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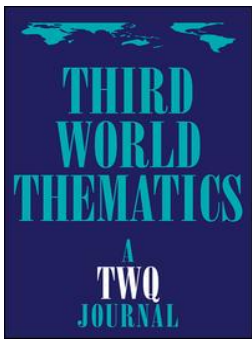
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Artisanal gold mining in Kejetia (Tongo, Northern Ghana): a three-dimensional perspective

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ABSTRACT

Using in-depth ethnographic analysis of Kejetia's artisanal gold mining community in Tongo (Northern Ghana), this article argues that governance is based on artisanal gold miners' three-dimensional orientation towards both 'above-ground' social-political relations and regulations (a geometrically two-dimensional orientation) and the 'subterranean' geological sphere (which literally adds depth and a third geometric dimension). A substance relation to gold also means that its properties and geological context strongly influence miners' micro governance, as do miners' cosmological perceptions of gold's relationship to the above-ground and subterranean spheres. Hence, gold acquisition is embedded in a web of geological, social and cosmological relations beyond actual excavation. Artisanal mining policy and research should recognise the impact of this three-dimensional orientation and substance approach.

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Introduction

Artisanal mining is a subject of interest in a diverse range of scientific and societal fields. This article aims to contribute to a more holistic and in-depth understanding of artisanal mining. This could provide beneficial insights for governmental organisations, environmental organisations, large-scale mining companies and social scientists, to name a few. Artisanal mining is dealt with and perceived very differently by different actors.¹ For example, from an environmental organisation's perspective, (artisanal) mining activities are viewed as a source of (unregulated) deforestation, contamination and (chemical) pollution of rivers, soils and vegetation.² National governments, in their turn, often associate artisanal mining with the occupation of land that does not administratively belong to someone. Or they view artisanal mining as profitable activities on which no taxes are paid – artisanal mining is in many places informally structured and not incorporated in the legal framework of a government.³ Large-scale mining companies may view artisanal miners as difficult to deal with since they are sometimes active on the same ground – artisanal miners may have older, unacknowledged, land rights for areas that are granted as concessions to large-scale mining companies by the government. Conflicts over minerals and land tenure typically combine with, among other things, tensions between political manifestations of the state and the use of (local) 'history'

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to justify claims, and an increased local sense of identity and autochthony.⁴ Artisanal mining is a very diverse practice; for example, it can take place on a very small or very large scale. It can be a side activity in the dry season when there are no yields from agriculture activities.⁵ Alternatively, artisanal miners can be people who happen to live at a place where minerals are found. In other situations, people are driven by poverty to participate in mining activities, when there are few alternative livelihood possibilities.⁶ Artisanal miners are often not included in decision-making processes. In order to obtain better insights into artisanal mining and be able to make adequate mining policies, it is important to engage with and research artisanal miners.⁷

A three-dimensional approach to artisanal mining is used in this article to enhance understanding of artisanal mining. Three-dimensional is meant in a geometric way: the 'above-ground' (two-dimensional) social-political arena on the surface is studied, as well as the subterranean sphere which literally adds depth and a third dimension.

The approach in this article is inspired firstly by the concept of the *social-ecological system*, developed by Ostrom,⁸ and secondly by anthropological literature insisting on researching the geological and substance influences on social organisation around artisanal mining sites.⁹

A social-ecological system is a dynamic complex adaptive system in which resource flows and uses (natural, socioeconomic and cultural) are regulated through a combination of social and ecological systems. In a social-ecological system, 'the natural context' of people involved in common pool resource-related activities should be researched as both an antecedent and consequence of social interaction.¹⁰ To wit, ecosystems and social action are constantly influencing each other and they should not be researched separately, but as dynamic interactions within a social-ecological system.^{11,12} Anthropological fieldwork could provide such research about society-environment interactions for common pool resource systems.¹³ Anthropology's in-depth fieldwork methodology, long engagement in questions of society-environment interactions and broad, holistic view of society have already been shown to yield valuable insights into the science, impacts and policy of climate change.¹⁴ These insights demonstrated the strong mutual influences between human action and ecosystem dynamics, and the need for a more thorough understanding of these connections between human actions and ecosystem dynamics in general.¹⁵

More specifically for this research, anthropological studies have begun to demonstrate the involvement of geological analysis in the study of social structures around artisanal mining. Artisanal mining activities are very mineral specific,¹⁶ and they are highly dependent on the geological structures underground. In 1985, Godoy suggested integrating geological knowledge with economic and sociocultural knowledge of mining.¹⁷ However, most anthropological and social research on mining stayed above ground. Gewalt, in 2010, attempted to support interdisciplinary anthropological, historical and geographical perspectives on gold mining in West Africa by providing an analysis of gold as a geological item.¹⁸ Panella also refers to the importance of a three-dimensional and interdisciplinary perspective on mining:

Anthropological research provides empirical insights into social processes. Secondly, historical research allows for long-term perspectives with which to counter pre-suppositions of empty lands and institutional vacuum. Thirdly, scrutiny of specific sites where both artisanal and industrial mining takes place, shows not just how these ways of mining compete but are also complementary in the three dimensional spaces of co-habitation. Together, this interdisciplinary

knowledge allows investigating broader articulations of mining with other forms of land use as part of long term, dynamic processes of cohabitation.¹⁹

Luning argues that there is often a form of cohabitation on or around mining sites.²⁰ This cohabitation refers to the spatial intertwinement of activities around artisanal mining and large-scale mining, and/or with agricultural activities and settlements. In the quote above, Panella introduces the concept of a 'three-dimensional' approach to mining and points out that to understand the dynamics of cohabitation in mining, anthropological and historical research should be supplemented by geological research of the mining site concerned. Luning and Pijpers also emphasise that in cases of cohabitation and in the analysis of relations between multiple actors around gold mining, a three-dimensional approach is vital.²¹ They show that mining companies can use geological knowledge, in combination with knowledge of artisanal gold miners' struggles with the water level, in company–community strategies. In their upcoming article, they make an interesting analysis of a mining company that used geological knowledge to decide how to govern the concession: artisanal miners 'are given' the upper layer of the ore body, and the mining company knows that it will be able to mine what is underneath the water table in the future. Luning and Pijpers relate this strategy to above-ground pressures in the social field and to subterranean features and the idea of 'vertical reciprocity'.

Different ecological and geological structures require different ways of mining that may have different impacts on the local social–ecological system dynamics. In nature, there are two types of gold: alluvial gold that is often found in river beds (dry gold with about 90–95% purity) and amalgam gold that is located in ore (about 82–90% purity).²² According to Aryee, methods used in the artisanal and small-scale mining (ASM) sector of particularly gold in Ghana can be placed into three groups: shallow alluvial mining, deep alluvial mining and hard rock (lode) mining.²³ Shallow alluvial mining refers to the 'dig and wash' technique, and the hard rock (lode) mining refers to amalgam mining – the latter is discussed in this article. Artisanal miners and large-scale miners may have interests in the same land, but the geological characteristics of the gold in the ground that are suitable for their techniques may differ. Bleischwitz et al. point out that large-scale mining companies mainly need large amounts of minerals in the ground in order to make the settlement of industrial installations profitable,²⁴ while artisanal miners benefit more specifically from high concentrations rather than large amounts of minerals in the ground. Banchirigah and Hilson emphasise that in Sub-Saharan Africa, artisanal mining activities mainly involve substance stocks that are relatively close to the surface.²⁵

This article focuses on the three-dimensional perspective discussed above on mining on a microlevel. Ballard and Banks identify three main kinds of stakeholders involved in mining: governmental agencies, mining companies and local communities.²⁶ All three were part of the research setting for this article.²⁷ However, this article does not assess the three-dimensional relations between these stakeholders. Instead, it takes a three-dimensional approach and zooms in on microgovernance in Kejetia's artisanal mining community. It argues that microgovernance in Kejetia's artisanal gold mining community is based on a three-dimensional orientation of artisanal gold miners and on their substance approach to gold. Orlove and Caton emphasise that a particular piece of matter can be seen by different actors in different ways. Therefore, they mention that matter is approachable as both a resource and a substance.²⁸ A resource view only refers to the economic value of matter, while a substance view allows for social, cultural, cosmological and geological perceptions as well. These

perceptions can differ in time and space and among different actors, and they are worth researching because they influence the way in which actors orientate and organise themselves around the substance. Approaching gold as a substance can take account of both above-ground and subterranean elements that structure artisanal mining; cosmological perceptions of gold, just like the geological context and substance features of gold, are part of such a substance approach and of a three-dimensional orientation.

Microgovernance is in this article defined as the way in which social actors – individuals, teams or organisations – coordinate their activities (formally and informally) to deal with collective problems or to achieve a common goal. Coordination is the way in which social actors adjust their activities to one another.

This article is based on multi-sited ethnographic field research among artisanal gold miners in Kejetia and the political elite of the Tallensi in Tongo.²⁹ Below, the research case is first introduced, including the complexity of the local social–political relations that artisanal gold miners in Kejetia have to deal with due to the many different actors that have made claims on Kejetia's gold and land over the past two decades. Then, the microgovernance of artisanal gold miners in Kejetia is discussed through a description of the implications of starting and running a *ghetto* in Kejetia (*ghetto* is the local English term for a mine) and processing the gold ore. Added to this description are cases of artisanal miners' strategies, thus illustrating both the third dimensional (subterranean) orientation of artisanal gold miners and the details and nuances of above-ground spatial (two-dimensional) governance in Kejetia. The article concludes that policy-makers and researchers that deal with artisanal mining should recognise the impact of the three-dimensional orientation and substance approach of artisanal miners on their mining behaviour.

Kejetia: a local mining history

Kejetia is an artisanal mining area in the village Gbani in Tongo (the administrative capital of the Tallensi district) in north-eastern Ghana.³⁰ Kejetia and neighbouring mining communities were established in the mid-1990s.³¹ Kejetia, though situated among sparsely populated farmland and bush, resembles a small town, and gold mining takes place among mud-block homes and a variety of small businesses, including food vendors, *pito* (millet beer) brewers, seamstresses, petty traders and mechanics.³² An official with the Minerals Commission estimated that the 2010 population was about 2500, although the transient nature of mining communities makes this difficult to approximate.³³ Both men and women participate in above-ground artisanal mining activities and enterprises and above-ground gold processing activities in Kejetia. Typically, (young) men in Kejetia participate in artisanal mining activities to earn money to build a home or marry a wife. Also, both men and women typically attempt to earn money to go to school or send their children, brothers or sisters to school. Only men go under the ground to mine gold, which is explained by many people in Kejetia, both men and women, in terms of physical strength and fear. This is unlike explanations in literature about artisanal mining in Burkina Faso, where this is attributed to the fact that women's traces of sexual interaction or menstrual blood might chase away the gold.³⁴ Many miners state that their work and residence in Kejetia are temporary; however, these miners often have been working in Kejetia for many years, sometimes since the origin of Kejetia. Over the past two decades, many different actors have made claims on the gold and

land in Kejetia. Artisanal gold miners in Kejetia therefore have to deal with complex local social–political relations.

In 1984, the Tallensi king and paramount chief of Tongo founded Gbani and *enskined* (made chief) the Gbani chief (who remains the Gbani chief to the time of writing).³⁵ Ten years later, in 1994, gold was found in Gbani and the gold mining community Kejetia emerged. Now, people from all over Ghana as well as from Burkina Faso, Togo, Benin and Nigeria are involved in artisanal mining activities in Kejetia. All of these people that are coming, staying and going are together part of Kejetia; however, many informal power relations and opportunities to acquire access to gold are also explained by artisanal gold miners in terms of who is autochthonous and who is ‘a stranger’ in Kejetia. Artisanal miners who are from Tongo and belong to the Tallensi are seen as autochthonous by both artisanal miners and the local authorities. Artisanal miners from other parts of Ghana and neighbouring countries are often perceived to be strangers. People from Tongo, and especially from the chief family from Tongo, have a powerful position in Kejetia due to their strong relation with the representative chief in Kejetia, who is a local authority in Kejetia – this is further explained below. When the artisanal gold mining activities in Kejetia came to be established, another powerful actor entered the picture.

Artisanal miners narrate that in 1996, the Minerals Commission ‘discovered’ the artisanal mining activities in Kejetia and proclaimed that artisanal miners had to apply for a small-scale mining concession (and that in 2013, artisanal miners were again obliged to register).³⁶ This happened following the policy to legalise the small-scale and artisanal mining sector.³⁷ Through a system of registration, Ghanaian prospective artisanal gold miners are required to apply for a license for entitlement to work a 25 ha plot of land.³⁸ This obligation relates only to Ghanaian miners, which points to the Minerals Commissions’ broader understanding of all Ghanaians, regardless of their being autochthonous or stranger, as being equally entitled to make claims on the gold in Kejetia. Ghanaians who are originally strangers in Kejetia use in particular these concessions to legitimise their claims on the gold and to acquire a more secure position in Kejetia. The application for a small-scale mining concession needs to be addressed to national governmental agencies. To wit, in Ghana, the state is the ultimate owner of all underground mineral wealth.³⁹ However, artisanal gold miners often have to deal with land surface rights that are locally regulated based on long historical practices and land rights. This requires artisanal gold miners to orientate themselves within complex, multidimensional social–political regulations; subterranean minerals and land surface have different lines of authority. This is also the case in Kejetia and is further discussed below. The coming of the Minerals Commission gave rise to a new sort powerful actor in Kejetia: the *concession leader*. Concession leaders are artisanal miners who have received a small-scale gold mining concession from the Minerals Commission and sell or sublet pieces of their land to other artisanal miners in Kejetia. Most, but not all, concession leaders in Kejetia are from Tongo; foreigners often legitimise their claims on gold through concession leaders.

In 2008, the Shaanxi Mining Company (GH) Ltd. (a foreign, service-providing, Chinese mining company) started prospecting in Gbani and in 2011, the company started operating. Since 1983, many foreign mining companies have started operating in Ghana, as a result of the Ghanaian national Economic Recovery Program (ERP).^{40,41} Shaanxi provides services on the concession of the son of the Gbani chief: a representative chief in Obuasi (a neighbouring gold mining community to Kejetia).⁴² Due to a lack of communication (by the representative chief and the company), the coming of Shaanxi was accompanied with dissatisfaction,

rumours and confusion among the artisanal miners in Kejetia, which is partly localised in their perception of subterranean geological structures.

Artisanal gold miners, not being involved in the decision-making process and agreements with Shaanxi, expected that Shaanxi would cooperate with them and bring developments to Kejetia such as economic growth, water supply and sanitation. These expectations were not met. When Shaanxi built a bridge from Kejetia to another gold mining community in 2013, artisanal gold miners perceived this as a threat: an attempt to create ways to mine outside their concession. The artisanal gold miners demonstrated, showing banners that expressed their dissatisfaction and blowing up one of Shaanxi's industrial machines. Since then, a police team visits Kejetia every week. Artisanal gold miners claim that the tension has decreased due to the police teams and the fact that the boundaries between Shaanxi and the artisanal mining (both underground and above ground) have become clearer. However, artisanal gold miners in Kejetia still very much perceive an unequal power relation between themselves and Shaanxi: they say that, '*the Chinese* have machines while we have only man power'. Some emphasise their expertise in (organising) mining activities and pursue a similar alignment to the one that the Obuasi representative chief made with Shaanxi: 'if I could have [private or state] investors and service providers for my concession, I would make the same deal'. Artisanal gold miners' (social-political) perceptions of their power in relation to Shaanxi are also embodied in their interpretations of subterranean geological structures. For example, some artisanal gold miners in Kejetia are convinced that Shaanxi built a concrete wall under the ground to block the way for artisanal gold miners and to create more mining space for the company.

The current Tallensi king and paramount chief of Tongo (since April 2015; at the time of the research, he was the supreme prince of Tongo) is also dissatisfied with Shaanxi. He is convinced that the land and gold in Tongo originally belong to the Tallensi and to his father, who founded Gbani. The Tongo chief believes that the arrangement with the foreign mining company is disadvantageous for 'his people'. The claims that he makes on Gbani's gold (mining communities) are in terms of autochthony arguments and the issue of 'who was here first'. Here, the paramount chief of Tongo struggles with the subsoil mineral ownership of the Ghanaian state while he makes political claims on Kejetia's land and subterranean gold based on long historical practices and land rights. This use of autochthony claims in terms of 'who was first' cannot be seen as classical or traditional, but it is a typical, modern, phenomenon of the twenty-first century as part of the implications of globalisation.⁴³ As more and more people are able to legally claim local resources (such as land or minerals), people (all over the world) tend to emphasise their autochthony and use this as to legitimise first rights over these resources. This is visible in Tongo, as a result of migration to the mining area and the privatised mining sector in Ghana. As described in the next paragraph, artisanal gold miners who are from Tongo also have more power in Kejetia than people who are not from Tongo. Artisanal miners who are not from Tongo, in their turn tend to legitimise their claims on land through the legal framework of the national government, even when stating that they do not view the government as a relevant, present or visible actor in Kejetia – many artisanal miners (both from Tongo and from elsewhere) perceive Kejetia as its own country.

Above-ground social-political relations in Kejetia have been complex and dynamic in the described local mining history of Kejetia. Next, the article shows how the

three-dimensional (above-ground and subterranean) orientation of artisanal gold miners relates to microgovernance in Kejetia.

A three-dimensional orientation: starting a 'ghetto'

Artisanal gold miners in Kejetia base their mining strategies on a three-dimensional orientation. The complex combination of an underground geological orientation and an above-ground social–political orientation originates with the beginning of a *ghetto* (*ghetto* is the local English term for a mine).

A strategy for beginning a *ghetto* is geological orientation, prospecting for gold. Multiple rows of small holes in the ground (rows of ghettos) are visible on Kejetia's land. Artisanal gold miners in Kejetia know that gold is usually in the ground in lines (gold veins). They know that ghettos in one row probably lead to one subterranean gold vein. The best way to find a good place to mine is thus to start by exploring the ground at the ends of the ghetto rows, where there is a good chance that powder gold (small amounts of gold dust) can be found that will lead to a gold vein.

Above-ground orientation is combined with the geological orientation; artisanal miners need to socially and politically position themselves in order to facilitate their mining activities. Who can give them permission to use the targeted land or to extract gold from the ground? In Ghana, subterranean mineral ownership and surface land ownership are regulated through different actors and regulations. The state is the ultimate owner of subsoil mineral wealth.⁴⁴ However, artisanal miners often deal with 'surface rights' that are locally regulated and based on long historical practices and land rights.

To use land in Kejetia, artisanal miners need permission from Kejetia's representative chief and representative *tindana* (spiritual land owner) – from now on, they are called simply 'chief' and 'tindana' in this article.⁴⁵ In return for permission, artisanal miners will give them a portion of the profit. The relationship with the chief is valuable for artisanal gold miners. To wit, the chief is the one who mediates when conflicts arise between artisanal miners; these conflicts often involve subterranean encounters of artisanal miners. The *tindana* mediates in cases of geological or spiritual trouble with the underground (such as a collapsed ghetto or a lack of gold in the ground) by sacrificing a chicken, goat or cow to satisfy the spirits and ancestors of the land – below, this article elaborates on artisanal gold miners' cosmological perceptions of the relations between the *tindana*, gold, spirits and ancestors. Subterranean encounters, geological matters and spiritual matters are thus part of artisanal miners' above-ground social–political orientation with regard to land use.

To extract gold from the ground, artisanal miners also need a concession for small-scale mining from the Minerals Commission (as discussed above). However, only Ghanaians can apply for a concession⁴⁶; foreigners have to find other ways to begin artisanal mining. In Kejetia, concession leaders play a large role in artisanal gold miners' access to subterranean gold. Concession leaders usually own about 25 acres (about 10 ha) of land. One way for foreigners (or other miners) to enable mining activities is to ask the concession leader for a part of the land in exchange for a share of the profits.⁴⁷ The complex multidimensional regulations, in which artisanal gold miners have to engage, make it all the more important for artisanal gold miners to position themselves well, socially and politically, towards powerful actors such as the chief, the *tindana* and concession leaders.

Issues of access to subterranean gold can highlight informal power relations between artisanal gold miners in Kejetia, relations that are, as mentioned above, for a large part explained in terms of people 'being from here' (being autochthonous, from Tongo) or 'being a stranger'. For example, artisanal mining teams from Tongo have a stronger voice with the mediating chief when they encounter with other mining teams under the ground – such underground encounters are caused by different mining teams following the same gold veins. Furthermore, Kejetia's committee of concession leaders mostly consists of concession leaders from Tongo. A concession leader from Bolgatanga remarks that some concession leaders from Tongo abuse their power in subterranean competition or conflict.⁴⁸ Therefore, this concession leader deliberately joined the committee of concession leaders to strengthen the power of people from outside of Tongo. A distinction between autochthones and strangers seems to be emphasised in artisanal miners' stories of subterranean competition.

Artisanal miners' intentions to comply with above-ground social–political regulations, mainly with the legal framework of artisanal mining, are sometimes challenged by their three-dimensional orientation. Artisanal miners state that they want to mine within the legal framework and that many mines in Kejetia are legal.⁴⁹ However, the process of getting permission for a concession is complex and takes a long time and artisanal miners cannot always ignore geologically urgent situations (especially when poverty is pressing); during above-ground social–political arrangements, a subterranean geological issue can arise. To illustrate this, an artisanal miner might be waiting for permission for a concession while the mining team of the ghetto right next to his land is suddenly finding lots of gold. Then, there is a good chance that the other mining team will soon come close to the ground under his land by following the gold vein. The artisanal miner cannot risk other miners getting to the gold under his land: he has already invested in relations with the chief and tindana and in exploring the ground of that land, so he cannot afford to wait and lose what is possibly 'his' gold. In cases that ghettos from different mining teams meet under the ground, the mining teams mostly come to an agreement or ask the chief to intervene. However, if a miner is not yet under the ground, there is a good chance that the other mining team will just keep following the gold vein under his land. The geological orientation of artisanal gold miners in Kejetia can, in these cases, overshadow their social–political orientation.

Going under the ground

Subterranean artisanal mining activities in Kejetia are a result of miners' three-dimensional orientation and their substance approach to gold. This is argued and illustrated with an explanation of microgovernance of underground mining activities.

When an artisanal gold miner in Kejetia has permission to mine (has made an agreement with the chief, tindana and the Minerals Commission or a concession leader), he needs a team for his mining activities. All artisanal miners in Kejetia work under the ground in teams – although many artisanal gold miners in Kejetia perceive mining as an individual 'everyone on their own' process: 'if you are not there, you will not get your share'. These teams for subterranean activities only include men and can consist of 10–100 miners. The organisation of subterranean mining tasks and teams depends on the subterranean geological structures that are found. The general tasks in a mining team are: sponsor, ghetto owner, gang leader,

Table 1. Names and descriptions of geological features by artisanal gold miners in Kejetia.

Name	Description
Stone	Stones that contain gold; ore
Rock or waste	Stones that do not contain gold
Gold-rock	Layered stones with both gold-containing layers and 'no gold' layers
Bulk	Huge piece of gold-containing stone (<i>blast man</i> needed)
Package	Many small pieces of gold-containing stone (<i>chisel man</i> needed)
Gutter	Gold line, both vertical and horizontal
Rainbow	Bent gold line
Table	Square of gold-containing rock (which you stand on)
Lane	Horizontal <i>ghetto</i> following a horizontal gold line (like a subterranean street)
Ceiling	Stone that contains gold (vein) (above your head)
Powder gold or powder money	Gold dust in ore (small amounts)
Nugget	Big pieces of gold in ore

blast man, drill man (*moyee man*), chisel man (*chiseler*), security man and local boy. Not every team has the same structure, but most teams are very similar.

The *owner* of the concession can also be the owner of a ghetto. A ghetto owner has to take care of his mining team; arrange the mining tools; and give his workers money for food. This is an expensive responsibility, especially in the beginning when the big nuggets of gold have not yet been reached and there is only some powder gold in the stones (Table 1). In such a situation, ghetto owners often decide to take a *sponsor*. The sponsor will invest in the mining activities and over the years, the ghetto owner will pay him or her back, with interest. Furthermore, he has to sell his gold to his sponsor (who is also his *buyer* now) for a relatively small price. The ghetto owner might choose to also take up the role of *gang leader*, which means that he is the one who gathers the required workers when certain activities need to be done. This can be a complicated responsibility because many miners move frequently between Kejetia and their home towns; not all team members are always in Kejetia because their family might be in their home towns or villages.

The first hole in the ground is made by the *drill man*. He drills a hole in the surface in the shape of dynamite. Then, the *blast man* uses dynamite, electric wire and a wick to blast away the first stones. With this method and by following the powder gold, a square or round vertical hole (roughly one and a half meters in diameter) is shaped: a ghetto.

Under the ground, a mining team will find different kinds of stone. Artisanal gold miners in Kejetia have a rich terminology for subterranean geological features. They define subterranean geological structures by their containment of gold, the direction of gold veins and by the position of gold-containing stones in relation to the position of the artisanal gold miners themselves (Table 1). Artisanal gold miners in Kejetia base their day-to-day mining strategies on their understanding of the subterranean geological structures and cosmology.

During the digging process, an artisanal miner has to keep orientating himself three-dimensionally; he has to anticipate and react to social above-ground factors, geological subterranean factors and also to cosmological relations. An artisanal gold miner illustrates this with the following experience:

Currently, our team has a problem. Our ghetto owner has always been both our ghetto owner and our sponsor. He had a lot of money, but it vanished. He said that he had to help some people, maybe his family. But now, the people don't want to help him back. Our ghetto owner doesn't want to take a sponsor, because he has always done it alone and he doesn't want to be dependent. So there is no money to eat or work, but the work is there – there is gold in the

ground! I called all the local boys together to discuss. We decided to all disappear for a while, to go on a strike. But now the situation is pressing, because we realized that we have reached a Lane (Table 1)! We know that the Lane has a lot of gold, because we saw other mining teams that reached that same Lane taking a lot of money. We have to hurry, we don't want other ghettos to follow the Lane with gold all the way to our ghetto. Our ghetto owner is now trying to get the people and tools ready again. Definitely we will get there and hopefully we will get a lot.

This story shows the *social–political–geological* three-dimensional orientation of his mining team. To wit, a social strategy (the strike) is interrupted by a geological urgent situation (the Lane) and the anticipation of a social conflict because of the Lane. The case also touches upon a perception of gold that is typical for many people in various West African countries. I will elaborate shortly on this because it enables me to discuss some of the *cosmological* three-dimensional orientations of artisanal gold miners in Kejetia regarding gold, land and gold mining – and to compare that with literature on miners' cosmological perceptions in various West African countries.

The miners' remark about the 'vanished money' corresponds with a perception that artisanal gold miners in Burkina Faso have, namely: that money acquired through gold is 'bitter money'.⁵⁰ Following this perception, 'bitter money' cannot be the basis for lasting prosperity. The reason for this is that gold belongs to ancestors and land spirits – a perception that is also common among the Malinke (who live in multiple West African countries).⁵¹ According to the idea of 'bitter money', ancestors will punish the seller of the gold by 'following' the money flow that originated from the gold. That is why money acquired through gold, according to the idea of 'bitter money', should be spent on luxury goods rather than on primary needs. Werthmann explains that people in Burkina Faso do continue to be involved in artisanal gold mining for several reasons: poverty (Jansen nuances this),^{52,53} the belief that ancestors and spirits can be satisfied with sacrifices and because younger generations attach less value to the idea of 'bitter money'.⁵⁴ Artisanal gold miners in Kejetia also relate spirits and ancestors to gold and the underground – the *tindana* has a role in intervening in these relations, which is illustrated later in this section. The miners spend the money acquired through gold in various ways. Home building, marriage and school were common answers to the questions about why people were involved in artisanal gold mining – which differs from the idea that money acquired from gold is 'bitter money' and should not be spent on primary needs. However, many artisanal gold miners also spend lots of the acquired money on alcohol and marijuana. Artisanal gold miners explain that they do this in order 'to get the strength to do the hard work and go under the ground again'. They often hope to, one day, find a lot of big gold nuggets that would enable them to go back home rich (and not have to come back to Kejetia again).

It is remarkable that some artisanal gold miners in Kejetia, who do relate gold to spirits and ancestors, also refer to the extraction of gold as *cultivation*. This seems to move away from the concept of *hunting* for gold, which the above-mentioned Malinke relate to the idea that gold belongs to spirits and ancestors. To wit, gold mining requires the skill to both work in the bush and to please the spirits while stealing the gold, as is the case with hunting activities.⁵⁵ This approach to gold mining implies that gold has a wild nature. However, perceiving gold mining as cultivation seems to imply a much tamer nature, making gold mining (from a cosmological perspective) less dangerous and more like harvesting.

The relation between microgovernance and cosmological perceptions is noticeable in (among other things) the taboo in and around Kejetia on mining on Fridays. Some artisanal

gold miners in Kejetia mention this taboo: on Friday, the land has to rest and the ancestors (the owners of the gold) should be left alone. However, some artisanal gold miners choose to go under the ground to mine on Friday anyway – also, not all artisanal gold miners in Kejetia mention ancestors and spirits in relation to gold, land and their gold mining activities.

An anecdote about a collapsed ghetto illustrates the cosmological perceptions of gold and land in Kejetia and their influence on governance: in November 2014, a ghetto in Obuasi (Kejetia's neighbouring artisanal gold mining community) collapsed when artisanal miners were under the ground. Some artisanal gold miners claimed that this happened because the miners in the collapsed ghetto went mining on a Friday. According to them, the miners in the collapsed ghetto should not have disturbed the land spirits. The tindana (who knows much about the land, land spirits and ancestors) found out that the ancestors and spirits of the land had not been satisfied and he sacrificed a cow after the collapse of the ghetto to satisfy the ancestors and land spirits again. The tindana works together with the chief. When the tindana believes the underground is safe to work again, the chief allows artisanal miners to continue their work.

As people in Kejetia come from very different places (within Ghana and from neighbouring countries), perceptions and beliefs regarding land and gold are diverse. However, during the research, it became clear that for all artisanal gold miners in Kejetia, the possibilities of acquiring gold are embedded in a web of social and cosmological relations and obligations that go beyond actual excavation. This makes gold a *substance* for artisanal gold miners rather than a *resource*.

An artisanal miner gives another example of geological structures that create social tension:

In our ghetto we have gutter stone and ceiling stone (Table 1). When we get ceiling stone, we have to be fast! Because it contains a lot of gold and it moves towards the ghettos of other miners; the risk is that other mining teams might find it before we do, because the gold is closer to the surface a few meters from our ghetto (where the other teams ghetto is).

In this case, the direction of the gold line (going up) increases the chance that other mining teams will reach the gold line before this miner's team can cultivate the gold. This creates urgency within the mining team and a possible underground conflict with the other mining team in which the chief would have to mediate.

The subterranean water level is also an issue for artisanal gold miners in Kejetia. A shop owner and sponsor states that the water in ghettos limits the work of artisanal gold miners:

At the moment, there are only a few people in Kejetia because there is no work now. There is water in the ghettos, so they first have to pull out the water. They have been pulling the water out of the ghettos for three days now, I think after another four days they are done. When the water finishes, a lot of people will come. It will be busy in Kejetia! A lot more busy than now.

When a mining team finally reaches more profitable gold ore, the team has to assess what kind of gold ore they have reached. The subterranean geology determines what strategy the miners prefer to use and what kind of mining expertise is needed. For example, a mining team might reach a Bulk stone. The ghetto owner generally prefers the *chisel man* to chisel away the useful ore because this saves the cost of the dynamite (Table 1). However, a hammer and chisel work for Package stone, not for Bulk stone so it is up to the *blast man* and *drill man* to separate the rock (waste) from the stone with dynamite. The *local boys* have the job

of carrying the waste up to the surface. Ghetto owners in some cases decide to leave the Bulk stone hanging under the ground for a while. This can be for several reasons. First of all, he does not want the stone to get mixed up with the waste. Secondly, the team wants to take the stone down together, with everybody there, in order to make sure that the stone is fairly divided. Finally, when a mining team waits to take up a large amount of stone, they can keep a bigger total portion for themselves. To wit, every time an artisanal mining team takes up stones, they have to give something to the chief, tindana and the sponsor – furthermore, if a team can process many stones at the same time and thus get more gold at the same time, they can use a piece to sell to (and satisfy) their sponsor and also use a piece to hide from their sponsor and sell to someone they do not owe, for a higher price. Some mining teams have a *security man* to prevent the artisanal miners that work under the ground from taking little pieces of stone or to protect Lanes from other mining teams.

Above the ground: processing the gold ore

When the Bulk stone has been taken down, all team members get a share of the stones (Table 1). They process their stones together, separately or in groups – this is different for every team. The concession and ghetto owner get a large portion of the stones. Then, it is time to process the stones in order to acquire the gold. The main activities of gold ore processing are crushing and grinding the stones, washing the stone dust and using mercury to capture the gold from the last mix of water, stone dust and gold dust. The above-ground gold ore processing activities, in which both women and men participate, are for a large part based on the substance features of gold: weight, smelt temperature and the ability to attach to mercury. The substance features of gold, and the gold ore processing techniques required for those features, determine a large part of the above-ground social organisation of the artisanal gold mining community in Kejetia.

Conclusion

Using in-depth ethnographic analysis of Kejetia's artisanal gold mining community in Tongo (Northern Ghana), this article argues that governance is based on artisanal gold miners' three-dimensional orientation towards both 'above-ground' social-political relations and regulations (a geometrically two-dimensional orientation) and the 'subterranean' geological sphere (which literally adds depth and a third geometric dimension). A substance relation to gold also means that its properties and geological context strongly influence miners' microgovernance, as do miners' cosmological perceptions of gold's relationship to the above-ground and subterranean spheres. Hence, gold acquisition is embedded in a web of geological, social and cosmological relations beyond actual excavation. Artisanal mining policy and research should recognise the impact of this three-dimensional orientation and substance approach.

The complex multidimensional regulations, in which artisanal gold miners have to engage, make it important for artisanal gold miners to position themselves well, socially and politically, above-ground. Above-ground social-political (f)actors, on which Kejetia's miners orientate themselves, are mainly the chief, the tindana, the Minerals Commission of the Ghanaian Government, concession leaders, competing mining teams and the issue of 'being autochthonous' or 'being a stranger'. Orientation on these (f)actors enables miners to

(strategically) undertake their (subterranean) mining activities. Claims to land and gold in Kejetia are legitimised through various mechanisms. Artisanal miners who are autochthonous (from Tongu) generally legitimise their claims in terms of 'who was first'. They often have a strong relation to the chief in Kejetia, which is beneficial in subterranean conflicts. Artisanal gold miners, especially Ghanaian miners that are perceived as strangers in Kejetia, also use the legal framework of the national government (sometimes through arrangements with concession leaders) to claim land and gold in Kejetia. Above-ground orientation is always combined with subterranean orientation.

Subterranean geological factors and substance features of gold are as well part of Kejetia's artisanal gold miners' orientation. The organisation and strategies of subterranean mining tasks and teams are very much based on subterranean geological structures. The direction of subterranean gold veins are in particular strongly related to social tensions and conflicts: Is a gold vein moving to the direction of another ghetto?, Is another mining team coming in the direction of your ghetto by following a gold vein?, Is your team going to encounter another mining team under the ground and what will then happen?⁵⁶ Above-ground gold ore processing activities also make up a large part of the social organisation in Kejetia and are based for a large part on substance features of gold: weight, smelt temperature and the ability to attach to mercury.

Artisanal gold miners' cosmological perceptions of gold and land also contribute to micro-governance in Kejetia. Artisanal gold miners often view gold as belonging to ancestors or land spirits. The possibilities for Kejetia's artisanal gold miners to acquire gold are embedded in a web of social and cosmological obligations and relations – which are typical for social-political relations in Northern Ghana – beyond actual excavation. This means that to understand organisation and microgovernance in artisanal gold mining communities, we should research this web of social and cosmological relations and approach gold as a substance and not as a resource. This approach would enable understanding of social, cultural, cosmological and geological perceptions as well as economical perceptions of gold.⁵⁷

The three-dimensional orientation of Kejetia's artisanal gold miners differs from the orientation of most policy-makers. Policy-makers tend to orientate themselves socio-politically and above ground. In order to deal adequately with artisanal miners, policy measures and studies that consider artisanal mining should comprehend the impact of the three-dimensional orientation and substance approach of artisanal miners on the dynamics of their mining behaviour. Policy-makers and researchers should therefore be aware of the pitfalls of literally overlooking subterranean contributions to above-ground artisanal mining micro governance.

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Notes

1. Hilson, 'Foreword', x.
2. Hilson, 'Structural Adjustment in Ghana', 54, 67.
3. See note 1 above.
4. Lund, "'Bawku is Still Volatile'", 587; Geschiere, *The Perils of Belonging*, 16–19; Bavinck et al., 'Introduction', 6; Wilson and Tisdell, *Conflicts, Resources and Environment*, 1.
5. Grätz, 'Gold Trading Networks', 152.
6. Banchirigah and Hilson, 'De-Agrarianization, Re-Agrarianization and Local Economic', 157.
7. Hilson, 'Foreword', xi.
8. Ostrom, 'A General Framework', 419.
9. Ballard and Banks (Godoy), 'Resource War', 307; Panella, 'Gold Mining in West Africa', 2–3; Luning and Pijpers, 'Co-habitation in 3D', 1.
10. Boons, 'Organizing Within Dynamic Ecosystems', 284.
11. See note 10 above; See note 8 above.
12. Ostrom furthermore presents a framework for the social–ecological system. She connects (S) social and cultural settings, (ECO) the related ecosystems, (U) users, (RU) the resource units, (RS) the resource system and finally (GS) the governance system. She presents as well 10 variables that influence the way in which people locally self-organise and structure themselves around resources: (1) size of resource system, (2) productivity of system, (3) predictability of system dynamics, (4) resource unit mobility, (5) number of users, (6) leadership, (7) norms/social capital, (8) knowledge of the SES, (9) importance of resource to users and (10) collective choice rules. I do not use the terms in this framework. However, the notion that all elements in a social–ecological system are constantly influencing each other is important in this article.
13. See note 10 above.
14. Barnes et al., 'Contribution of Anthropology', 541.
15. *Ibid.*, 543.
16. Bleischwits et al., 'Coltan from Central Africa', 5.
17. Ballard and Banks, 'Resource War', 307.
18. Gewalt, 'Gold as a Geological Item', 15.
19. Panella, 'Gold Mining in West Africa', 2–3.
20. Pijpers, 'Busting Diamonds, Booming Gold', 83.
21. Luning and Pijpers, 'Co-habitation in 3D', 1, 22.
22. Puijtenbroek et al., *A Golden Future in Ituri?* 19.
23. Aryee, 'Small-Scale Mining Ghana', 372.
24. See note 15 above.
25. Banchirigah and Hilson, 'De-Agrarianization, Re-Agrarianization and Local Economic Development', 1.
26. Ballard and Banks, 'Resource War', 297.
27. These stakeholders, and the developments of these stakeholders, turn out to be very much intertwined.
28. Orlove and Caton, 'Water Sustainability', 401, 404, 408.

29. In the period of January–March 2015, multi-sited anthropological ethnographic field research was conducted in Tongo and Kejetia. While living with both the artisanal gold miners in Kejetia and with the political elite of the Tallensi in the Tongo centre, participant observation, semi-structured interviews and participatory mapping methods were the main research methods. Semi-structured interviews were done with artisanal gold miners (with various backgrounds and functions in Kejetia, both men and women), the paramount chief of Tongo, the representative chief of Kejetia, the representative chief of Obuasi, sponsors and buyers in Kejetia, the HR and PR manager of Shaanxi Mining Company (GH) Ltd. and with the Upper East Director of the Environmental Protection Agency in Ghana. There was no translator used.
30. Kejetia is named after the large market in Kumasi.
31. Long et al., 'Water Values in a Ghanaian', 209.
32. Ibid., 201.
33. Ibid.
34. Pijpers (Werthmann), 'Busting Diamonds, Booming Gold', 85–88.
35. This happened as a result of an intervention to solve a dispute in the village GbokGbani. The Tongo paramount chief separated the village and made Gbok and Gbani. Gbok and Gbani are now 2 of the 36 villages that are part of Tongo and the Tallensi district.
36. The governmental agencies Minerals Commission and Environmental Protection Agency work (together) to establish a hold on artisanal and small-scale mining through laws such as the *Minerals and Mining Act* (Act 703, introduced in 2006) ('As of July 20, 2015, the Ghana Extractive Industries Transparency Initiative listed on its website;' 'Minerals and Mining Act 703' Accessed July 2015. <http://www.sds.org/wp-content/uploads/2011/06/Ghana-Minerals-Act-2006.pdf>: point 81–99). This law emphasises the mineral sovereignty of the Ghanaian state and obliges artisanal miners to register for a small-scale mining concession.
37. Hilson, 'Structural Adjustment in Ghana', 60.
38. Hilson and Potter, 'Structural Adjustment and Subsistence Industry', 108.
39. Luning and Pijpers (Newmont), 'Co-habitation in 3D', 3.
40. Hilson, 'Structural Adjustment in Ghana', 53, 57, 59–60.
41. In 1983, the Ghanaian Government started the national ERP under the guidance of the IMF and World Bank. This happened after the Ghanaian economy deteriorated in the 1970s and early 1980s and, by 1983, was in a state of crisis. Since 1983, the Ghanaian Government developed policies to establish a more attractive investment climate for foreign mineral exploration and extraction companies. The ERP was meant to privatise the mineral sector of Ghana and make it more accessible and attractive for foreign investors. The arrival of Shaanxi in Tongo was also initiated among others by the national government.
42. The agreement and collaboration between Shaanxi and the representative chief in Obuasi (who is both a local authority and living in Kejetia with his artisanal mining brothers) are facilitated by the Ghanaian national government. This arrangement is an example of the fact that the different kind of stakeholders (identified by Ballard and Banks, as described above) that are involved in mining communities are very much overlapping and intertwined. Also, Shaanxi mines on a small-scale mining concession, while performing large-scale and industrial mining activities.
43. Geschiere, *The Perils of Belonging*, 16–19.
44. Luning and Pijpers (Newmont), 'Co-habitation in 3D', 3.
45. The actual chief and tindana live in Gbani. The mining area Kejetia is part of the village Gbani (in the Tongo region). In Northern Ghana, chiefs are typically in charge of above-ground political matters, whereas tindana typically manage the relations that people have with underground land spirits and ancestors.
46. Aryee, 'Small-Scale Mining Ghana', 370.
47. In Kejetia, I met no women who were concession leaders.
48. Concession leaders might suggest strategic temporary mining breaks, to the chief or tindana, for specific mining areas at moments this would suit them.
49. This is what many artisanal gold miners in Kejetia claim, I never saw actual contracts.
50. Werthmann, 'Cowries, Gold and "Bitter Money"', 105.
51. Keita, 'Les Sacrifices pour l'Orpillage', 127.

52. Jansen, 'What Gold Mining Means', 97–98.
53. Jansen explains that migrations to artisanal gold mining sites in West African countries (like Mali and Guinea) are not an economic activity per se. In several West African countries, every dry season, thousands of people migrate to gold mining sites. These migrations to gold mining sites are not an economic activity as they have a social function as well. The migration enables people to establish a safety network for current or future periods of scarcity. Relations around the gold mines are organised in terms of hosts and guests – people can be a guest one year, and a host the next year, as the locations of gold mining sites might change over time.
54. Werthmann, 'Cowries, Gold and "Bitter Money"', 118–119.
55. Jansen, 'What Gold Mining Means', 99–100.
56. It appears here that the strategy of artisanal miners to determine the location for their ghetto – the strategy of reading the locations of other ghettos (the rows of ghettos) – will inevitably lead to mining teams meeting under the ground. Some people living in Kejetia claimed that artisanal gold miners sometimes use metal detectors to determine the location of their ghetto, although I did not observe this. It would be interesting to know whether or not the strategy of not following the rows of ghettos leads to fewer (or later) meetings under the ground.
57. See note 26 above.

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