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Landscape assessment for sustainable resettlement of potentially displaced communities in Ghana's emerging northwest gold province

Abdul-Wadood Moomen*, Ashraf Dewan, Robert Corner

Department of Spatial Sciences, Western Australian School of Mines (WASM), Faculty of Science and Engineering, Curtin University, Perth, Western Australia, GPO Box U 1987, Australia

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ABSTRACT

This study assesses the physical suitability of the local landscape to enhance resettlement of future displaced communities as a result of mining. The study focuses on Ghana's emerging northwest gold province. Landsat images from 1986 to 2014 were used to map land-use/land-cover changes to predict future changes. Participatory mapping and focus group discussions were incorporated, to develop reference points, training sites and land use areas by villages. The results showed that expansion of occupied lands occurred from 25.4% in 1986 to 44.8% in 2014 with associated increasing population densities. Predicted land-use/land-cover changes indicated 52% expansion of occupied lands over a 15 year period. Much of that expansion was from vegetation and waterlogging. The results also showed large patterns of waterlogging in the area. The existing and predicted landscape character in the area indicated unsuitable environments for enhanced resettlement and livelihood to potentially displaced communities as a result of future mining operations.

1. Introduction

Globally, mining-induced displacement and resettlement of local communities is a common phenomenon. Nonetheless, identifying suitable landscapes, before a project concept, for optimal relocation of potentially displaced communities has been a governance aberration in developing countries. Meanwhile, policy transformations and technological advancements have expanded the frontiers of mineral resource exploration and extraction into previously inaccessible areas in these countries (Hilson, 2004; Thomson and Joyce, 1997). Besides, the United Nations Economic Commission for Africa, the World Bank and African Union (AU) recognition of the mineral resources sector as a panacea to economic growth and industrialisation (Africa, 2009), has engendered a proliferation of mining sector investments in Africa. For instance, there was a minimum of 230 Australian exploration and mining companies in Africa in 2011, pursuing about 650 projects in 42 countries, including Ghana (Catherine and Andrew, 2012). Thus, large tracts of rural space are often leased for open-pit mining, thereby, invoking displacement, resettlement and sustainable development concerns of local communities. Sustainable development refers to the use of environmental resources in producing the present needs of society in ways that do not compromise the ability of future generations to meet their own needs from the same resource base (Bruntland, 1987). Resettlement is the physical relocation of settlements or livelihood activities from their present area of occupancy to new locations (Cernea, 1997).

Since the publication of the Brundtland report (Bruntland, 1987), Convention 169 (International Labour Organisation, 2013) and the Agenda 21 (UNCED, 1992), the attention of scientists, policy makers and the mining industry has been drawn towards placing rural communities at the centre of land use planning and resource creation. The Brundtland report emphasises two key concepts: prioritising 'needs' of the local communities and protection of the natural environment's ability to meet present and future needs of local communities. These needs include food security and economic livelihood. Thus, sustainable resettlement refers to a recognition of the potentials and risks of landscapes that would support the diversity of enduring livelihood activities of displaced rural communities in mining regions (Cernea, 2003; Downing, 2002). Nonetheless, Downing (2002), Owen and Kemp (2015) found that mining leads to resettlement of displaced communities on low productive and agriculturally unsuitable areas, leading to impoverishment and conflicts. For example, Schueler et al. (2011) found

* Corresponding author.
E-mail addresses: a.moomen@postgrad.curtin.edu.au (A.-W. Moomen), a.dewan@curtin.edu.au (A. Dewan), R.corner@curtin.edu.au (R. Corner).

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that mining-induced displacement and resettlement of farming communities on unsuitable agricultural lands, in south-western Ghana, resulted in agricultural extensification. This incident led to loss of over 58% forest cover between 1986 and 2002. Similarly, Lillywhite et al. (2015) found that mining-induced displacement resulted in the resettlement of over 736 farming households in Benga, Mozambique, leading to poor water supply, food security issues and flooding hazards.

Governments and companies often introduce financial compensation and alternative livelihoods as mechanisms for mitigating a community's penury after resettlement. However, the scope of these schemes is widely contested in many mining areas. For instance, in the West Kutai area in Indonesia, villagers were paid compensations for resettlement. Notwithstanding, the local communities resisted relocating on the basis of a longer-term view of the compensation packages (Jenkins, 2004). Likewise, in the Tarkwa mining district in Ghana, it is reported that displaced communities complained of unfavourable compensation arrangements that led to livelihood disarticulations (Taabazuing et al., 2012). Women traders in resettled communities were displaced out of business due to a disconnect with customers in their new settlements. In this regard, De Wet (2004) and Hilson and Banchirigah (2009) postulate that communities' resistance against the mining sector is due to the unsustainability of resettlement schemes and lack of prior resettlement surveys (Downing, 2002). Thus, it gives a new recognition of the probes of Cernea (2003): 'The question not asked: when does displacement end?' Hence, Moran and Kunz (2014) suggested a delineation between Sustainable Development (the longer-term socioeconomic benefits of the mining industry to communities) and Operating Sustainably (best environmental stewardship of the sector).

The mining industry has introduced various initiatives to address sustainability issues in its operations. These include the Mining, Minerals and Sustainable Development (MMSD) project. On this note, the International Council on Mining and Metals (2008) introduced the community development toolkit, which undertakes baseline studies and Social Impact Assessments of affected communities. Measures such as buffer zones and offsetting would be introduced to mitigate the potential negative effects of future mine expansions (Sonter et al., 2014a). These tools are a means of identifying and measuring the potential impacts of projects on local communities (Catherine and Andrew, 2012). The World Bank, on its part as a major financier, also instituted the Resettlement Action Plan (RAP) and the Equator Principles (EP). These directives are expected to be implemented by governments and companies, to ensure sustainable mine operations as well as sustainable resettlement of displaced communities. The RAP and EP guidelines provide that the operations of mines on local space should not stifle the ability of displaced communities and individuals to find more improved livelihood than their pre-displacement conditions (Downing, 2002; Principles, 2013). To this end, remote sensing and geographic information systems (GIS) tools have been widely used to assess the effects of surface mine expansions and reclaimed lands on resettled or neighbouring local communities. Examples include (Craynon et al., 2015; Schueler et al., 2011; Sonter et al., 2015; Townsend et al., 2009).

Nonetheless, the community development toolkit, resettlement action plans and equator principles do not establish explicit criteria, such as buffering parameters, to secure a sustainable livelihood for resettling rural communities. While feasibility studies of a mine are usually done ahead of operations, feasibilities of sustainable livelihood of potentially displaced communities come after mine commissioning (Owen and Kemp, 2015). Earlier studies have given insights into the unsuitability of resettlement schemes for the livelihood of displaced communities. However, there are limited studies providing rural landscape analysis for enhancing resettlement planning decisions of potentially displaced communities, particularly, in Africa. Besides, few studies have established benchmarks, linking the influence of communities on land-cover dynamics and the potential effects of future mining activities on existing land-use/land-cover patterns (Sonter et al., 2014a,b). Also, there is a paucity of land-use/land-cover information for rural resource management in the Northern Savannah regions of Ghana. As such, large-scale mining is an emerging land-use activity in the area. Hence, anticipated transformations on existing land-use and livelihood activities due to the mining sector activities, are not yet understood in context.

Therefore, the main objective of this study is to assess the physical suitability of local space to enhance options for sustainable resettlement of potentially displaced communities as a result of mining. Thus, this study: (1) characterises current land-use/land-cover patterns to establish baseline conditions of the landscape prior to mining; (2) identifies the spatial extents of concessions and their interfaces with local communities to determine potential displacements related to mining; and (3) analyses the development patterns, opportunities and limitations associated with the landscape to place resettlement opportunities and issues in a local and regional perspective. The study is novel in its approach to linking the risks and opportunities of future mining activities with existing landscape conditions. The study is expected to guide spatial planning and potential land use conflicts management in the emerging north-west Gold province of Ghana.

2. Methods

2.1. Study area

Globally, Ghana is reckoned as a valuable mineral resource country (Standing and Hilson, 2013). The country has significant deposits of gold, diamond, bauxite and limestone, as well as recent discoveries of copper and uranium in the Northern areas (Coakley, 1996; Griffis and Agezo, 2000). However, the gold mining subsector is the largest mineral resource development in the country. Geologically, gold occurrences in Ghana are confined to the Birrimian rocks that underlay the central and south–western portions of the country. Thus, the south-west and central regions of Ghana host the historical gold mining activities in the country. However, the Birrimian rocks further extend from the south-west through the middle transition belt to the three Northern Savannah regions of Ghana. These regions are the Northern, Upper East and Upper West. Hence, geological endowments coupled with industrial advancements have unveiled the value of gold deposits for extraction in the Northern Savannah, particularly in the Upper West Region.

The study focuses on seven of the 11 districts in the Upper West Region, situated between latitudes 9°45′ and 11° 00′ and longitudes 1°30′ and 2°50' (Fig. 1). The districts are: Wa West, Wa East, Nadowli-Kaleo, Jirapa, Lambussie Karni, Lawra and Nandom. These districts currently have mineral exploration leases and gold mining concessions. The area is covered by the Guinea Savannah agro-ecological zone with scattered trees and grasses. It is a semi-arid region with mean annual precipitation of 989 mm (Blench, 2006). Minimum and maximum temperatures range between 21° and 39 °C (EPA, 2003). The upper west region had a total population of 702,546 in the last population and housing census (GSS, 2013). Most of the region's population is concentrated along the Wa-Lawra belt in the western corridor (Fig. 1). The region is also the second poorest in the country with a per capita income of less than US$ 1 (GSS, 2007). Agriculture is the primary economic activity in the region, employing about 80% of the population and over 90% of rural households (GSS, 2013; RADU, 2010). However, it is