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Mineral industries, growth corridors and agricultural development in Africa

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ABSTRACT

An extractive industries boom in Africa is driving unprecedented expansion of infrastructure into sparsely populated regions. Much of the investment is in high-volume minerals such as iron and coal that will require heavy infrastructure and large settled workforces. New roads and railways are being built to support these industries. Mineral infrastructure is reinforcing the dynamic of designated "growth corridors", which are increasingly determining settlement patterns and rural land use in Africa. These corridors are penetrating into areas where agriculture has been constrained by lack of access to markets. They could unleash a major expansion of arable crops in the Guinea and Miombo savannahs, tropical tree crops in Congo Basin rainforests and irrigated agriculture on the floodplains of several African river systems. Rapidly growing African cities are largely dependent on imported food but growth corridors linking them to hinterland areas could favour shifts to African-sourced foods. Governance weaknesses may allow outside investors to make land grabs along growth corridors and further marginalise poor smallholders. New pressures on environmentally sensitive areas may emerge. Policy changes are needed to avoid negative impacts of this major new development trend and to exploit the potential for poverty alleviation and food-security benefits.

1. Introduction

Mineral extraction has influenced population distribution and development patterns in Africa since pre-colonial times. The ancient civilisations of Ghana and Mali existed because of trans-Saharan trade in gold and salt. The Great Zimbabwe ruins were linked to gold exploitation. European colonists discovered gold in South Africa in 1886; colonial gold mining in Zimbabwe started in the early 1890s and copper mining in Zambia in 1895 (Economist, 2011; Pakenham, 1991). Development in present day South Africa, Zimbabwe, Ghana, Zambia, and Congo was driven by mineral exploitation in the early days of European colonisation.

An unprecedented mineral boom is now occurring in Africa. Six of the ten fastest growing economies in the world are in Africa and all of them have thriving mineral sectors (Economist, 2011). The mineral boom is contributing to the emergence of "growth corridors" where infrastructure upgrades will improve the competitiveness of agriculture and other economic activities (African Agricultural Development Company Ltd., 2013; Delgado et al., 1998).

Much of the recent increase in foreign direct investment in Africa is linked to extractive industries (Fig. 1). The number of projects under study or being negotiated with African governments is at an all-time high (AusAID, 2011; Cheung et al., 2012; Department of Foreign Affairs and Trade, 2011; Huang and Wilkes, 2011; Janneh and Ping, 2011; The Americas Team, 2010; WWF, 2011; Zhang and Wilkes, 2010). For example, in 2011 close to 150 Australian mineral companies were investing ~$20 billion in more than 40 African countries (Negin et al., 2011). China is rapidly increasing investments in minerals in Africa (Fig. 2). Much recent mining expansion is for high-volume resources such as coal, iron and other heavy metals of importance to the steel industry (Fig. 3). The extraction of these minerals requires railways or significant road infrastructure and ports (Carmody, 2009; Jalloh et al., 2013; Zhang and Wilkes, 2010).

Here we review trends in new mineral activities in Africa and argue that they will be major drivers of change in settlement patterns and agricultural development. We relate new mining activity and its associated infrastructure with the location of land that has agricultural potential. We examine the extent to which the economic changes associated with mineral activities may impact on farming, food security and rural livelihoods.

2. Growth corridors

Infrastructure is the key to agricultural development in Africa (Delgado et al., 1998). This has led to recognition of the "African

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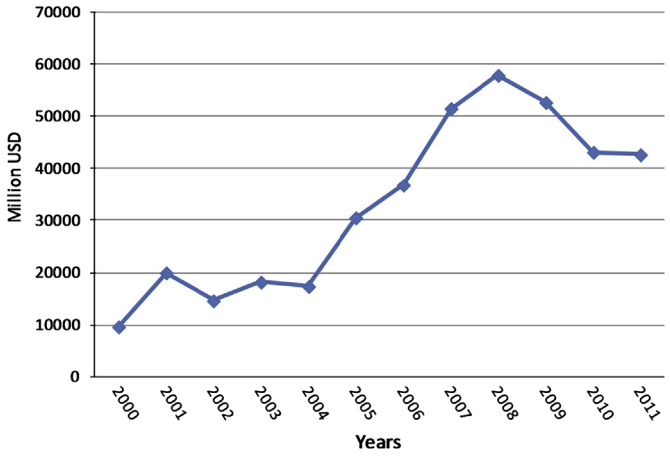

Fig. 1. African Inward foreign direct investment flows.
Source: UNCTAD *http://unctadstat.unctad.org/TableViewer/tableView.aspx* (accessed 22.03.13)

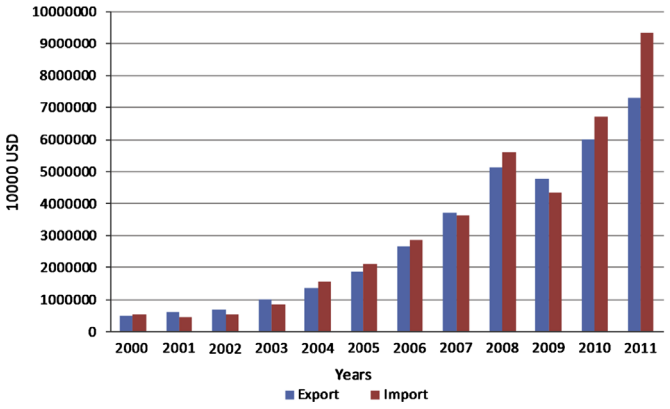

Fig. 2. Chinese import and export trade with Africa.
Source: China Statistical Database http://www.stats.gov.cn/english/statisticaldata/yearlydata/ (accessed 25.03.13)

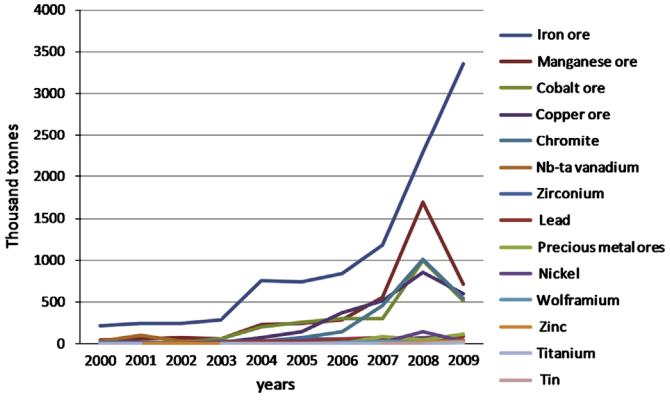

Fig. 3. Chinese metal ore imports from Africa by volume (2000–2009). In addition crude oil exports to China increased very rapidly from 3.62 million tonnes in 2000 to 38.94 million tonnes in 2008, then declined to 24.04 million tonnes in 2009.
Source: Zhang and Wilkes (2010). Trends in Chinese trade and investment in Africa's mining sector. Beijing: Chinese Academy of Land Resources and Economy (accessed 15.7.12)

Agricultural Growth Corridor" concept at the UN General Assembly in 2008. Growth corridors achieved a high profile at the World Economic Forum in 2009 and 2010 at meetings in Davos, Switzerland and in Dar es Salaam, Tanzania (Paul and Steinbrecher, 2012). There is a proliferation of web-based material on growth corridors (African Agricultural Development Company Ltd., 2013) but few systematic studies have been published. The logic is simple – improved access and the existence of new settlements with well payed workers will create conditions where agriculture can readily be intensified (Laurance and Balmford, 2013). The assumption is that, with improved access to markets and agricultural inputs, the principle barriers to agricultural innovation and intensification will be broken down.

Mining is a major driver of economic growth in many African countries (Scott, 2009). Growth may encourage development of secondary industries in cities and create new opportunities in services and manufacturing. Urban populations with increased purchasing power will demand more and different agricultural products. This could address one of the most serious constraints to African agriculture, the absence of domestic markets (Collier, 2007). Profitable urban markets could enable farmers to make investments in agricultural inputs and close the large yield gaps that at present exist in African smallholder agriculture (Lobell et al., 2009).

3. Linking mining infrastructure and agricultural growth corridors

African countries are heavily dependent on agriculture and the sector accounts for more than 30% of regional GDP and 60% of total employment. In spite of this, only 220 million ha of the 2.4 billion ha of land in sub-Saharan Africa is cropped (with larger areas under various livestock-grazing systems). Much farming is by smallholders using low-intensity methods: less than 5% of existing cropland is irrigated, improved crop varieties are grown on only about 35% of cropland, inorganic fertilizer use averages less than 10 kg/ha, and mechanisation is limited (Diao et al., 2006). The potential for major growth in agricultural production is enormous and lack of infrastructure and markets is a major constraint (Jayne et al., 2010). African smallholders typically have diverse farming systems with multiple tree and arable crops grown mainly for subsistence needs (IAASTD, 2009). Many farmers have small (<2 ha) plots and do not produce enough to feed their families for the entire year and have to purchase their staple carbohydrate diets during periods of scarcity. The ability to intensify agriculture and achieve increased yields on such small plot sizes is limited by lack of access to markets and fertilizers. Improved infrastructure could allow transformational change in these marginal farms (Limão and Venables, 2001). African cities are growing rapidly and it is projected that they will continue to do so. At present much of the food consumed in cities is imported and smallholder farmers are failing to benefit from this large potential market for their products.

The potential to link extraction of high-volume minerals to agriculture has been recognised in development plans in several countries. Growth corridors associated with mines for iron ore, copper, coal, nickel, and some other minerals are already planned in Tanzania, Northern and Central Mozambique, Namibia, Botswana, Zambia, Ghana and to a lesser extent Liberia and Sierra Leone (Robbins and Perkins, 2012). These minerals require settled populations for their exploitation and robust infrastructure for their transport to ports. The recent expansion of infrastructure for extraction of these minerals is a main driver of the growth corridors. Smallholder farmers should be able to respond to the improved markets and infrastructure provided by these corridors.

We reviewed available literature and web-based sources on existing and planned development corridors in Africa (Table 1). Here we assess the extent to which they are linked to mineral projects and suggest some of the agricultural crops that may expand in the areas opened up by the corridors. Fig. 4 shows the approximate location of the major corridors together with locations