The interface of environment and human wellbeing: Exploring the impacts of gold mining on food security

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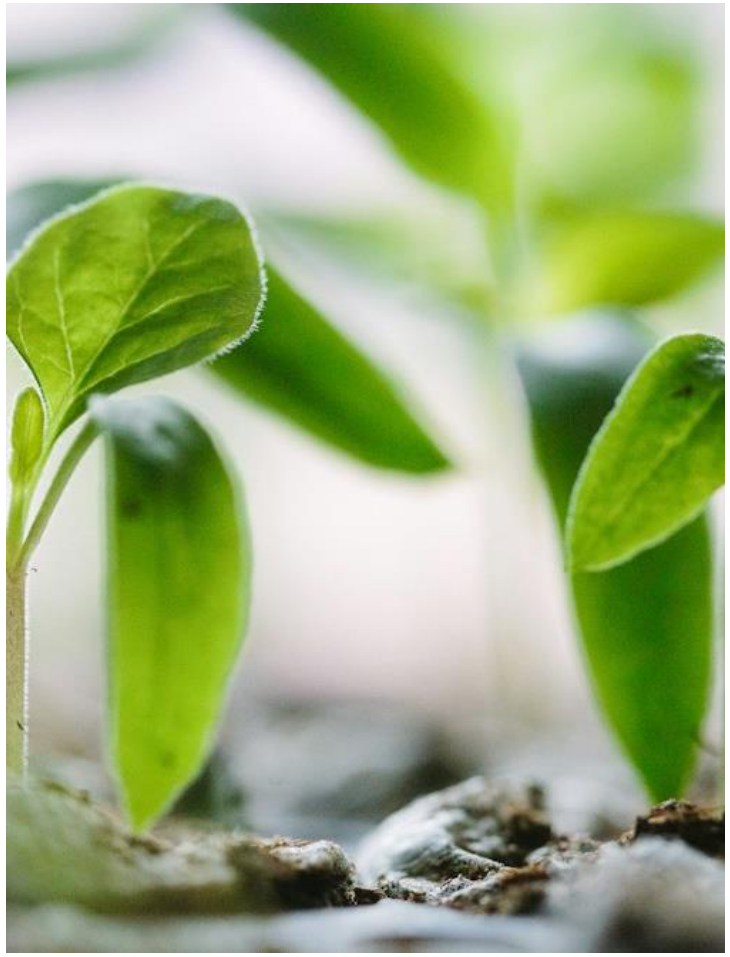
Presentation Outline

- Introduction
- Overview of mining and agriculture sectors in sub-Saharan Africa
- Interrelation of mining and agriculture
- Policy and governance: Power dynamics
- Environmental impacts: Life on land/ Clean Water
- Impacts on food security: availability, access, utilisation and stability
- Summary/Conclusions

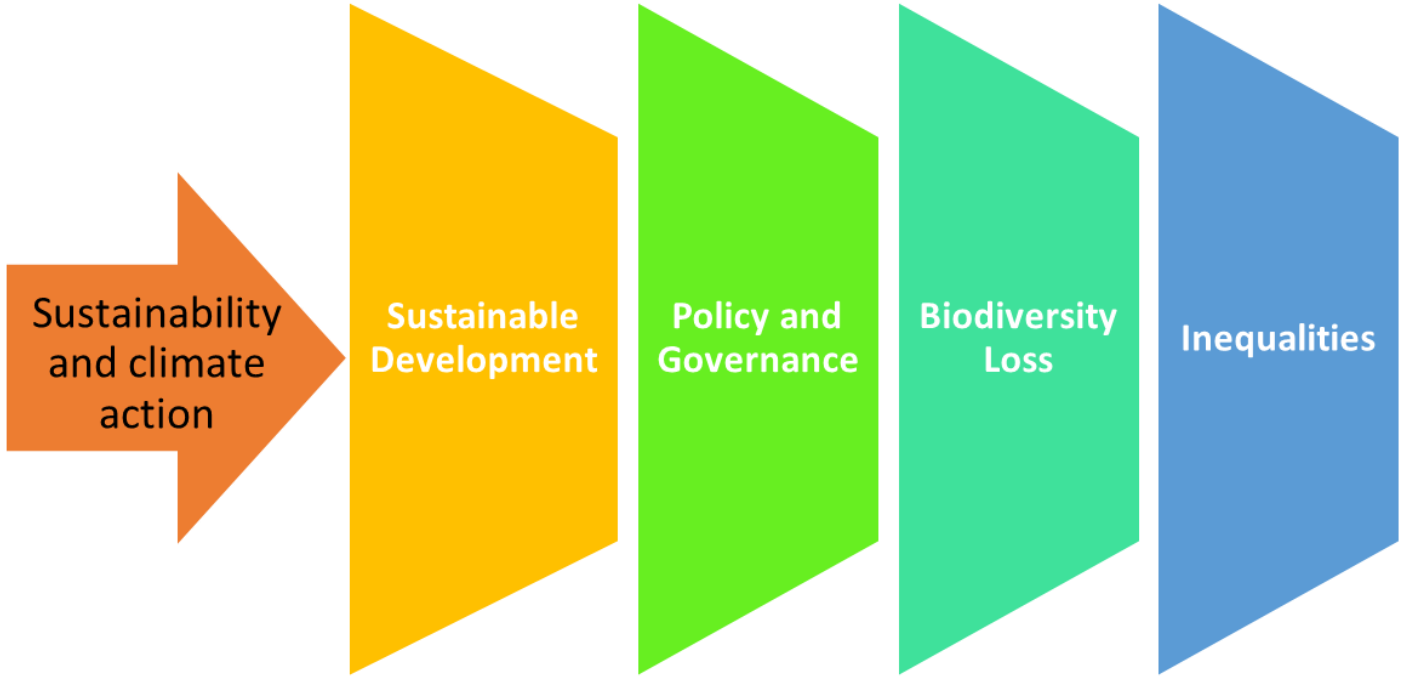
Introduction: Interface between environment and human wellbeing



- Economic wellbeing – natural resource vs economic growth
- Climate change and health – extreme weather events
- Social and cultural wellbeing – cultural identities and social cohesion

Introduction: focus of webinar

- SDG 2: Zero Hunger
- SDG 6: Clean water
- SDG 8: Decent work and economic growth
- SDG 10: Reduced inequalities
- SDG 15: Life on land



Overview of mining in sub-Saharan Africa

Important economic activity in sub-Saharan Africa

- GDP
  - Ghana: > over 7% (The Ghana Chamber of Mines 2022)
  - South Africa 8.7 % (Minerals Council South Africa, 2022)
  - Zimbabwe over 12 % (International Trade Administration, 2022).

- Employment and revenue generation

Overview of mining in sub-Saharan Africa

Small-scale mining verses large scale

The rapid growth of small-scale mining – theoretical lenses

Global

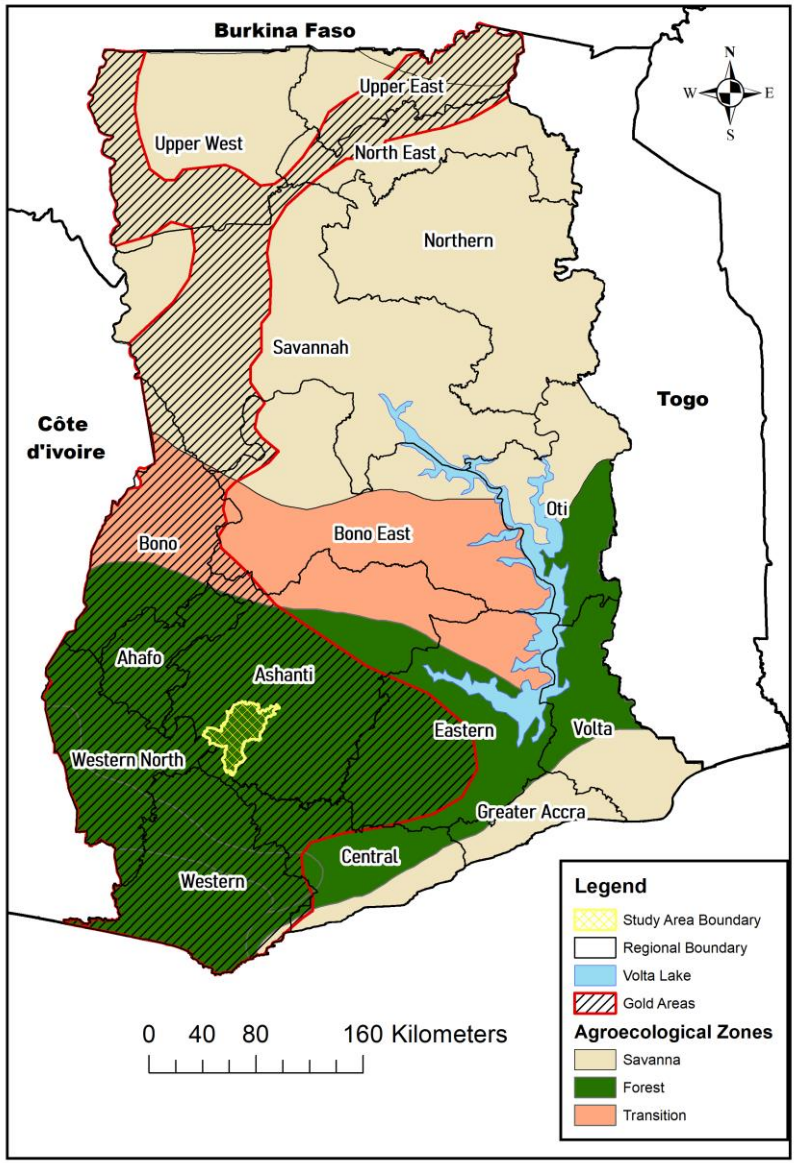
- Increased demand for natural resources (Balatsky et al., 2015; Preston et al., 2016).
- Rise in natural resources prices (Bryceson et al., 2014; Seccatore et al., 2014; Tschakert, 2016; Hausermann et al., 2018; Chigumira, 2018; Barenblitt et al., 2021).

Local drivers --- three theoretical lenses

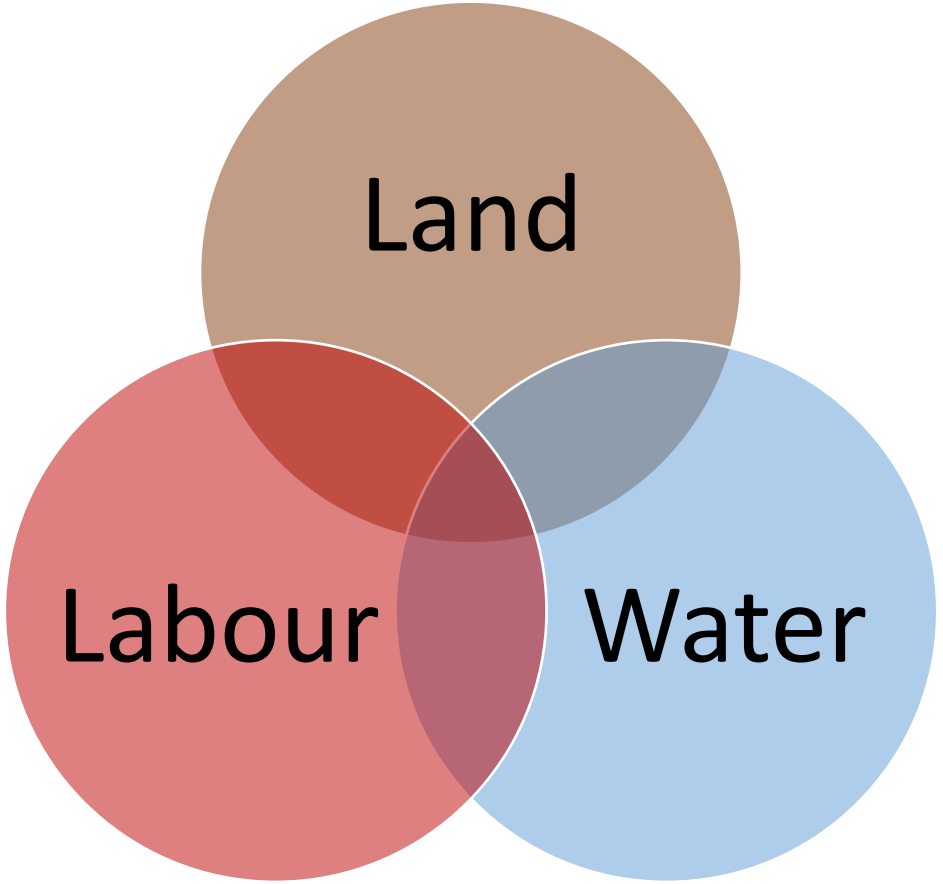
- Get rich quick (Banchirigah, 2008; Hilson and Garforth, 2012)
- Declining fortunes of agriculture, particularly in Africa (Hilson and Garforth, 2012, 2013; Bryceson et al., 2014; Afriyie et al., 2016).
- Vehicle for wealth creation (Hilson and Hu 2022)

Overview of agriculture in sub-Saharan Africa

- Fundamental pillar of numerous economies >> contributor to food security, GDP, employment, and trade.
- Pivotal role in meeting the SDG 1 – zero poverty and 2- zero hunger (United Nations 2015; Giller 2020; FAO et. al, 2023).
- Agriculture remains vital for most impoverished and food-insecure populations residing in rural areas (Andrés Castañeda, 2018).
- Smallholder farmers diversifying into small-scale mining, viewing it as a supplementary source of income (Hilson and Garforth, 2012, 2013; Bryceson et al., 2014; Afriyie et al., 2016; Hilson, 2016a, 2016b; Hilson and Maconachie, 2020b; Mkodzongi and Spiegel, 2019).



Interrelationship between mining and agriculture



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The Extractive Industries and Society

Volume 16, December 2023, 101357

Original article

Beyond legislation: Unpacking land access capability in small-scale mining and its intersections with the agriculture sector in sub-Saharan Africa

Jacob Obodai [a], Giles Mohan [b], Shonil Bhagwat [c]

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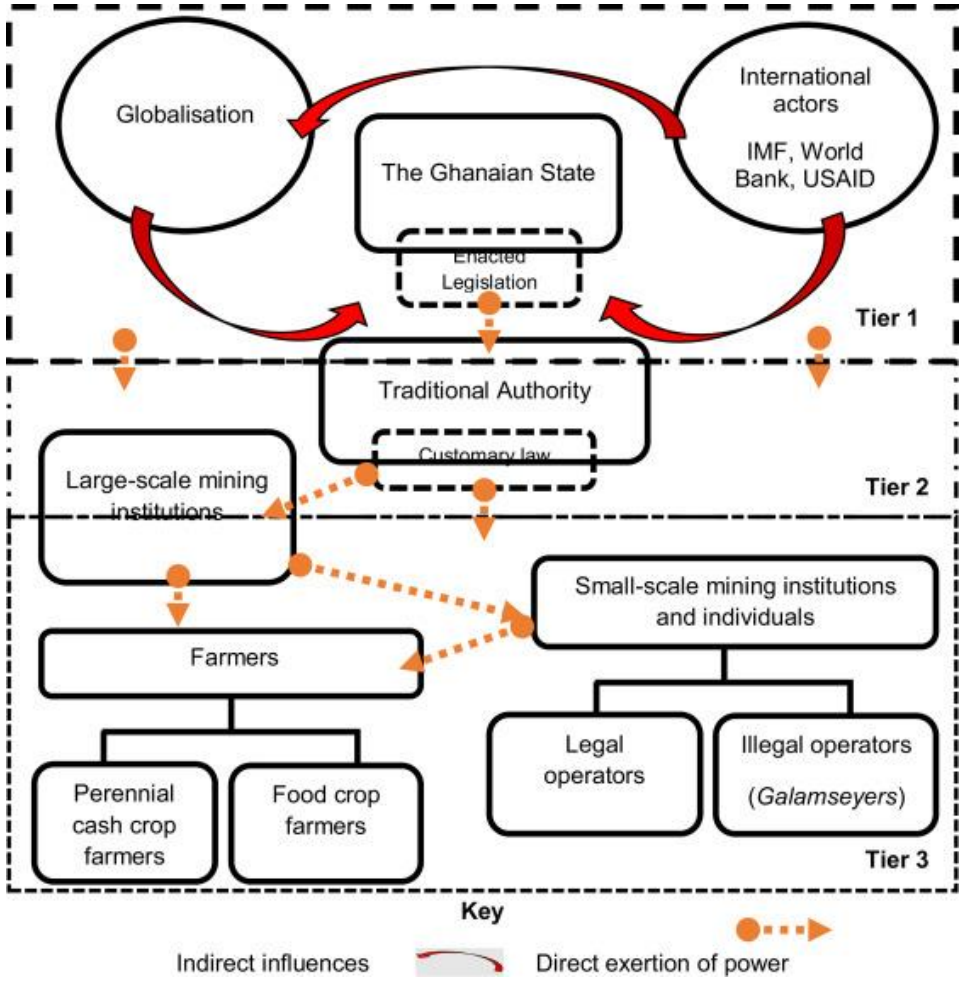
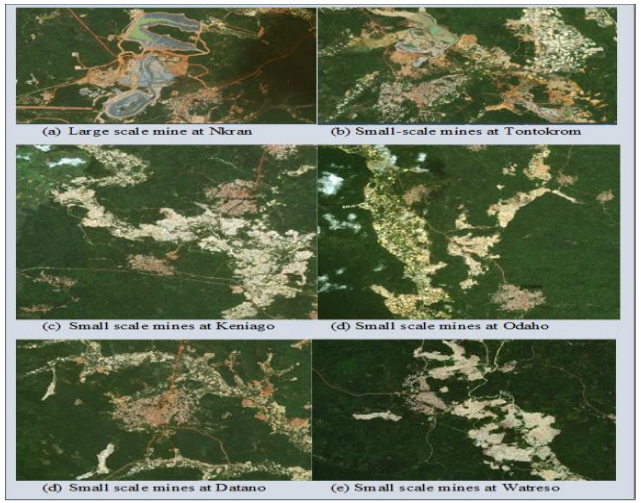


Policy and governance: Power dynamics



Source: ESRI (2021) High Resolution 30cm Imagery

Source: Fieldwork, 2020

Life on land/ Clean Water

- Degraded lands
- Water diversion and pollution
- Deforestation

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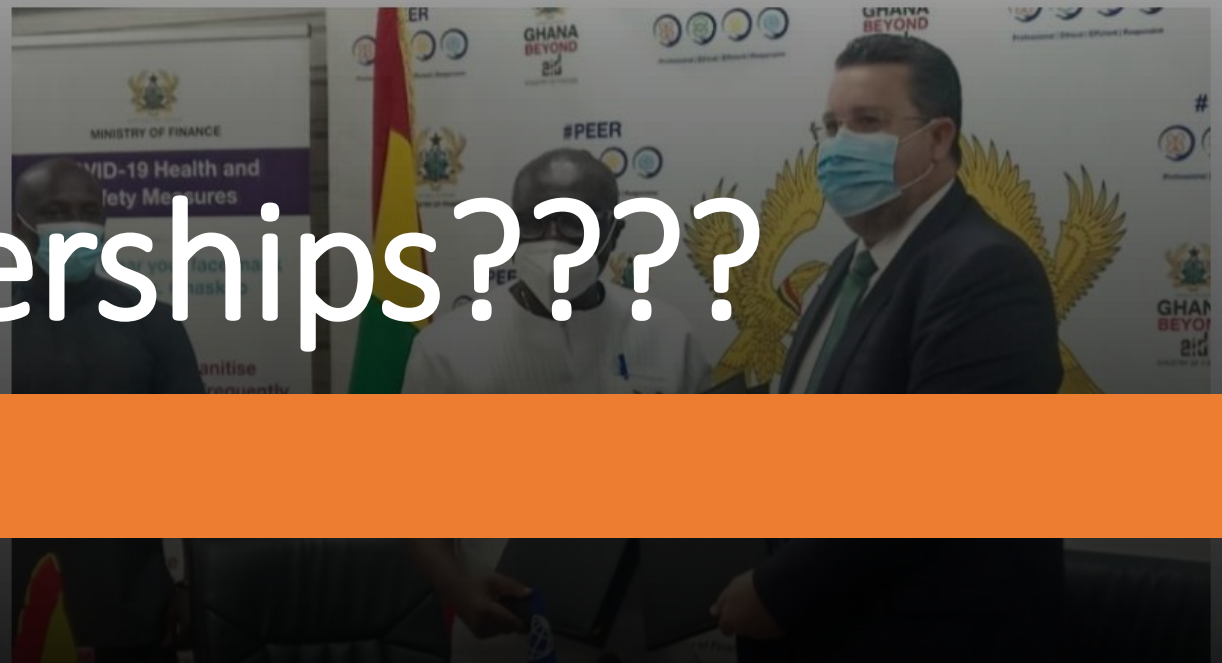

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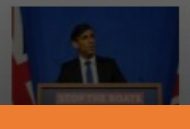

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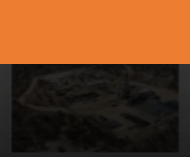

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Gold mining's environmental footprints, drivers, and future predictions in Ghana

Jacob Obodai [a], Shonil Bhagwat [b], Giles Mohan [c]

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Abstract

The last two decades have seen a surge in gold mining operations around the world. Despite mining occupying a smaller geographical area compared to other land use/land cover (LULC) classes, it exhibits strong interconnections with various land uses and serves as a major driver for changes in mining landscapes. Understanding and evaluating historical and potential future LULC changes in these landscapes are crucial in assessing the environmental impact of mining. Traditionally, these assessments heavily rely on geospatial techniques, with limited emphasis on projecting future LULC trends. This research aims to monitor, analyse the drivers of change, and predict future changes in LULC under two scenarios: the “business as usual” scenario and the "remedial measures" scenarios. Utilising the CA-Markov model, this article predicts LULC changes and offers comprehensive insights into the environmental impacts of mining, combining geospatial and social research methodologies. The investigation spanned a 34-year period (1986–

Inequalities

- Turbid water
- Loss of water for vegetable farmers
- Land dispossession
- Fishing

There is **a daily exclusion of 140,000** individuals reliant on water sourced from the Oda river due to elevated turbidity levels. This heightened turbidity leads to the disposal of over 50% of abstracted water, significantly impacting access for the affected population - Ing. Dr Clifford Braimah, Managing Director of the Ghana Water Company.

(Source: Modern Ghana Online 2021)

The concept of food security

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (World Food Summit, 1996)

Sustainability

Food Security Dimensions

Food Availability

Food Accessibility

Food Utilisation

Food Stability

Agency

Impacts on food security: availability

Food availability: a function of food production and trade and constitutes the supply side of food security (FAO 2008).

Poor road infrastructure/ lack of organised markets

Uptake of productive arable lands and farms for mining/ Increased population

- Local food shortages and hunger
- Increased food prices

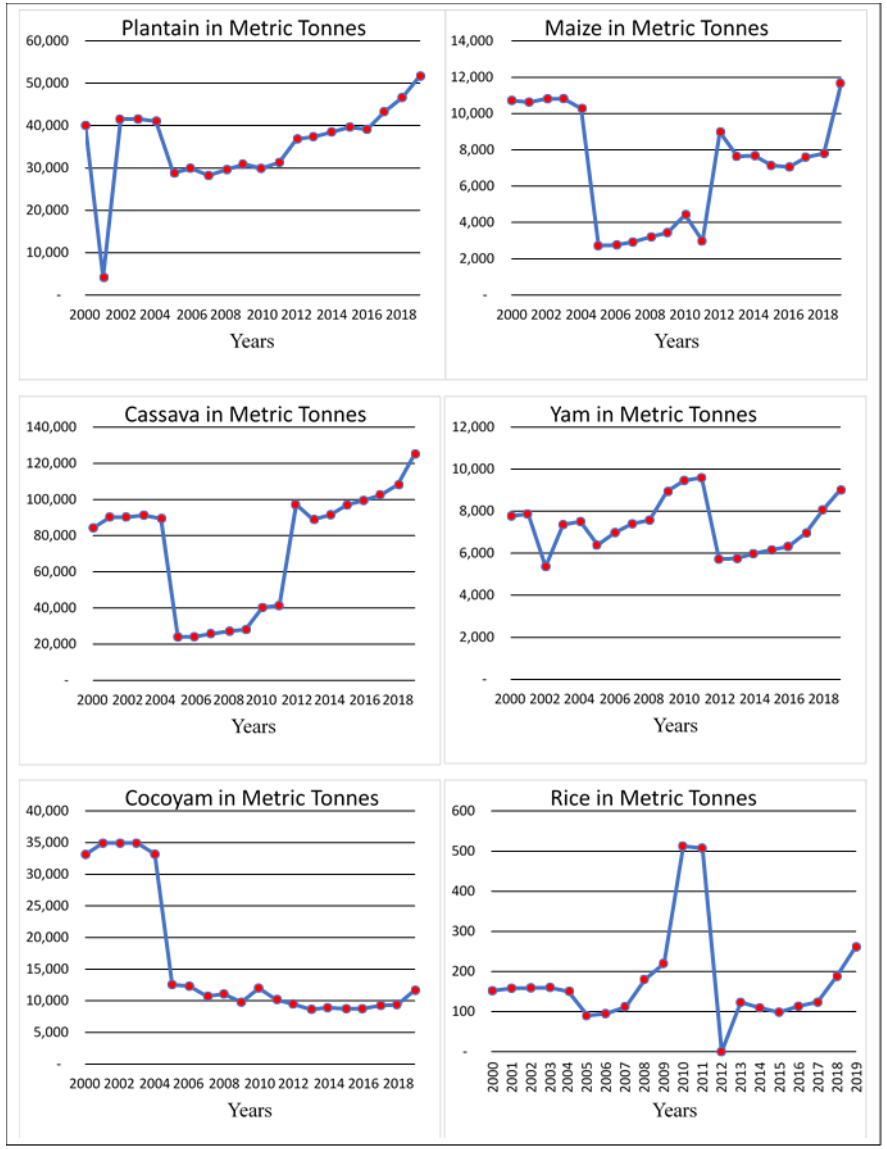


Figure 1: Historical trends in production of major food crop

Some few direct quotes related to food availability

"As I mentioned earlier, all the areas which previously support food and cash crop production have been used for 'galamsey' [illegal mining] activities. Now only a side of the community is used for food thus there are food challenges here If you compare now to years past, there is a significant difference in food available in this community" (KII_008_M_LS).

"It [small-scale mining] has led to hunger in this community. All those who are not able to engage in galamsey activities lack money and the prices of food are expensive here thus they are unable to buy" (SSI_AD003_M_FM).

"Formerly, you will notice people selling foodstuff on their head while others arrange these foodstuffs including plantain (*Musa paradisiaca*), cassava (*Manihot esculenta)*, etc on small tables in front of their houses. However, now, this does not often occur. We must buy such foodstuff from Kumasi, even cassava. Just last three days, I roam this community in search of plantain but did not get some to buy which was not so previously "(ORH_04_AD).

Impacts on food security: access

Food Access: physical, economic and social access to food (FAO, IFAD, UNICEF, WFP and WHO, 2020)

Prevalence rate of moderate to severe food insecurity

- **50.3%**

Prevalence rate of severe food insecurity

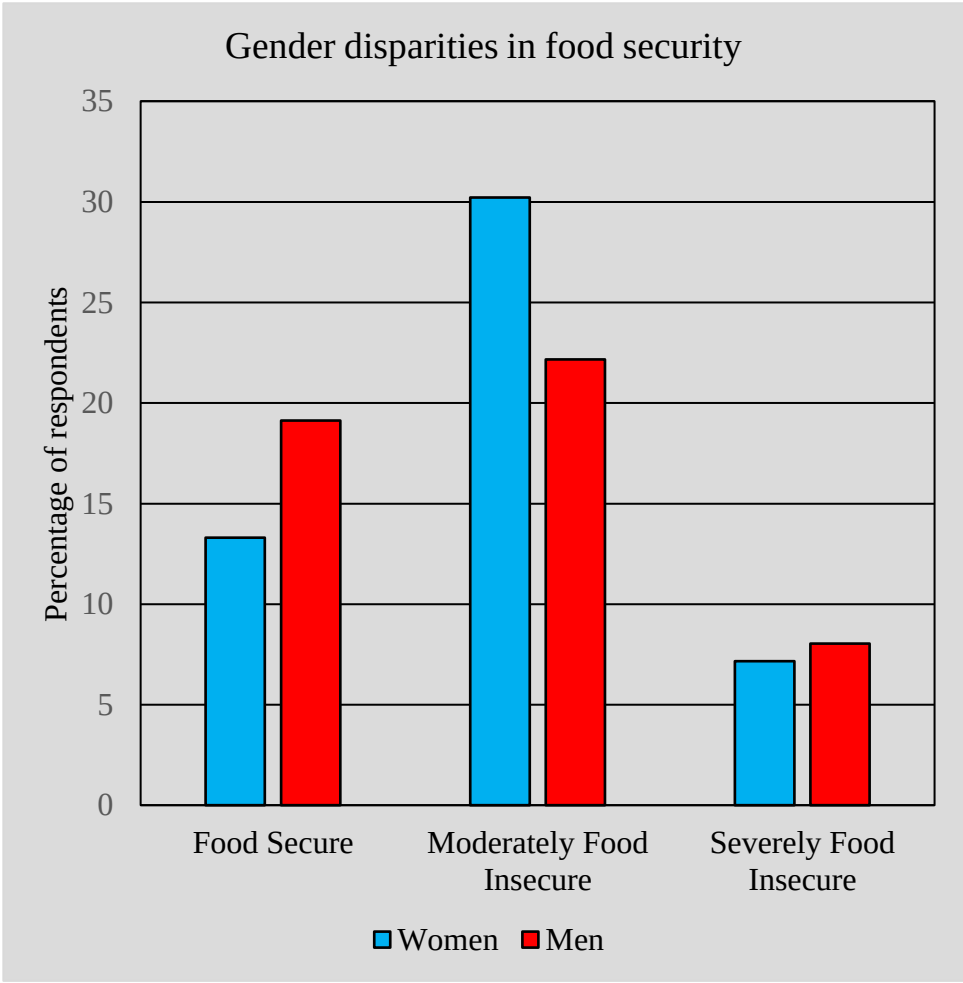
- **13.3%**

Impacts on food security: access con'd

Associations between socio-economic variables and food insecurity: Multivariate pooled linear analysis

Variable		Model 1		Model 2	
		β	(SE)	β	(SE)
Gender (ref: men)		0.801	(0.304)*	0.769	(0.324)*
Age (in years)		0.450	(0.010)*	0.030	(0.013)*
Migration status (ref: native)		-0.364	(0.335)		
Marital status (ref: married)		-0.936	(0.351)*	-0.479	(0.400)
Employment status (ref: employed)		0.474	(0.423)		
Employment type (ref: others)					
	Farming	1.524	(0.332)*	0.812	(0.413)*
	Small-scale mining	0.463	(0.231)*	0.793	(0.235)*
Level of education (ref: basic/no education					
	Secondary	-0.369	(0.187)*	0.087	(0.192)
	Higher	-0.872	(0.271)*	-0.608	(0.314)*
Income (¢)		0.001	(0.001)*	-0.001	(0.001)*
Adjusted R Square					0.125

* $p < 0.05$



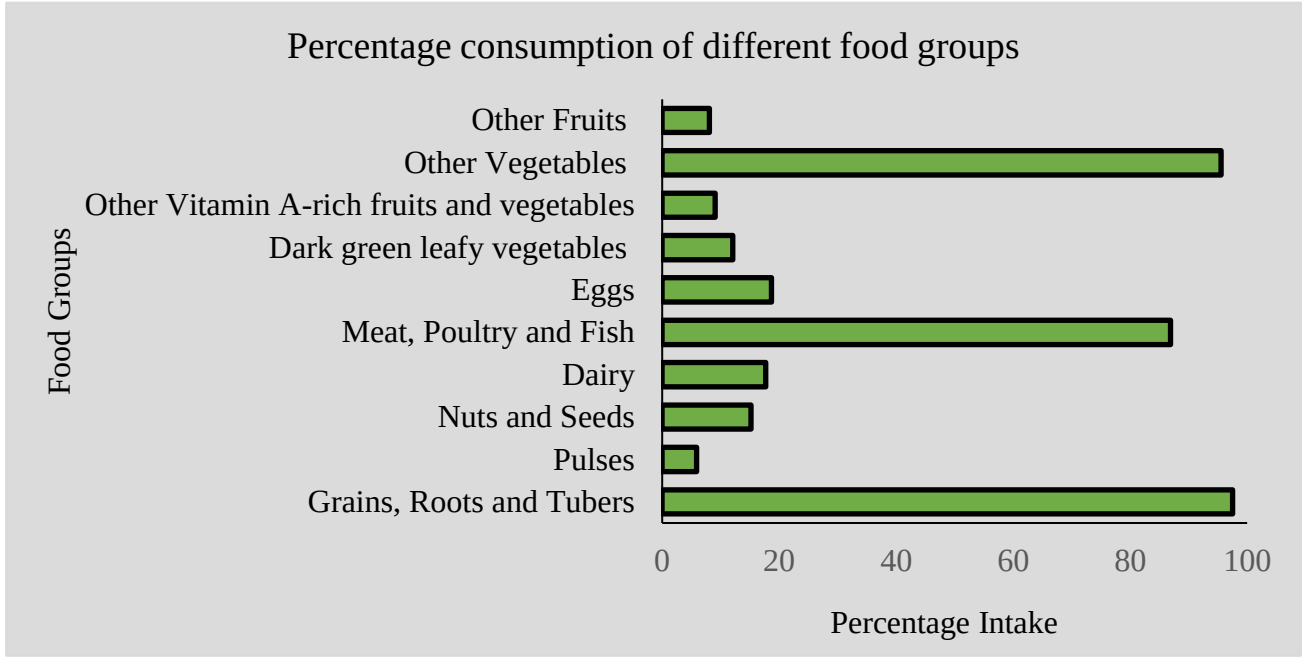
Impacts on food security: utilisation

Food Group	Aggregated 10 food groups
Foods made from grains + White roots and tubers and plantains	Grains, Roots, and Tubers
Pulses (beans, peas, and lentils)	Pulses
Nuts and seeds	Nuts and Seeds
Milk and milk products	Diary
Organ meat + Meat and poultry + Fish and seafood	Meat, Poultry and Fish
Eggs	Eggs
Dark green leafy vegetables	Dark green leafy vegetables
Vitamin A-rich vegetables, roots, and tubers + Vitamin A-rich fruits	Other Vitamin A-rich fruits and vegetables
Other Vegetables	Other Vegetables
Other Fruits	Other Fruits

Source: Adapted from FAO and FHI (2016)

Impacts on food security: utilisation

Food Utilisation: Nutritional adequacy



Variable	Mean ± SD	Total (%)
MDD-W Categories	3.67 ±1.1	
Inadequate		157 (79.3)
Adequate		41 (20.7)

Impacts on food security: utilisation

Threats to stable food availability and accessibility

- Local food shortages and hikes in prices due to land use changes
- Reduced food diversity

Adoption of different coping strategies: few foods, comparatively less healthy foods, skipping meals, or consuming less food at a time

Summary and conclusions

- Gold mining significantly impacts on all the four dimensions of food security

- Women were more likely to suffer food insecurity in mining hotspot
  - Repercussion of children

- The activities of gold mining have great implications for the sustainable development goals 2, 6, 8, 10 and 15.

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