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# **Mining and agriculture for development: exploring the nexus**

Kevin Chika Urama

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# Mining and agriculture for development: exploring the nexus

Professor Kevin Chika Urama

Executive Director, African Technology Policy Studies Network

## Abstract



Can agriculture and mining work together to improve food security? How can policy, investment and research provide for benefits? Agriculture and mining rely on similar inputs, outputs and externalities. In both Africa and Australia the relationship between the two industries can be symbiotic or competitive, depending on the situation. Mining makes profits from its mined products. Agriculture also needs mined products such as potash for soil improvement. Mining requires upgraded or new infrastructure, for transport and export, and may open up new areas, and these can benefit agriculture and other aspects of a country's economic development.

Mining uses less land and leads to less degradation of water and land than does agriculture, but both do good if done well. In terms of corporate social responsibility, mining companies have to answer to shareholders. Nevertheless, there is evidence that multiplier effects improve income and employment opportunities in the regions around mines. However, Africa is challenged by non-inclusive growth despite resource development. There are perceptions in society and the media that mining takes rather than giving back, although there is evidence of the reverse. It is recommended that the huge knowledge gaps around mining and its nexus with agriculture be tackled through research into the true impacts of mining on food production and poverty. There is an urgent need to build better awareness of the realities, and to engage with affected communities.

This talk outlines interactions between mining and agriculture for development and the nexus between them. It also touches on practices and policies that can enable mining and agriculture to work together to improve food security: how policies and investment, and also research for development, can be used to provide for benefits in this sector.

I represent the African Technology Policy Studies Network (ATPS). Its mission is to build Africa's science, technology and innovation (STI) capacity for sustainable development. The ATPS is represented in most continents and many countries (Figure 1), including Australia.

## Mining and agriculture: similar but different

Agriculture and mining have features in common, in inputs and in outputs. These industries are mainstays of the economies of most countries in Africa and strong contributors also in Australia: what externalities do they have in common?

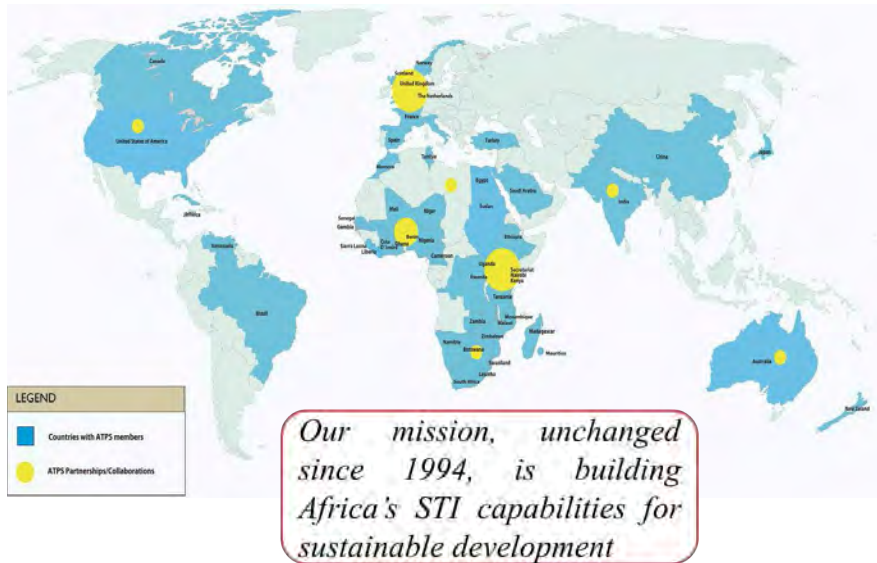


Figure 1. The African Technology Policy Studies Network (ATPS) has members in many countries, and partnerships or collaborations in the countries that include yellow on the map. The ATPS considers that the missing link in Africa's industrial development effort is not resources but lack of technological capacity to innovate and add value to products.

Both mining and agriculture depend on mined inputs, whether for producing food or gold or iron ore. The whole human race mines nature to provide for human sustainability and livelihoods. Inputs to mining and agriculture include land and water resources; there is also human capital — the labour that is put into both industries. The common output is food security. In mining for gold you get money — to do what? — to eat food and continue to survive; that is part of what we do as humans. So it can be said that mining and agriculture have the common feature of trying to address food security and human livelihoods.

The externalities of both are social and environmental. Both industries deprive some humans of basic human rights; that is, access to food or access to a good environment or access to a good living. These common features mean there is a mixed outcome in that there is either a symbiotic relationship between the two or competition between the two.

In Australia there seems to be a growing symbiosis, where the miners are investing in agriculture and rehabilitating soils in order to ensure that agriculture can continue to survive. In Africa, as we are hearing at this conference, the case is a bit different. It is more of a competition with, in some cases, eviction of farmers and actual displacement of agricultural investment in favour of mining. On the other hand, the literature about research that has been done shows that in fact the evidence is a bit mixed, even in Africa.

Agriculture itself depends on mined minerals. One of the major problems of agriculture in Africa is the small use of inputs for improving soil fertility and

productivity. Many of the minerals needed for soil improvement, such as potash, are mined, and so mining is actually delivering some of the minerals required for the fertilisers that are much needed in Africa to increase our agricultural output and food security.

Mining also can deliver infrastructure development. Opening up new mines may also open up new land for agriculture in places that were not accessible before. Deliberate development of infrastructure along mining corridors may also favour agriculture eventually.

Land taken over for actual mines is often discussed, but on examination you find that in fact mining is using very much less land than agriculture in many areas, and it is causing less harm to land and land resources than agriculture does. This is something not generally mentioned in the public domain, especially the media.

Displacement of human settlements for mining is an issue that occurs in many places, because you have to move people. Moving people, in many countries in Africa, is not just about equality of the land or the resettlement homes that you build; it is actually about people's cultural access to the land that they want. It is about origins: 'This is my land; this is my culture; this is where my grandfather was buried and I want to live there; so even if you put me in a skyscraper in New York I will prefer this particular place'. Such cultural preferences are very deep in many African countries and also in parts of Australia, and they need to be considered in the resettlements that happen.

Water use and water pollution are also very much discussed, but in at least some of the literature the evidence is less negative for mining than it is for agriculture. In many cases we think that mining is causing more harm to water resources, but agriculture also does a lot of harm, such as through eutrophication and nutrient pollution which happen in many areas. In both cases this depends on how it is done. Mining done well will cause less harm and more good. Agriculture done well will also cause less harm and more good.

Figure 2 gives some information on the amount of land being used by mining in several countries. It is less than 0.1% of land in many countries, and less than



Figure 2. Percentages of countries' total land used in mining; comparing countries.

0.26% in Australia. In contrast, agriculture in the United States occupies about 54% of the land, and it will be much more than that in many African countries (though we do not have measures). So mining is actually not using as much land as agriculture and is not causing as much harm as agriculture. However, where mining is being done by companies that are foreign, we often hear protests.

### **Potential for benefits, compared to challenges**

Improving infrastructure is something that is imperative for mining — opening up roads and creating corridors for growth.

Corporate social responsibility is also a requirement, even though (as we have heard from the miners at this conference; e.g. Sullivan 2013, this volume) mining is a business and business is meant to make profit. I am not a strong believer in corporate social responsibility. In countries where enforcement is weak because of poverty, because of poor institutions and so on, it behoves this same mining company, which is there to make a profit, to instead use funds from financiers and stakeholders' goodwill to apply corporate social responsibility.

Mining revenues are expected to improve food security, through multiplier effects, providing bread from stones indirectly by improving incomes and employment and creating other opportunities for income generation by rural households living around the mines. In mined areas the evidence is always that incomes are better: this is often so wherever industrial activity is happening.

However, in Africa there is a long list of challenges which need to be managed.

Where the policy environment and law enforcement are problematic — and this is a general problem not only for mining — there can be non-inclusive growth, as has been discussed by the first keynote speaker (Pezzini 2013, this volume). In Africa in the last few years we have seen a commodity boom and growth in gross domestic product (GDP), but in many cases there has also been deepening poverty for many people. Such non-inclusive growth is not sustainable. It does not leave either the mining companies or their rural people happy, because in the end it will only lead to protests and major problems.

Artisanal mining is an aspect of mining that is causing more harm in Africa, and probably other places, than large-scale mining, because of its informality and the poor regulations in those areas. People leave agriculture, because it is becoming less profitable to do agriculture and more profitable to do artisanal mining. That creates more food insecurity in places where small-scale agriculture is the source of livelihood for many people.

Capacity for science and technology and also innovation is a fundamental challenge, implicit in the recommendations and policy pointers below.

Marketing imperfections and lack of perfect information can be major problems. When a government representative says: 'We are told that there's this quantity of this mineral in my country', it can mean the government does not itself have a good estimate of the size of its resource. It is relying on the company — the company that is coming to sign contracts with the government to mine for minerals and make profits and pay good dividends to its shareholders — to

tell the government the size of that mineral resource. For a government, that information asymmetry is a major issue that really needs to be addressed.

Government institutions also need to deal with historical perceptions being very strongly against mining. Many in civil society, non-government organisations and local communities think that large-scale mining will only take their resources and not give them back. There is not very much evidence in the literature of that: in fact, the evidence shows the opposite, with mining producing benefits for the rural communities where they are operating. Linked to this is what I call 'media hype' or fake criticism of large-scale mining, as against even artisanal mining.

Linking mining and agriculture will be a challenge in countries where cross-ministerial collaboration is a challenge. People tend to think of their own areas of work, and of 'my budget', 'my policy', 'my ...', 'my ...', 'my ...', and that kind of attitude makes it very difficult to bring about effective collaboration between these two major industries.

Last but not least is the challenge of education. The type of education we have in Africa needs help. It needs to have a changed mindset, from just studying to gain certificates to studying to be able to do things. Much can be shared between Australia and Africa about how to educate better, with universities forming collaborations.

## **Media**

Increasingly I am beginning to believe in the power of the media, especially after the 'Arab Spring' and seeing how attitudes are spreading.

I have just read about Sierra Leone's Deputy Minister for Agriculture Marie Jalloh. She says,\*

Getting agriculture and mining [to] work together in that part of the country that I'm coming from is difficult. I've never seen it happen.

This reflects the sentiments of other speakers at this conference.

In Australia you also have this problem. For example, the Australian media on 22 August 2013 reports that coal and gas mining sparks protests and people are on the streets protesting against that. If you look at Africa you can see the same thing from, for example, rural Sierra Leone where the chiefs are complaining about displacements and major problems created by mining impeding agriculture. I know that in the media things may not be completely true, but they may also not be completely false. So we need to think about that.

## **Knowledge gaps, policy pointers, recommendations**

There are challenges in trying to make any conclusive recommendations for discussion in this area.

First, there are huge knowledge gaps. We do not really know clearly the impacts of mining on agriculture and poverty alleviation in Africa, though there is much anecdotal evidence. Research needs to be done so that we can look at the whole value-chain and gain a clear understanding of what is happening in these

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\* <http://www.abc.net.au/news/2013-08-22/nrn-africa-mining-ag/4904602>

sectors, and the important interactions. Then it may be easier to see policy pointers and make recommendations for going forward.

At the ATPS we think there is a need for independent research and documentary evidence. Normally when a company is telling you what it is doing for you, you 'take it with a grain of salt' because the company is highly likely to say something positive about itself. We need independent research instead.

Africa also needs to go beyond environmental impact assessments, which are required for establishing mines and also for mines closures. We need to think more in terms of social and economic assessments for both new and closed mines in Africa.

### Policy pointers

(i) One currently important policy pointer is the need to *create awareness*. I have recently increased my knowledge of large-scale mining, and found it is not really as bad as we used to think. We all need better awareness about the realities of these sectors.

(ii) *Community participation* is another policy pointer. Engaging local communities, before, during and after the contracting and development of large-scale operations, is a pre-requisite for sustainable mining.

(iii) *Research for development* is also required, especially to document the good and bad practices and to learn lessons for policy-making.

(iv) We need *integrated community development*. It is important not to view mining differently from agriculture and other industries, and instead to identify and develop agricultural opportunities in mining corridors. Let us think about how to use the resources we have to deliver what we want.

(v) *Environmental policies, regulations and standards and certification* are important, as is the *strengthening of indigenous technology capacity*. For example, mining contracts could include a needs-assessment of indigenous technological and innovation capacity along the value-chain.

(vi) We need to support *incubation centres for sustainable mining innovation*, and also *policy coordination*. I have written about this in 'Africa Up Close' (Urama 2012), a forum for perspectives on issues affecting Africa, run by the Wilson Center in Washington, DC.

### Conclusion

Here is a quote by Michael Spence, Nobel Laureate Economist, which I found on the Crawford Fund webpage for this conference. It is something we need to think about:

In developing countries resource wealth should make it easier to make investments that underpin steady growth, and with less short term sacrifice than is normally the case. However that is not how it usually plays out.

In summary, the African Technology Policy Studies Network recommends in-depth research to develop a more holistic perspective on mining systems for



development, including: creating capacities for green industrial policy, innovation portfolios, low-carbon policy instruments, educational reform, international cooperation, and technology transfer for green energy and economic development. The ATPS has been developing a proposal around these points, in liaison with African stakeholders.

Overall, there is a need to look at how to reverse the 'resource curse' in Africa, turning it into a resource blessing, because without that the continuing commodity boom and increasing commodity prices will increase GDP but not deliver growth or food security or alleviate poverty.

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Professor Kevin Chika Urama is an economist specialising in agricultural, resources, environmental and ecological economics. He has received many awards and prizes for academic and leadership excellence at various scales. He is the Executive Director of the African Technology Policy Studies Network (ATPS), and the Inaugural President of the African Society for Ecological Economics (ASEE) — the African chapter of the International Society for Ecological Economics (ISEE). Professor Urama serves on the boards of international organisations, scientific panels and research programs, including the High-Level Panel on Global Assessment of Resources for Implementing the Strategic Plan for Biodiversity 2011–20, the International Panel for Sustainable Resource Management (as Chair of the Water Working Group), the OECD Green Growth and Poverty Reduction Task Team, and the UNESCO Governing Board of the International Research and Training Centre for Science and Technology Strategy (CISTRAT), among others. He is a member of the Editorial (Advisory) Boards of a number of international journals.

Email: [KUrama@atpsnet.org](mailto:KUrama@atpsnet.org)