The Extractive Industries and Society xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

The Extractive Industries and Society

journal homepage: www.elsevier.com/locate/exis

Original article

Maximizing the impact of mining investment in water infrastructure for local communities

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ARTICLE INFO

Article history:
Received 9 June 2016
Received in revised form 27 January 2017
Accepted 28 January 2017
Available online xxx

Keywords:
Water supply
Service delivery
Sustainability
Guidelines

ABSTRACT

Mining activities requiring the development of new or expansion of existing water infrastructure provide an opportunity to benefit local communities with limited access to clean water. Mining companies have commonly assisted water service provision to communities as part of their mining concession or through corporate social responsibility programs. In addition to the water infrastructure provided to local communities, the accompanying capacity building, infrastructure governance, and the consultation process all have notable impacts not only on the sustainability of the water infrastructure, but also the level of benefit to communities. Using recent Australian Government funded water and sanitation interventions along the Nacala Economic Corridor (Mozambique) as a case study, we provide an examination of how mining companies can most effectively ensure the delivery of sustainable water infrastructure to local communities.

1. Introduction

A recent publication by the World Health Organization (WHO) emphasized the importance of a renewed focus on increasing access to safe water and improving sanitation and hygiene practices to combat a number of tropical diseases. The publication noted that prioritizing access to improved water supply, sanitation, and hygiene (WaSH) would be expected to not only have significant positive effects for health but also be instrumental in reducing poverty (WHO, 2015). The health impacts of access to improved WaSH are well understood with diarrheal diseases being the third leading cause of death in the WHO Africa Region and fifth leading cause of death in the WHO South-East Asia Region, regions that are generally characterized by the lowest levels of access to improved WaSH (WHO, 2014). Mortality rates for children are disproportionately higher for such diseases, which rarely result in death in developed countries. The economic benefits of improved WaSH are also substantial with savings in terms of health costs alone making investment in WaSH cost-effective, particularly in those regions where diarrheal diseases are a leading cause of death (Evans et al., 2004). Additionally, less time missed from work, greater educational opportunities, and other indirect benefits from access to improved WaSH increase earning potential for individuals (Bartram et al., 2005).

1.1. The health impacts of access to clean water

The WHO/UNICEF Joint Monitoring Programme estimated that, as of 2012, "more than 700 million people still lack ready access to improved sources of drinking water; nearly half are in sub-Saharan Africa" (Joint Monitoring Programme, 2014). For the sub-Saharan Africa region, it was estimated that 36% of households rely on unimproved water sources for water supply with this being broken down between surface water sources (such as rivers, streams, and lakes) at 12% of households and other unimproved sources (such as unprotected wells or springs) at 24%. Only an estimated 16% of households have water piped to the premises. The small percentage of households with water piped to the premises is important, as Pickering and Davis (2012) claim that water infrastructure improvements that do not deliver water near the home will be unlikely to engender health and sanitation benefits to children under five years of age. Schmidt et al. (2009) found that use of soap or ash increases with use of water points in closer proximity to households as well as with targeted media messages, and piped water at the household has been found to lead to an increase in washing hands at key moments (e.g. after defecating, before preparing food, before eating or serving food) for young mothers (Curtis et al., 1995). Cairncross and Valdmanis (2006)

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http://dx.doi.org/10.1016/j.exis.2017.01.014
2214-790X/

argue that provision of a public water point has little if any impact on health, regardless of the water quality of the water point it is replacing. However, simply by moving the water point within close proximity to the house (and particularly within the yard confines or the home), significant health benefits occur with a substantial reduction in incidence of diarrhea, which is commonly caused by Salmonella or *E. coli*. The explanation for this improvement in health is the relationship between water consumption and time spent collecting water. Pickering and Davis report that approximately 44% of the global population (mostly women and children) must travel to fetch water for drinking and domestic use, causing a massive physical and time burden. The time burden has indirect implications for health, as long travel times are associated with decreased water consumption (White et al., 1972; Feachem et al., 1978; Thompson et al., 2002; Wang and Hunter, 2010; Subaiya and Cairncross, 2011). Cairncross and Valdmanis (2006) found that, as water consumption increases, much of the additional water being consumed goes toward hygiene purposes (such as handwashing, cleaning, or bathing), and Moe and Rheingans (2006) argue that increased water consumption is more important than improved water quality in achieving effective hygiene and leading to greater prevention of many diseases (including shigellosis, trachoma, and scabies). In general, the closer and more convenient the water source is to the home, the more likely that effective sanitation and hygiene will be the norm. In particular, using data from the Demographic and Health Survey for 26 sub-Saharan African countries, Pickering and Davis (2012) found that a 15 min reduction in one-way walk time is associated with a 41% average relative reduction in incidence of diarrhea prevalence, improved nutritional status, and an 11% relative reduction in mortality for children under the age of five; a benefit comparable to water disinfection and hygiene promotion programs.

1.2. Mining activity and resulting pressures on water supply

For mining companies operating in developing countries, mining activity frequently occurs in rural areas where nearby communities tend to have lower socio-economic status and poorer health conditions, in part due to insufficient access to clean water (and particularly piped water to the home). Even in areas where access to clean water is sufficient, mining and associated economic activity can lead to rapid population growth (Australian Bureau of Statistics, 2007; Petkova et al., 2009; Carrington and Pereira, 2011), placing significant pressure on existing water infrastructure. This population growth oftentimes extends well beyond the general vicinity of the mine site due to infrastructure projects (such as roads or rail) accompanying mining. For example, in Mozambique the shallow water port of Beira has limited capacity for increasing mineral outputs, especially coal, from mining activity in Tete Province. To address this limited capacity, Mozambique developed the Nacala Corridor and the deep-water port of Nacala, which can better accommodate large vessels for bulk cargo. Road and rail construction along this corridor to facilitate the transport of mineral resources to the port has generated economic opportunities in small towns along the corridor, and accompanying this economic opportunity has been significant population growth. In the town of Ribáuè (pop. 26,000), which falls along this corridor and has seen significant rail and road works in recent years, roughly 8% of households surveyed in November 2014 reported having moved to Ribáuè within the past three years specifically for work, and it is estimated that Ribáuè will grow by 140% over the next 25 years, a rate significantly higher than the estimated growth rate of 63% over the same period of time for the province as a whole (Instituto Nacional de Estati'stica, 2010).

At the same time, because mining is often a water-intensive endeavour (Szyplinska, 2013), particularly for lower grade ores (Business Monitor International, 2013; Global Water Intelligence, 2011), it has the potential to affect water availability (through reduction of surface water availability or lowering groundwater levels) and quality (through contamination of water supply). In addition, mining may lead to involuntary resettlement of communities, in which case the site selection of resettlements has been crucial in relation to water availability. Oxfam has identified a number of critical factors that should be considered when examining the suitability of any candidate resettlement location, and, as would be expected, one of the key factors is the availability of clean water. In the Mozambican context, these factors have not always been appropriately considered, however, as evidenced in reports by the Human Rights Watch (Varia, 2013) and Southern Africa Resource Watch (Kabemba, 2012). One of the cases highlighted in these reports is the Benga Coal Mine and resettlement of families to Mualadzi. In fieldwork carried out by Oxfam Australia in Mualadzi in November 2014, households noted that water availability from the nearby river is seasonal, and only four of eleven electric pumps used to supply water to the town were functional, leading to water shortages for not only livestock but also households (Lillywhite et al., 2015).

1.3. The role of mining companies in delivery of water supply to communities

Investment in water infrastructure for local and other impacted communities is an important consideration for mining companies. This should be the case when clean water is scarce in close proximity to mining operations and mining operations may be anticipated to lead to rapid population growth, placing an increased strain on water infrastructure and potentially impacting on available local water capacity. It is also an important consideration when mining activities lead to resettlements. Investment in water infrastructure can occur directly from mining companies as part of corporate social responsibility projects integrated in local social and economic planning or through negotiations with the government where a portion of mining royalties is earmarked for investment in water infrastructure for local communities or communities affected by associated infrastructure projects. Although the private sector may consider investing if it is possible to supply water profitably, securing private investment may still require some form of investment on the part of mining companies or the government. Budds and McGranahan (2003) suggest that rural and peri-urban areas (which are the areas most significantly impacted by mining operations) tend to be unattractive investment destinations for private WASH projects unless they are bundled with other utility services, as the rate of return otherwise would be anticipated to be too low to make investment worthwhile.

Mining companies may view such investments as an additional financial burden that should not be their responsibility given the substantial royalties or taxes they already may pay. However, in many cases existing water infrastructure in local communities is insufficient for mining needs, meaning that mining projects increasingly must invest in water infrastructure to meet their own needs. Over the period of 2011 to 2014 it is estimated that global spending on water infrastructure for mining will have doubled from $7.7 billion USD per annum to $13.6 billion USD (Thomas, 2012). This spending on water infrastructure accompanying mining activity during the development and production phases can be a catalyst for improving water situations for local communities, and Toledano and Roorda (2014) explore the opportunities that exist when mining companies share this water infrastructure with local communities. Thus, investment in water infrastructure by mining companies can lead to substantial benefit for local communities for an incremental increase in spending on

Please cite this article in press as: R. Admiraal, et al., Maximizing the impact of mining investment in water infrastructure for local communities, Extr. Ind. Soc. (2017), http://dx.doi.org/10.1016/j.exis.2017.01.014