the richest vein of precious metal, every drop counts.

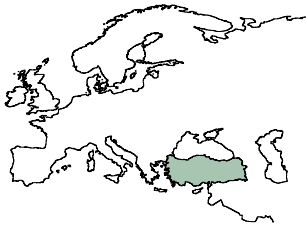




“This isn’t just a matter of running a pipe out into the sea. There are only a handful of people in the world who can design this kind of solution.”

At a depth of about 150 m the waters of the Black Sea are anoxic, supporting no life, and therefore provide a sustainable environment for submarine tailings disposal.

WATER



DEEP DOWN

At first glance, pumping mine tailings through a pipeline to the bottom of the sea may not seem like the most reasonable thing to do. But at the Çayeli mine in northeast Turkey, it's proven to be a safer and more environmentally sound solution to the perennial challenge of waste disposal.

As you descend through the numbing cold, nearing a depth of 150 m, the Black Sea lives up to its name. What little sunlight penetrates here is barely perceptible – the rays that slanted down through the surface layers now long gone, even the weak afterglow faded into inky darkness. Virtually all life has vanished as well, deprived of oxygen in the largest anoxic body of water on Earth. Below this point, only a few bacteria have adapted to an environment naturally contaminated with hydrogen sulfide. Beneath sparkling waves that for centuries have carried ships between Europe and Western Asia – within a 4,300-km shoreline that has been the backdrop for many turbulent events in human history – 90% of the lower depths are a dead zone, frigid and silent.

And yet, another 100 m deeper, something is moving in the void. From the mouth of a pipe that snakes its way down the sloping seabed, a stream of slurry pours out into the dark water, briefly forms a cloudy plume, then continues downward, spilling over an undersea cliff and disappearing into the abyss. What has intruded upon the solitude is a steady flow of tailings, the ground rock and other waste created by the processing of copper ore. It has been pumped from the mine site 7 km inland and on through a submarine pipeline running another 3 km out from shore – finally emerging, at a depth of 275 m, to sink further through the gloom to the lifeless seabed below.

Deep-sea tailings placement (DSTP) remains a relatively uncommon practice in mining, and its brief history has not been free of controversy. Understandably, many people who have concerns about the environment are wary of a process that involves excavating large volumes of rock, removing a small amount of valuable metal and disposing of the rest in the sea. Attempts to use submarine tailings disposal close to shore, at shallow depths, have had negative environmental consequences in several parts of the world. Moreover, the first deployments in the 1970s were technologically crude by today's standards.

The story is different, however, at Çayeli, the underground copper and zinc mine operated by First Quantum in northeast Turkey. Located in the coastal mountains of the Pontic range, the mine is set among steep forested slopes at the bottom of a river valley. The region has heavy rainfalls, averaging more than 2.5 m annually, which leads to regular flooding. In this environment, containing the waste material from ore processing in a conventional tailings pond would not be feasible; the risks of a devastating dam breach are far too high.

On the other hand, with the Black Sea close by – and especially given its unique hydrological profile – submarine tailings disposal presents a safer and more ecologically sound alternative. The key, as with all such challenges, is to combine a deep commitment to sustainable practices with disciplined use of the best available technology.

A COMPLEX CHALLENGE

Operated by Çayeli Bakir Isletmeleri A.S., a wholly owned subsidiary of First Quantum, the Çayeli mine produces about 1.3 million tonnes of copper and zinc ore annually. In production since 1994, it is the largest underground base metals mine in Turkey, with a projected lifespan extending to at least 2019.

The use of DSTP to dispose of post-processing waste, or gangue, has been integral to the operation from day one. A line of heavy-duty plastic pipe, about a half-metre in diameter, runs northwest along the river valley to the Black Sea. When tailings from the ore-processing facility reach the coast, they flow into a large tank and are combined with excess water from the milling process, as well as other contact water from the mine site. The resulting mix of slurry and water then flows via gravity along the undersea segment of pipeline, which slopes steadily downward to the discharge point.

While the basic concept is straightforward, DSTP is a complex process. As high-density slurry travels down the submarine line into less-dense sea water, it moves very quickly, which can create a siphon effect. And if air should be inadvertently drawn into the system, there is a risk that the pipeline could lift off the sea bottom and no longer discharge properly. However, the advanced technology deployed on the Çayeli pipeline has performed to a rigorous standard for the past dozen years – and established a new benchmark for the industry.

“This isn’t just a matter of running a pipe out into the sea,” says Joe Boaro, First Quantum’s Director of Mining, who supervised construction of the improved DSTP system in 2003. “The hydraulics are incredibly complicated. There are only a handful of people in the world who can understand and design this kind of solution. They’ve developed advanced software to model all of the tricky little balances you need to maintain.”

The system also requires disciplined management over the long term. “We do quarterly surveys with an ROV – a remotely operated underwater vehicle,” Boaro explains. “We look for any signs of upwelling, which could potentially carry tailings up past the 150 m level where you begin to see some simple marine life. But while there may be a slight plume just as the material discharges, it immediately carries on downward. We’ve been doing these surveys since the current line was put in place, and we’ve never found any issues.”

RIGOROUS STANDARDS

The same vigilance applies at every step in the process. The mainland pipeline is inspected regularly, and more advanced leak detection technology has recently been installed. The computer-controlled DSTP system is also monitored constantly to ensure sufficient velocity. And to avoid any unexpected pressure buildups there are emergency release valves at frequent intervals along the line.

When undersea tailings placement was originally proposed for Çayeli, the plan was closely scrutinised by the Turkish government, in part because of the questions it raised about protecting the marine environment, and also because this innovative solution had not been contemplated by any existing legislation. The environmental ministry ultimately granted an exception to a law governing wastewater disposal and provided a letter giving the mine permission to operate. However, when this arrangement had to be renewed every few years, discussions unfolded without the benefit of an objective regulatory framework.

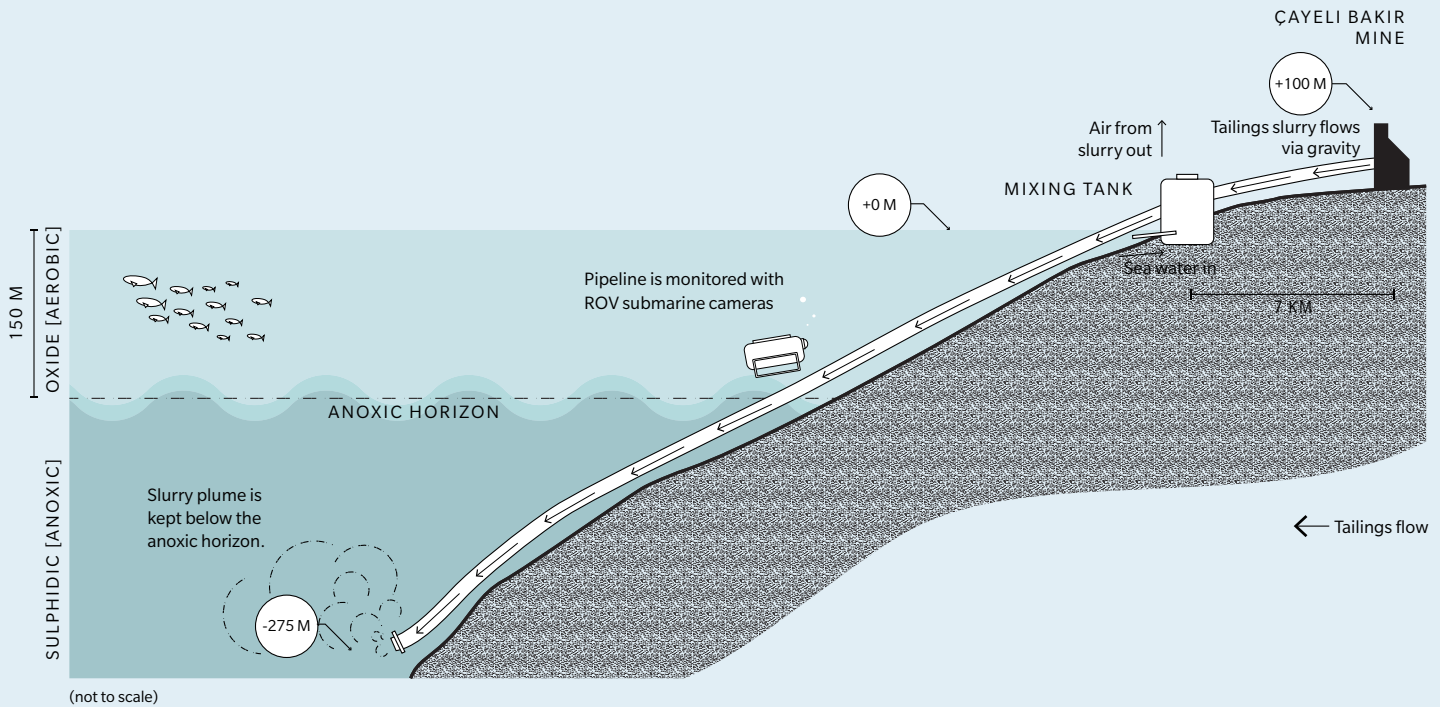
More recently the government, after looking closely at European Union standards and guidelines, has introduced new regulations for disposing of mine waste – including under the sea. “Over the past 20 years we’ve taken every opportunity to share our insights on DSTP with ministry experts,” Joe Boaro says. “Having a more up-to-date set of rules will make it easier to carry on the conversation around compliance and sustainability.”

Globally, standard-setting bodies such as the European Union Commission, the International Finance Corporation and the International Maritime Organisation have all endorsed DSTP – provided it is used in the appropriate circumstances and with environmental sensitivity. The specific implementation at Çayeli has been favourably assessed by a number of international mining organisations.

REDEFINING RISK

As with any complex industrial enterprise, there are always new challenges to face. The busy two-lane highway that runs past the Çayeli mine is now being widened to four lanes, which raises concerns about sections of the tailings pipeline that are buried immediately alongside the road – as well as two points where it crosses the river. A demanding protocol, spearheaded by the mine, will help to ensure that all parties involved in the highway project respect the integrity of this vital piece of infrastructure.

Deep Sea Tailings Placement



Another significant nearby development is the ongoing construction of a hydroelectric dam spanning the river valley just above the mine. In a region that is already vulnerable to flooding – one recent storm saw 440 mm of rain fall in just three hours – any project with an impact on the surrounding watershed is naturally of significant interest. Çayeli’s management team is conferring closely with the power utility and other agencies on risk assessment.

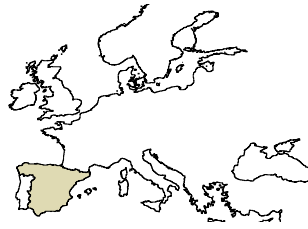
As for the undersea tailings pipeline, what once may have struck some as risky has proven over nearly two decades to be safe, secure and, on balance, an environmentally responsible solution. “We understand that people have legitimate concerns about the process,” says Iain Anderson, General Manager of the Çayeli mine. “When I was approached to lead the team here, I first needed to satisfy myself that it’s a sound solution. And after I saw the evidence, I was very comfortable taking on this role.”

“What once may have struck some as risky has proven over nearly two decades to be safe, secure and, on balance, an environmentally responsible solution.”



María León, who has worked at Cobre Las Cruces for nearly a decade in environmental services and technical operations, in the nature reserve that has been created around the mine site outside her native Seville.

WATER



SHARING WELL

Set in sun-baked farmland just outside Seville, in the historic heart of southern Spain, the Cobre Las Cruces mine has a readily accessible deposit of high-grade copper ore. But getting that valuable commodity from the ground requires careful management of another precious resource: water.

One of Europe's most popular tourist destinations, Seville embodies the rich history and passionate spirit of southern Spain. It's a place where Moorish porticos overlook Baroque churches and the world's largest Gothic cathedral. Where enterprising explorers once loaded their ships on the Guadalquivir River before setting sail to the New World. Where the sun-drenched streets are filled with lively crowds, and in the evening strains of classic flamenco mingle with the buzz of conversation in the tapas bars.

One association this vibrant city does not evoke, even for those who know it well, is mining. Yet just 20 km from the cathedral spire, where Seville's outlying areas blend into the rolling countryside of Andalusia, the Cobre Las Cruces mine is producing some 72,000 tonnes of copper per year. What's more, the ore extracted from the open pit is of remarkably high quality: in an industry that sees many mines competing viably with copper content as low as 0.5%, the deposit at First Quantum's Spanish operation, with an ore grade 10 times higher, ranks among the richest anywhere.

In production since 2009, the operation uses hydrometallurgical processing, in which wetted ore is milled to facilitate the extraction of copper. This requires a significant water supply and, as with all sustainable mines, careful management of such a vital resource to control consumption and minimise any environmental or social impact. In the case of Cobre Las Cruces, these sensitivities are complicated by the fact that the mine is so close to Seville, a major city with a population of 1.5 million in its greater metropolitan area.



(top) José, an operator at the Cobre Las Cruces water treatment plant, tracks system performance data. **(bottom)** Water samples taken on a daily and weekly basis are sent to independent labs for evaluation, as well as to government quality-assurance facilities. **(opposite)** Juan Antonio Sanchez, who has been with the mine's environmental department for nearly 20 years, is responsible for monitoring water levels and standards of purity.

Faced with an understandable level of concern from nearby residents – and strict regulatory oversight intended to safeguard their interests – the mine must work constantly to balance business goals with its broader responsibilities. And that calls for agile management of people, systems and resources.

THE RIGHT SYSTEM

Fully describing the complex process design implemented at Cobre Las Cruces would require a report unto itself. But a simplified explanation will help to highlight the crucial importance of water management in making the operation sustainable.

The open pit is excavated in relatively soft clay or marl. To reach the ore body, however, it's necessary to dig through a layer of sand and sandstone containing the Niebla-Posadas aquifer, which supplies water to nearby farms, as well as communities from Huelva to the northern edge of Seville. A condition of the mine's licence to operate is that any water drained from the aquifer must be reinjected elsewhere; there can be no net impact on overall water volume. Moreover, all reinjected water must first be treated to a high standard of purity, irrespective of the quality of the water it is replacing. Therefore an elaborate system has been created to pump water away from the pit area – to prevent any contact with the sulfide-based ore – and then treat the diverted water before it is reintroduced into the aquifer.

This Drainage-Reinjection System (DRS) has three main components:

- drainage wells drilled down into the aquifer around the periphery of the pit
- reverse-osmosis and filtration plants that remove impurities from the diverted water
- reinjection wells that reintroduce treated water into the aquifer more than 2 km away from the pit.

By purifying the aquifer water to drinking-quality standards, the DRS is designed to allay any concerns over potential contamination. Diverted water is tested frequently before reinjection to ensure it meets all environmental protection criteria.

The Cobre Las Cruces operation also requires water for the hydrometallurgical processing of ore. There are two principal sources. About 60% is "contact water," which, as the name suggests, has had direct contact with mining activity. It is removed constantly from the base of the pit and stored in ponds around the site. Another 40% of the process water consists of urban wastewater from a sewage treatment plant in nearby San Jerónimo. Piped in annually, this is also stored in a dedicated holding pond.

Wherever possible, used process water is neutralised and recycled within the facility. The balance is treated using the same reverse-osmosis



technology as for the diverted DRS water. Some of this treated water, which has a level of contaminants well below regulated safety standards, is used for compacting waste dumps and reducing dust on unpaved roads. Any water not required for these purposes is discharged into the Guadalquivir River. The mine is permitted to discharge up to 900,000 m³ of treated water annually.

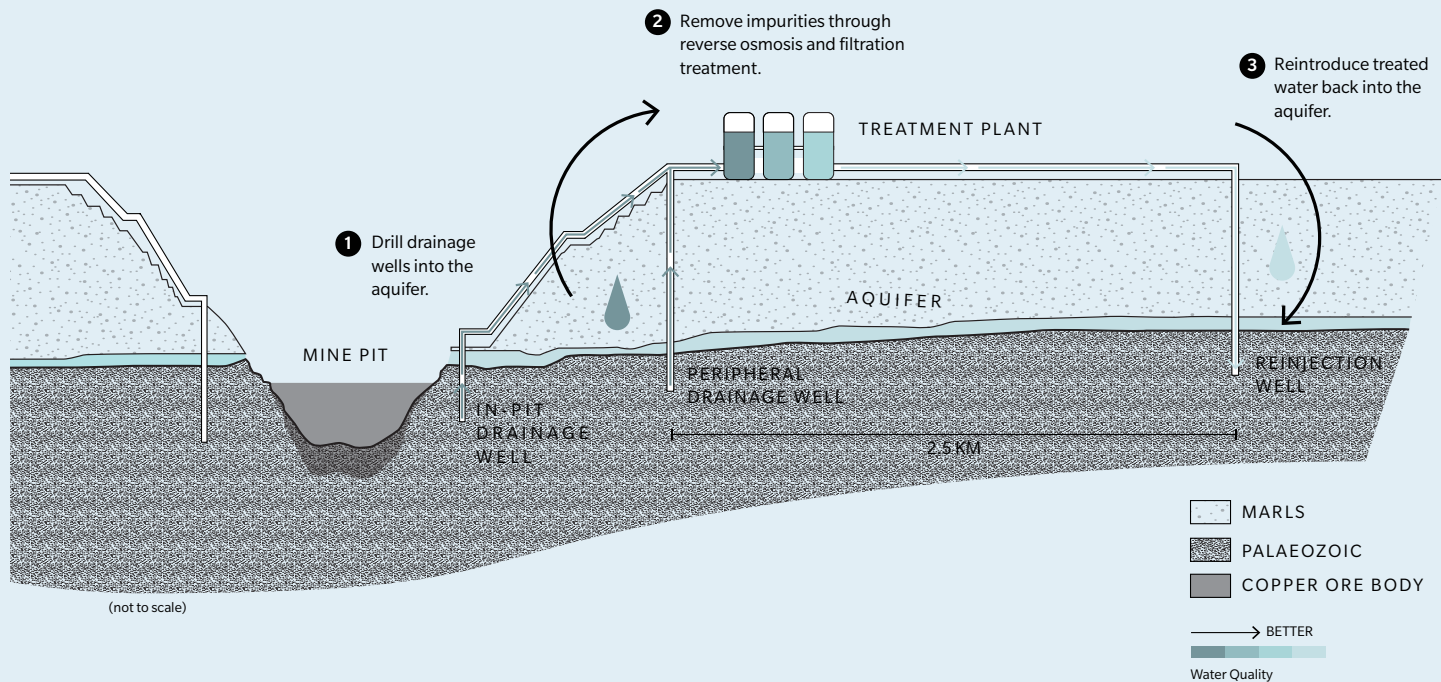
THE BEST FRAMEWORK

Water management at Cobre Las Cruces is a highly complex responsibility, requiring 10 treatment plants, 20 storage ponds, dozens of specialised wells and 124 km of pipes and conduits. Moreover, this costly infrastructure must comply with stringent regulations.

“Historically, the province of Seville has not been a mining region,” explains Joe Boaro, First Quantum’s Director of Mining. “Compared to neighbouring jurisdictions, there isn’t the same familiarity with environmental approvals, mining permits and other regulatory procedures.” At the same time, because the province is home to nearly 2 million people, there is naturally heightened awareness of any potential impact on the environment, and in particular on water quality.

“There is naturally heightened awareness of any potential impact on the environment, and in particular on water quality.”

Drainage-Reinjection System



Through several years of design and construction there were many discussions – and periodic disagreements – between the original developers of the mine (which was acquired by First Quantum in 2013) and local, regional and national authorities. The regulatory framework that emerged from this dialogue sets out exacting criteria for every aspect of managing, monitoring and reporting water usage, right down to the licensing of drinking-water stations within the plant.

One requirement that has proven challenging is the stipulation that 100% of the water drawn from the aquifer must be returned to it after treatment. This is problematic, as some water passing through the DRS does not originate in the aquifer but instead comes from the lower Palaeozoic layer of rock, which contains additional ground water and water-bearing structures. In addition, some aquifer water bypasses the DRS and flows directly into the mine. “And to add one more level of complexity,” Boaro explains, “the treatment plant produces a significant amount of reject water that must be factored in as well.”

After extensive data collection and in-depth discussions, the company and regulatory authorities have agreed on a protocol for determining precisely how much water must be treated and reinjected annually at Cobre Las Cruces. And because the agreed standards are reinforced with substantial fines, some differences of interpretation over past levels of compliance have been referred to the courts for resolution. From First Quantum’s perspective, this is a reasonable option to pursue within a healthy and productive working relationship; in the course of explaining the nuances of a complex technical issue to a third party, each side learns from the other.

“I think the authorities will agree that we’ve all been committed to keeping things fully transparent,” Boaro concludes. “We sometimes differ on certain points – for example, how to handle potential pollutants when they’ve been reduced well below threshold limits and are nearly undetectable. But through the years we’ve maintained a totally open and respectful dialogue. Water management at Cobre Las Cruces is complicated, but it’s working – and so is our relationship.”



“Water management at Cobre Las Cruces is complicated, but it’s working.”

The environmental sensitivity required of any mining operation is especially acute at Cobre Las Cruces – just 20 km from the centre of Seville, whose greater metropolitan area has a population of 1.5 million.

“We’re definitely committed to taking the long view.”

INTEGRITY

In an industry that creates value through the extraction of resources, we’re obligated to return at least as much as we take away. Maintaining the planet’s natural equilibrium is both an environmental responsibility and a moral duty.

(this page) In the rainforest near First Quantum’s Cobre Panamá development, a boy from the village of San Juan de Turbe guides his dugout canoe along a river that the company is working to protect. **(right)** One of several zebras reintroduced into the Musele chiefdom, part of the vast West Lunga Management Area, through the efforts of the Trident Foundation.



NATURE



GROWING POSSIBILITY

From reforestation and erosion control to the protection of sea turtles and other vulnerable species, First Quantum has created a network of programs to mitigate and remediate environmental impact around the Cobre Panamá project. But what about the human dimension of sustainability? Two recent initiatives show how efforts to preserve the sensitive Mesoamerican Biological Corridor also recognise the vital role of agriculture and a need to safeguard the livelihoods of local farmers.

100,000 PINEAPPLES: AGRICULTURAL EXTENSION

The Cobre Panamá copper mine is one of the largest construction projects ever undertaken in a country that in many ways has been defined by infrastructure development on a massive scale. About 120 km west of the Panama Canal, deep in the rainforest that covers much of the district of Donoso, up to 7,000 workers will spend the next few years preparing the open-pit site and its various support facilities, including a power plant and a shipping port on the nearby Caribbean coast. At its peak, the \$5.9 billion project will rank among Panama's largest employers. And once the construction phase is complete and the mine commences operations, it will continue to be a significant contributor to job creation and economic growth.





Miguel Perez is one of many farmers who have benefitted from First Quantum's integration of sustainable agriculture into the biodiversity conservation strategy for the Cobre Panamá project.



(above) Through a unique collaboration between First Quantum, Panama's Ministry of Agricultural Development and other organisations dedicated to fostering sustainable development, more than 160 farmers have begun growing tomatoes, pineapples and other crops. **(opposite)** The farming cooperative supplies fresh produce to the kitchens of the Cobre Panamá mine project – the first step in a plan to supply grocery stores and other consumer outlets across the country.

At a practical level, the Cobre Panamá development has a lot of people to house: employees and contract workers live in a half-dozen camps designed to minimise impact on surrounding communities. What's more, when such a large workforce is based in a remote area, with everyone focused on getting the job done, it also means many mouths to feed.

"To give you a sense of the scale, the cooks here use about 26,000 eggs a week," says Alberto Casas, Director of Community Affairs and Environment at Cobre Panamá. "Over the next year, we'll consume well over 100,000 kilos of pineapples. From the outset we faced a huge logistical challenge in supplying three meals a day to several thousand people. But when I asked my colleagues how much food we bought from the surrounding community, I was surprised by the answer: 'Nothing.' It was clear that this had to change."

When First Quantum representatives began talking to area farmers about the possibility of supplying food to Cobre Panamá, there was immediate interest. All agreed that a critical first step was organising into a single group, so individual producers could pool their resources and coordinate efforts to meet the mine's needs. The result was a local cooperative called DONLAP, the Spanish acronym for the Association of Small Farmers of Donoso and La Pintada. An initial group of three-dozen farmers was supported by First Quantum, the national Ministry of Agricultural Development, the Institute of Agricultural Research and other organisations dedicated to fostering sustainable development in the region.

The collaboration was a textbook example of what development practitioners call "agricultural extension" – *agroextensionismo* in Spanish – which brings together experts in farming techniques, scientific research, business planning, marketing, distribution and related areas to educate traditional farmers and help them improve their livelihoods while growing crops sustainably. With guidance from the mine's foodservice and procurement teams, DONLAP members focused on produce that was in high demand, including cucumbers, peppers, onions, tomatoes, bananas, papayas, cassavas – and, not surprisingly, pineapples.

By the time the first shipment arrived at the mine site in October 2015, more than 160 farmers had joined the cooperative, inspired by the efforts of their neighbours and attracted by the company's commitment to spend at least \$2.5 million annually on locally supplied food. "In the first three weeks they delivered more than 20,000 kilos of produce," Alberto Casas says. "Our camp leaders found the fruits and vegetables to be so good, they immediately wanted to know what else DONLAP could provide."

For First Quantum, the program's success reinforces a long-standing commitment to promote sustainable development and economic self-sufficiency in communities around the company's mines. "These farmers are very happy to realise a financial gain from their produce," Casas says. "And at the same time, it's all grown using organic practices, so they're being environmentally responsible. We hope to see this group provide more and more to the mine, including a wider variety of produce, as well as eggs and maybe even chickens." Over the longer term, what began as a local experiment in *agroextensionismo* could help transform this whole region into a major source of food production for all of Panama. "Already you see the landscape changing; originally there were very few farms along the mine road, and now you're seeing plots of pineapples, tomatoes and other produce as people put this land to good use. That's a great legacy."

"As we work with our partners to protect what's here today, we're helping to create a more hopeful future."





Joaquina Gil, a participant in First Quantum's sustainable farming program, also benefitted from free fertiliser to help her new venture flourish.



COFFEE UNDER THE TREES: AGROFORESTATION

The Biodiversity Action Plan for the Cobre Panamá mine calls for the reforestation of more than 10,000 hectares in and around the project site. This is being implemented through three complementary programs: (1) ongoing rehabilitation of the site footprint, as quickly as possible restoring areas disrupted during development; (2) collaboration with the Ministry of the Environment to restore native forest within protected areas and discourage future clear-cutting; and (3) community reforestation, which increases tree cover to improve ecological conditions while also benefitting local residents.

“The problem with community reforestation is that you can’t guarantee it will be sustained even over the next few years, let alone for decades to come,” Alberto Casas explains. “So to extend the sustainability of these areas we’ve also launched an agroforestation program. We’re introducing product-bearing trees, such as coffee and cocoa, along with the native trees.”

Planting crops under forest canopies has become increasingly common in tropical countries, especially among small-scale farmers facing the impacts of climate change. The practice reduces the threat of erosion while helping to enrich the soil. Moreover, when crops are planted in a shady environment, it doesn’t necessarily mean lower yields; photosynthesis actually declines in intense sunlight, whereas many plants thrive in lower-light conditions. Shade-grown coffee trees require far less weeding than in a traditional plantation, and growers say that they produce a higher-quality, better-tasting product.

“We’re only in the early days, but we’re already seeing the economic benefits of agroforestation as well,” Casas says. “The biggest Panamanian coffee maker has committed to buy over 60,000 tonnes from our first harvest. This is great news for our farmers, and also for people who’ve agreed to the reforestation of their lands and will now see a financial advantage, too.”



This innovative program is aligned with the sustainability objectives set out in the Environmental and Social Impact Assessment (ESIA) for Cobre Panamá. In addition to conserving habitats and protecting species of concern, the Biodiversity Action Plan explicitly addresses the need to support local residents in deriving sustainable benefits from the ecosystem. These efforts are part of a broader commitment to maintain the integrity of the Mesoamerican Biological Corridor, a network of protected habitats and adjoining natural ecosystems that spans Panama and the rest of Central America. Just in the segment around the mine concession, there are two national parks and a government-protected Multiple Use Area that together cover most of the district of Donoso.

This is the context of environmental responsibility that frames every initiative undertaken at Cobre Panamá. Virtually the entire surrounding region is either protected outright or subject to strict controls on land use and economic development.

“By next year, the entire area around a quarry developed for construction of the coastal road will be reforested,” Alberto Casas says, pointing across the mine property to a cleared hillside. “Some of the amphibian species of concern that were rescued in our ex-situ conservation programs will be reintroduced to creeks in the area. As we monitor their development, we’ll gain important firsthand experience for future mine closure practices. At the same time, the rock pit will be restored and turned into a lake that our employees can use for recreational purposes. Looking to the future, once the mine has run its course, the three open pits could become a centre of recreation and eco-tourism – within a larger region that nicely balances agroforestation, organic farming and huge expanses of untouched nature. That’s the kind of sustainable future we’re trying to help build here.”

(above) First Quantum farming program consultant Eufrates Lopez (kneeling) advises Jaime Nunez on his tomato crops. In addition to training in sustainable agriculture, the farmer has received assistance to build structures such as a greenhouse.

CREDIT WHERE IT'S DUE

Panamanian researchers get the recognition they deserve

The rich flora of Panama has long attracted botanists worldwide – most notably from the Missouri Botanical Garden (MBG) in the U.S., which has been sponsoring research in the rainforest for nearly a century. However, very few Panamanian researchers have had their contributions recognised internationally. First Quantum is helping to change that.

In 2014, Christel Ramos and Orlando Ortiz, two botanists from the School of Biology at the University of Panama, travelled to the MBG for specialised training in the identification and description of new flora species, as well as the procedures for having their work published in peer-reviewed journals.

“We’re proud to sponsor the first young Panamanian botanists to participate in this training,” says Todd Clewett, First Quantum’s Country Manager for Panama. Since 2011, the company has supported MBG scientists in the inventory and study of native flora around the Cobre Panamá project – including the identification of previously unknown species. “As we contribute to the development of knowledge about the Donoso rainforest,” Clewett says, “we want to ensure that Panamanian researchers are able to bring their unique local perspective to this vital work in biodiversity conservation.”



NATURE



BEYOND THE HORIZON

A mine's obligation to preserve biodiversity doesn't end at the concession fence. In addition to its area of direct environmental impact, there's the broader ecosystem to consider, along with aspects of sustainability that may extend across an entire region. As well, conservation efforts extend over time, addressing challenges that often predate development and will require attention well beyond the project's lifespan. This is the far-reaching perspective First Quantum brings to the Trident mine in Zambia.

One of Africa's largest copper mining operations, Trident has an immediate environmental footprint of about 315 km². But First Quantum's biodiversity initiatives reach much farther than that, encompassing the vast 9,500 km² expanse of the nearby West Lunga Management Area. Add in support for other government-led conservation programs throughout the North-Western Province, and the company's scope of responsibility takes in over 14,000 km² of forest, plains and wetlands, including the rivers of the Zambezi watershed.





“Our wildlife protection programs have an important part to play in sustaining this community.”

Wildebeest were among the indigenous species reintroduced into the 1,400-hectare wildlife reserve at First Quantum's Kansanshi mine. The reserve now supplies animals to a new sanctuary at Kalumbila, adjacent to the company's Trident site – which in turn will provide starter populations for protected zones within the West Lunga Management Area.

Preserving Biodiversity in Northwest Zambia



“It takes people working well together to bring agreements to life.”





In December 2014, the Trident Foundation unveiled a comprehensive strategic plan for building a legacy of sound environmental management and biodiversity conservation in the region. The plan has three key areas of focus:

- The West Lunga Management Area – supporting the conservation work of the Zambia Wildlife Authority (ZAWA) and local communities within and around this large protected zone.
- The Kalumbila Wildlife Sanctuary – creating a forest reserve between the Trident site and the neighbouring community of Kalumbila.
- Regional conservation initiatives – supporting the national Forestry Department with projects across the North-Western Province.

The five-year plan puts in place the building blocks of a longer-term strategy for managing threatened wildlife populations and forest environments around Kalumbila. It reflects First Quantum's firm commitment to helping local communities and various levels of government enhance biodiversity protection, prevent the destruction of habitats and offer sustainable alternatives to the depletion of natural resources.

"We're the only mining company in Zambia that directly supports public sector biodiversity programs," says Dorian Tilbury, Wildlife and Conservation Coordinator with the Trident Foundation, the not-for-profit that coordinates First Quantum's sustainability activities in the region. "We're working to restore the ecology in sensitive areas and revive animal populations that were nearly eliminated over the past 30 years. We're also introducing community education programs to reduce negative environmental impacts and help people pursue sustainable livelihoods. And our

ultimate goal is to help create the infrastructure for a thriving eco-tourism industry while maintaining a balanced approach to natural resource management. So we're definitely committed to taking the long view."

CONSERVATION IN WEST LUNGA

The West Lunga Management Area (WLMA) consists of the 1,684 km² West Lunga National Park and three adjacent protected areas: Chibwika-Ntambu, Musele-Matebo and Lukwakwa (see map). The park is under the jurisdiction of ZAWA, which also supervises wildlife management in the bordering reserves governed by traditional chiefdoms. The overall territory of the WLMA spans a diversity of environments, from *miombo* woodlands of the type that cover much of south-central Africa, to open grasslands dotted with seasonally flooded depressions (*dambos*), to the network of rivers and tributaries that constitute the headwaters of the Zambezi and Kafue systems.

Of particular ecological interest in the WLMA are the extensive areas of *mavunda* – dry evergreen forest that forms an almost continuous canopy above a dense undergrowth of shrubs, scramblers and climbers. Unique to this part of Africa, the complex *mavunda* environment is believed to play a critical role, like the Amazon rainforest, in mitigating the impact of greenhouse gases on climate change. On the other hand, clearing forested areas through burning further raises the level of harmful emissions. And in contrast to the highly adaptive *miombo* woodlands, which produce new growth quickly following slash-and-burn intrusions, the *mavunda* is very slow to recover from fire.

Adding to this latter threat is Zambia's widespread dependency on charcoal as a source of energy, which has only deepened as recent

(above) Zebras are among the first large mammals to be reintroduced into the Musele chiefdom, part of the West Lunga Management Area, in more than 30 years.



shortages of hydroelectric power have led to regular blackouts across the country. Industrial projects such as Trident also bear some of the responsibility here. The in-migration of workers and jobseekers to Kalumbila has increased local demand for household fuel. And as more and more goods and supplies arrive by road, there is no shortage of transport drivers who are happy to fill their empty trucks with charcoal that can be profitably resold in Lusaka and other centres to the south.

“Over the past 20 years, I’ve watched charcoal production steadily rise in this area,” says Dorian Tilbury. “As demand continues to grow – and especially given what we now know about the forests’ role in regulating climate – it’s critical that we support the government’s actions to promote conservation in what is so far the only formally protected area of *mavunda* forest on the continent.”

First Quantum has signed a memorandum of understanding with ZAWA to collaborate on a range of conservation initiatives in West Lunga. Within this partnership, the company provides technical, managerial, material and financial support to ZAWA’s regional management unit, which is responsible for day-to-day decision making in the WLMA. The five-year agreement, ratified by Zambia’s attorney general in October 2014, is designed to evolve into a longer-term commitment as the two organisations determine how best to complement one another’s contributions.

“This agreement was finalised with remarkable speed,” Tilbury says, “I believe because our partners see First Quantum’s Trident operation as a local company that’s in for the long haul. And speaking as a Zambian who’s spent the past 20-odd years

working in our protected areas, I know it also comes down to the relationships we’ve built with community, traditional and government leaders. It takes people working well together to bring agreements to life.”

RESTORING AND PROTECTING WILDLIFE

Conservation initiatives start right in Trident’s backyard, where the mining concession extends into the protected Lualaba National Forest. Under the environmental compliance terms agreed with the Ministry of Mines and the Forestry Department, First Quantum is committed to preserving the forest while also helping to restore the ecological balance that has been disrupted in recent decades by development and illegal poaching. To that end, the company has fenced off 8,500 hectares within its lease area to create the Kalumbila Wildlife Sanctuary.

“It serves as a kind of green belt between the mine and the town of Kalumbila,” Tilbury explains. “Other than the protective fence and a small road, there will be no infrastructure development. And now we’re starting to reintroduce various mammal species that have nearly disappeared from the area.”

Among the species that the program is focusing on are impala, sable, eland, reedbuck, lechwe, roan and Lichtenstein’s hartebeest. Animals will be obtained from other Zambian sanctuaries, including the 1,400-hectare reserve created at First Quantum’s Kansanshi mine 150 km to the east. Once reintroduced successfully at Kalumbila, the new arrivals will form starter populations for restocking the other game management areas within the WLMA, where the company is working with Forestry Department experts on a range of biodiversity initiatives.

(above) Dorian Tilbury, Wildlife and Conservation Coordinator with the Trident Foundation.

Of course, simply designating a reserve and putting up a fence is not enough to ensure that animals will be protected. So another key component of First Quantum's conservation strategy is enforcement. The Kalumbila sanctuary is patrolled by specially trained wildlife monitors who manage camera traps, watch for signs of illegal activity and gather data on wildlife behaviour and population growth – while encouraging mine workers and visitors to share their sightings as well.

Maintaining well-organised vigilance is even more critical in the West Lunga reserves, where the sheer expanse of uninhabited territory makes poaching difficult to police. Working closely with ZAWA wildlife officers, the Trident Foundation is supporting a rigorous recruitment and training program to build a network of "village scouts" across the WLMA. Schooled in everything from game tracking to non-weapon arrest techniques, the scouts are encouraged to strictly enforce the law while being sensitive to the motivations of those who break it.

"Many poachers you encounter are living below the poverty line," Tilbury says. "They're typically just trying to get some meat for their families with a homemade weapon or snare. We want our scouts to understand this, and to feel confident enough in their roles that they can avoid conflict and, when they do need to make arrests, not use undue force." At the same time, the program is helping raise awareness of conservation issues among all

community members – while also highlighting the economic advantages. "Overall, we're finding a lot of support, because for the first time in decades a wildlife program is not only having an impact on poaching, it's also helping to create real jobs."

SUSTAINABLE FUTURE

Indeed, all aspects of First Quantum's strategy are designed to minimise or offset any negative impacts on biodiversity while reinforcing a broader commitment to sustainability in all of its dimensions – environmental, social and economic.

"Our forest and wildlife protection programs have an important part to play in sustaining this community beyond the finite lifespan of the mine," Tilbury says. "There's a vision emerging of Kalumbila as a gateway for eco-tourism in the North-Western Province, with easy access not only to West Lunga but to other great national parks such as Kafue, as well as to the massive wildebeest migration routes on the Liuwa Plains, and to places like Mwinilunga, which has one of the largest concentrations of diverse bird species in Africa. This expected growth in tourist traffic will create niche support businesses. In addition, there are many other wildlife-related activities that can potentially contribute to prosperity, from beekeeping in the *mavunda* to scientific research projects – including those seeking deeper insights into climate change. So as we work with our various partners to protect what's here today, we're helping to create a more hopeful future."

(below) The Trident Foundation is reintroducing a range of mammal species, including impala, into protected parts of the West Lunga Management Area.





BALANCING TODAY AND TOMORROW.

Ensuring that current needs will continue to be met in the years ahead, and that the problems of the present will inspire lasting solutions in the future – this is the perpetual challenge of sustainability. For First Quantum, progress is always a matter of weighing long-term aspirations against immediate practical goals. We invite all of our stakeholders to share their views, ideas and concerns as we work to balance the responsibilities of today with our vision for tomorrow.

WWW.FIRST-QUANTUM.COM/CORPORATE-RESPONSIBILITY



FIRST QUANTUM
MINERALS LTD.

