Resources Policy 49 (2016) 1–11

Contents lists available at ScienceDirect

Resources Policy

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

Mineral resources and localised development: Q-methodology for rapid assessment of socioeconomic impacts in Rwanda

Fitsum S. Weldegiorgis *, Saleem H. Ali

The University of Queensland, Sustainable Minerals Institute, Level 4, Sir James Foots Building (47A), St Lucia, Brisbane, 4072 Queensland, Australia

ARTICLE INFO

Article history:
Received 16 September 2015
Received in revised form
10 March 2016
Accepted 24 March 2016

Keywords:
Mining
Sustainable development
Impact indicators
Q-methodology
Rwanda

ABSTRACT

The regional impacts of large development projects often require rapid appraisal in confined geographies. Impacts have largely been studied at country level, which have often neglected a finer granularity of analysis at sub-national level, which has specific relevance in Africa, since many mineral conflicts on the continent are highly localised. This study applies Q-methodology to quantitatively analyse qualitative perspectives regarding impacts of mining-led development at a district level in Rwanda – a densely populated country with a high economic growth rate. This approach revealed three classes of shared perspectives regarding topics of greatest concern to stakeholders: (a) economic diversification and sustainable socioeconomic development; (b) employment, resettlement, and mining land-use; and (c) income, benefit distribution, and social impacts. The use of this method to consolidate qualitative data through a deliberative process to get an output that can be used for broader geographic comparisons holds much promise for researchers and practitioners alike working in geographies of rapid development.

1. Introduction

The primacy of any sub-national economic development analysis should reside with an understanding of stakeholder perceptions and feedback which add a dimension to the analysis that facts and figures alone cannot provide. Often economic development analysis focuses on macroeconomic data and multipliers generated through input-output analyses that provide a good panoramic view of development but can often miss finer granularity at the sub-national level. For research on extractive non-renewable resources such as mining there has been some preliminary work done on developing sustainable development indicators but application and measurement is often at national level (Azapagic, 2004).

Our research uses Q-methodology[1] as a novel means of assessing the impact of mining development at the sub-national level in a way that blends qualitative feedback from stakeholders with quantifiable metrics of development impact. Such an approach allows policy-makers to gauge the level of informed consent for mining projects, which is becoming increasingly salient to ensure development conflicts can be averted. The aim of this research is, therefore, to identify key impact areas of mining and sub-national development and quantitatively analyse perceptions of stakeholders about those impacts in order to draw impact areas that are shared by a significant number of people. Those indicators identified in this research will then be part of a bigger research project that aims to develop rapid assessment framework of indicators for mining and sub-national development.

Our approach is predicated on a theory of deliberative democracy (Fishkin, 2009; Gutmann and Thompson, 2009) and subsidiarity governance (Colombo, 2012) that has particular relevance in post-conflict areas that require higher level of engagement at the local level to build trust with the central government and multinational interests. The approach incorporates the varied interests, perceptions, knowledge, expectations, values, and desired management options regarding mining activities and its impact on sub-national development. Engagement of stakeholders makes sure that impacts are adequately identified and measured, providing an important basis for informed policy making. In addition, increased knowledge of relevant stakeholders regarding the range of impacts ensures that a solid grounding is provided for informed communication among the relevant stakeholders. This supports a proactive and coherent measure to realise the contribution of mining to sustainable development at a time when mining activities are considered an integral part of the region's economic prospects.

Rwanda's economy has been largely based on agriculture, which remains the mainstay of livelihoods contributing to 36

* Corresponding author.
E-mail addresses: f.weldegiorgis@uq.edu.au (F.S. Weldegiorgis), s.ali3@uq.edu.au (S.H. Ali).

[1] A method used to quantitatively and qualitatively measure subjectivity within a discourse.

http://dx.doi.org/10.1016/j.resourpol.2016.03.006
0301-4207/

percent of total Gross Domestic Product (GDP) on average from 1999 to 2012. However, the country has set off on a larger scope of economic development planning, expanding to other sectors including extractives and service sector delivery for East Africa. More than a decade after the Rwandan genocide, the country has made remarkable progress on most development metrics, though often at the cost of full pluralistic democracy (Crisafulli and Redmond, 2012). Rwanda provides an important opportunity for research, with the high population density of the country and situation of villages around mine sites. In such coexistence, mining and a range of other economic activities that can be linked to development outcomes, provide important baseline data for research.

2. Mining activity in Rwanda's Rulindo District

Mining activity has been increasing in Rwanda, especially over the last five years. According to Rwanda Natural Resources Authority (RNRA, 2014), the mining sector contributed to average 30 percent of total export earnings in the last decade and currently employs in excess of 30,000 people. The mining sector is one of the key strategic priorities of Rwanda's phase two Economic Development and Poverty Reduction Strategy (EDPRS-2)[2], setting a target of tripling the 2012 export earnings to US$400 million by 2017 (MINIRENA, 2013).

The Rulindo District is one of five districts in the Northern Province of Rwanda (Fig. 1). It has a population of 288,452 and population density of 507.6 inhabitants per square kilometre (Rulindo District, 2013). Around 77 percent of persons above 16 years of age are engaged in agriculture, with coffee and tea being the principal crops (Rulindo District, 2013). Poverty is prevalent, with 43 percent of the district's population categorised as either poor or extremely poor and only 2.6 percent of households having access to electricity (National Institute of Statistics of Rwanda, 2012). In a district with a high population density and substantial dependency on subsistence agriculture, mining coexists with human settlements and agricultural land. Mining and quarrying employs 5.3 percent of persons above 16 years of age in the district and the expansion of this activity carries implications for both social structure and land use.

While mining activities in many parts of the country mainly involve artisanal small-scale mining (ASM), the Rutongo Mines in the Northern Province have been a major producer operating at semi-industrial scale. These cassiterite mines are operated by the privately-owned South African company, Tinco. The mines have been operational since the 1930s, with major developments made by a Belgian company before being nationalised by the Rwandan Government in 1986. Currently owned 100 percent by Tinco, the Rutongo Mines produce over 100 t of 71 percent tin concentrate a month that is exported to Malaysia (TINCO, 2014). In 2013 alone, the Rutongo Mines accounted for 11.3 percent of the total 6842 t of cassiterite produced in the country (Cook and Mitchell, 2014). The mines are the largest private sector employer in Rwanda currently employing 3475 people, mainly through subcontracting to local miners who are paid per extracted minerals.

Tinco is in the process of renewing its license with a long-term plan of expanding and industrialising its operations. At present, it covers a concession area of 9432 ha in the Ntarabana, Cyinzuzi, Murambi, and Masoro Sectors of the Rulindo District with estimated reserves of 52,000 t of tin (Wilson, 2013). As part of the long-term plan, the company aims to produce between 200 and

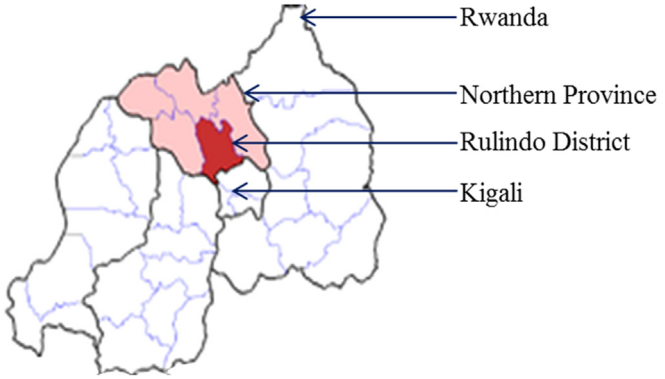

Fig. 1. The Rutongo District Map (adapted from Northern Province Government website).

250 t of tin concentrates per month. With industrialisation and further expansion, social and environmental impacts are inevitable. According to interview with Tinco management, the mines coexist with the 70,415 population in all the four sectors where the mining concessions are located, and many people live within the concession areas. Initial site observation and consultations with the Ministry of Natural Resources authorities and the Rutongo Mines management team revealed impacts relating to population pressure and land issues, conflicts between illegal miners (subcontracted miners who illegally sell minerals) and the company, land degradation, aggregate mining, employment and training of locals, and company support for community.

Given these prevailing impacts and considering future activities at a larger scale, it is important to understand the main concerns and expectations of relevant stakeholders. This research engaged relevant stakeholders in the Rulindo District to gauge their understanding, perspectives, concerns and expectations about the existing activity and future expansion of the Rutongo Mines and the impact this holds for sub-national development. While the Rutongo Mines are by far the largest mining activity in the area, it is important to recognise that ASM activities either organised in cooperatives or run by family or individuals also play a role in the social and environmental impacts in the district.

3. Method

This research utilises Q-methodology, which is a scientific method of analysing opinions, concerns, perceptions, and standpoints about a certain topic. It combines both quantitative and qualitative research approaches in that it examines participants' subjectivity using a "factor analysis"[3] technique (Brown, 1996). A heterogeneous sample of qualitative content is ranked along a standardised ranking distribution, allowing for quantitative analysis (Watts and Stenner, 2005). It allows similar response patterns to be identified, discerning general perspectives or points of view amongst respondents (Shinebourne, 2009).

Q-Sort methodologies join a range of tools that have been used to garner community perception data through a participatory and engaged process. Roloff (2008) has highlighted the importance of "issue-focused" rather than "organisation focused" management approaches to improving corporate engagement with society. A variety of methods have been suggested to glean data on issues that are most relevant to communities. Linear surveys of community perception are often the simplest method but have

[2] EDPRS is a 5 year strategy with objective of improving the quality of life for all Rwandans moving towards the Vision 2020 goal of becoming a middle income country. EDPRS is implemented in two phases namely, EDPRS-1 (2008–2012) and EDPRS-2 (2013–2018).

[3] A statistical method that correlates Q-sort responses into groupings or factors. Each grouping of statements is mathematically unique from other groupings.