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ARTISANAL FRONTIER MINING OF GOLD IN AFRICA: LABOUR TRANSFORMATION IN TANZANIA AND THE DEMOCRATIC REPUBLIC OF CONGO

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ABSTRACT

This article studies the transformative nature of “artisanal frontier mining” in view of Sub Saharan Africa’s mining history. Artisanal gold production has generated livelihood earnings for millions of people in Sub-Saharan Africa. Yet we must go beyond a study of artisanal mining as an individual livelihood choice and consider the sector’s internal dynamics. In this sense, the concept of “labour transformation” is helpful. It refers to a process in which individuals’ skill acquisition, economic exchange, psychological re-orientation and social positioning evolve towards a shared occupational identity and collective professional norms, leaving considerable scope for self-governance amongst artisanal miners. This process is captured in the notion of the “frontier”, which in our case refers to occupational rather than geographic locational change. However, the frontier is necessarily of limited temporal duration given the existence of gold as a non-renewable resource, the depth of the gold supply sinking beyond the exploratory and extractive reach of artisanal miners, and the expanding interests of foreign mining corporations and the state. Our argument is illustrated through a comparison of the artisanal mining experiences of two neighbouring countries, Tanzania and the Democratic Republic of Congo (DRC), whose artisanal labour patterns are remarkably similar to each other despite their very different national political contexts and the DRC’s recent experience of conflict mineral production.

OVER THE PAST TWO DECADES, Africa’s rising economic performance has been largely dependent on the exploitation of its oil and mineral wealth. Yet this mining boom was primarily based on large-scale corporate mining, for which foreign private capital and African government elites were the

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major beneficiaries.¹ The aim of this article is to draw attention to African artisanal mining, which is labour-intensive mineral extraction on the basis of minimal capital investment, the use of manual tools and devices or simple portable machinery.² Such artisanal mining activities afford direct benefit in the form of employment, skills and management capability to considerable numbers of people. Figures are hard to come by but Karen Hayes estimates that 9 million miners and 54 million non-miners derived economic benefit from artisanal mining.³

As African artisanal mining gathered momentum during the 1980s and 1990s, academic enquiry was relatively negligible.⁴ During the latter half of the 1990s development, NGOs and donor agencies, notably the World Bank, the United Nations and the International Labour Organization, entered the scene, emphasizing artisanal mining's social and environmental impact, its "informality" and relationship with poverty, and trying to shape policy.⁵ Since 2000, Gavin Hilson has taken the lead in introducing development studies concepts into the analysis of artisanal and small-scale mining, beginning with a seminal edited collection examining its socio-economic impacts and a proliferation of articles on an array of development studies themes including poverty alleviation, livelihood diversification and good governance.⁶ Current documentation of African artisanal mining stresses its significance as an economic livelihood, with far less attention drawn to

¹ Bonnie Campbell, 'Corporate social responsibility and development in Africa: Redefining the roles of public and private actors in the mining sector', *Resources Policy* 37, 2 (2012), pp. 138-43; Roger Moody, *Rocks and hard places: The globalization of mining* (Zed Books, London, 2007).

² Deborah Fahy Bryceson and Jesper Bosse Jønsson, 'Mineralizing Africa and artisanal mining's democratizing influence', in Deborah Fahy Bryceson, Eleanor Fisher, Jesper Bosse Jønsson and Rosemarie Mwaipopo (eds), *Mining and social transformation in Africa* (Routledge, Abingdon, 2014), pp. 1-22.

³ Karen Hayes, 'Artisanal and small-scale mining and livelihoods in Africa' (Amsterdam, Common Fund for Commodities, 2008).

⁴ Notable exceptions were: Seithy Loth Chachage, 'The meek shall inherit the earth but not the mining rights: Mining and accumulation in Tanzania', in Peter Gibbon (ed.) *Liberalised development in Tanzania* (Institute for African Studies, Uppsala, 1995), pp. 37-108; Filip De Boeck, 'Domesticating diamonds and dollars: Identity, expenditure and sharing in Southwestern Zaire (1984-1997)', *Development and Change* 29 (1998), pp. 777-810.

⁵ Jeffrey Davidson, 'The transformation and successful development of small-scale mining enterprises in developing countries', *Natural Resources Forum* 17, 4 (1993), pp. 315-26; Mamadou Barry, 'Regularizing informal mining: A summary of the proceedings of the International Roundtable on Artisanal Mining' (Washington D.C., 17-19 May 1995, Available from www.commddev.org/regularizing-informal-mining-summary-proceedings-international-roundtable-artisanal-mining (accessed 14 January 2013)); UN, 'Recent developments in small-scale mining: a report of the Secretary-General of the United Nations', *Natural Resources Forum* 20, 3 (1996), pp. 215-225; Wilson Mutagwaba, Rose Mwaipopo and A.L. Mlaki, 'The impact of technology on poverty alleviation: The case of artisanal mining in Tanzania' (REPOA Research Report no. 97.2, Dar es Salaam, Inter Press Tanzania Ltd, 1997); ILO, 'Social and labour issues in small-scale mines: Report for discussion at the tripartite meeting on social and labour issues in small-scale mines' (Geneva, ILO, 1999); Thomas Henschel, Felix Hruschka and Michael Priester, 'Global report on artisanal and small-scale mining' (International Institute for Environment and Development, London, 2002).

⁶ Gavin Hilson (ed.), *The socio-economic impacts of artisanal and small-scale mining in developing countries* (London, Taylor & Francis, 2003); Gavin Hilson and Clive Potter, 'Structural adjustment and subsistence industry: Artisanal gold mining in Ghana', *Development and Change* 36, 1 (2005), pp. 103-131; Gavin Hilson, 'Small-scale mining, poverty and economic development in Sub-Saharan Africa: An overview', *Resources Policy* 34 (2009), pp. 1-5; Gavin Hilson, "'Once a miner, always a miner": Poverty and livelihood diversification in Akwatia, Ghana', *Journal of Rural Studies* 26, 3 (2010), pp. 296-307; Gavin Hilson, 'Artisanal mining, smallholder farming and livelihood diversification in rural Sub-Saharan Africa: An introduction', *Journal of International Development* 23 (2011), pp. 1031-1041; Gavin Hilson, Richard Amankwah and Grace Ofori-Sarpong, 'Going for gold: Transitional livelihoods in Northern Ghana', *Journal of Modern African Studies* 51, 1 (2013), pp.109-137.

its normative evolution as a cultural way of life.⁷ Another salient thematic strand focuses on the clash between small and large-scale mining's land and mineral rights, which is in keeping with the sectoral perspective of this literature.⁸ Overall, the policy-oriented nature of the literature gives salience to problem-solving and advocacy of artisanal miners' interests. In this sense, ample use is also made of the concept of "informality", arguing that the informal nature of artisanal mining activities hinders their efficiency and productivity.⁹

Another problematic feature of artisanal mining that has received considerable attention in the literature at the turn of the twenty-first century is human rights abuses and forced labour in the context of conflict mineral production. In the brutal civil wars in Angola,¹⁰ Sierra Leone,¹¹ and Liberia,¹² diamonds were sold to finance warlords' activities, invading armies and insurgencies. In the eastern Democratic Republic of Congo (DRC), the extraction and sale of coltan and gold enabled rebel groups as well as Congolese and foreign government forces to purchase arms and continue fighting over strategic mining sites and trade routes.¹³ In these mines, people were forced to work and cede part of their production to the armed forces, as witnessed in many NGO reports by Global Witness, Amnesty International, Human Rights Watch, Enough Project and others.

⁷ Sadia Mohammed Banchirigah, 'How have reforms fuelled the expansion of artisanal mining? Evidence from sub-Saharan Africa', *Resources Policy* 31, 3 (2006), pp. 165-71; Eleanor Fisher, 'Occupying the margins: Labour integration and social exclusion in artisanal mining in Tanzania', *Development and Change* 38, 4 (2007), pp. 735-60; Gavin Hilson (ed.) *The socio-economic impacts of artisanal and small-scale mining*.

⁸ Gavin Hilson, 'Land use competition between small- and large-scale miners: A case-study of Ghana', *Land Use Policy* 19, 2 (2002), pp. 149-56; Gavin Hilson, Nathalia Yakovleva and Sadia Mohammed Banchirigah, "'To move or not to move': Reflections on the resettlement of artisanal miners in the Western Region of Ghana', *African Affairs* 106, 424 (2007), pp. 413-436; Siri Lange, 'Gold and governance: Legal injustices and lost opportunities in Tanzania', *African Affairs* 110, 439 (2011), pp. 233-252; Godfried Appiah Okoh, 'Grievance and conflict in Ghana's gold mining industry: The case of Obuasi', *Futures* 62 (2014), pp. 51-57; Mbianyor Bakia, 'East Cameroon's artisanal and small-scale mining bonanza: How long will it last?', *Futures* 62 (2014), pp. 51-57; Remi Canavesio, 'Formal mining investments and artisanal mining in southern Madagascar: Effects of spontaneous reactions and adjustment policies on poverty alleviation', *Land Use Policy* 36 (2014), pp. 145-154.

⁹ The concept of informality has a normative connotation which we want to avoid in this article. A conceptual discussion of informality is beyond the scope of this paper, but see Kuntala Lahiri-Dutt, 'Informality in mineral resource management in Asia: Raising questions relating to community economies and sustainable development', *Natural Resources Forum* 28 (2004), pp. 123-132; Shefa Siegel and Marcello Veiga, 'Artisanal and small-scale mining as an extralegal economy: De Soto and the redefinition of "formalization"', *Resources Policy* 34 (2009), pp. 51-56; Sara Geenen, 'A dangerous bet. The challenges of formalizing artisanal mining in the Democratic Republic of Congo', *Resources Policy* 37, 3 (2012), pp. 322-330.

¹⁰ Global Witness, 'A rough trade. The role of companies and governments in the Angolan conflict' (Global Witness, London, 1998); Justin Pearce, *An outbreak of peace: Angola's situation of confusion* (David Phillip, Claremont, SA, 2005); Cristina Udelsmann Rodrigues and Ana Paula Tavares, 'Angola's planned and unplanned urban growth: Diamond mining towns in the Lunda Provinces', *Journal of Contemporary Africa Studies* 30, 4 (2012), pp. 687-703.

¹¹ Paul Richards (1996) *Fighting for the rain forest: war, youth and resources in Sierra Leone* (James Currey, Oxford, 1996); Alfred Zack-Williams, 'Sierra Leone: The political economy of civil war, 1991-98', *Third World Quarterly* 20, 1 (1999), pp. 143-162; Roy Maconachie, 'Diamond mining, urbanization and social transformation in Sierra Leone', *Journal of Contemporary African Studies* 30, 4 (2012), pp. 705-23.

¹² François Prkic, 'The Phoenix state: War economy and state formation in Liberia', in Klaus Schlichte (ed.) *The dynamics of states. The formation and crises of state domination* (Ashgate Publishing Limited, Hampshire, 2005), pp. 115-136.

¹³ Stephen Jackson, 'Making a killing: Criminality and coping in the Kivu war economy', *Review of African Political Economy* 29, 93/94 (2002), pp. 517-36.

The anthropological literature on African mining became well-established decades ago with the work of the Rhodes-Livingstone Institute. Nonetheless, that and subsequent anthropological research has until very recently mostly related to large-scale mining and labour coercion, documenting the effects on African wage workers and broader communities.¹⁴ Reviewing existing anthropological perspectives on mining in 1985, Ricardo Godoy noted a general lack of integration between anthropologists' interests in socio-political and ideological issues, and the geological and economic aspects of mining, remarking that such integration would be possible when studying artisanal mining.¹⁵ This has proven to be true. Over the last decade, anthropologists' analytical gaze has focused on the arena of social interaction in and around the mining settlements, primarily social relations between artisanal miners and the state,¹⁶ miners' collegial relationships,¹⁷ morality,¹⁸ and women's lives in the mining camps.¹⁹ Sabine Luning,²⁰ taking an "anthropology from above" lens, has studied artisanal mining's interaction with the corporate world of large-scale mining.

In the literature of the 1990s and 2000s, artisanal mining was often defined in terms of "what it was not": it was not formalized, not mechanized and not regulated. Gradually more and more academics started to criticize the tendencies of NGOs to victimize and of policy-makers to criminalize artisanal miners.²¹ It is only very recently that academics have started analyzing what artisanal mining is. In this article we endeavor to probe the sector's internal dynamics, going beyond its socio-economic impact and miners' individual motivations to engage in artisanal mining.

This article contributes to the literature by conceptualizing current African artisanal mining in terms of its transformative nature in the face of temporality. We conceptualize "artisanal frontier

¹⁴ South Africa: Alan Jeeves, *Migrant labour in South Africa's mining economy: The struggle for the gold mines' labour supply 1890-1920* (McGill-Queen's University Press, Kingston, 1985); Dunbar T. Moodie with Vivienne Ndatshe, *Going for gold: Men, mines and migration* (Witswatersrand University Press, Johannesburg, 1994); Harold Wolpe, 'Capitalism and cheap labour-power in South Africa: From segregation to apartheid', *Economy and Society* 1, 4 (1972), pp. 425-56. Southern Rhodesia: Charles van Onselen, *Chibaro: African mine labour in Southern Rhodesia 1900-1933* (Pluto Press, London, 1976).

¹⁵ Ricardo Godoy, 'Mining: Anthropological perspectives', *Annual Review of Anthropology* 14 (1985), pp. 199-217.

¹⁶ Eleanor Fisher, 'Occupying the Margins: Labour Integration and Social Exclusion', *Development and Change* 38, 4 (2007), pp. 735-760;

¹⁷ Tilo Grätz, 'Friendship ties among young artisanal gold miners in northern Benin (West Africa)', *Afrika Spectrum* 39, 1 (2004), pp. 95-117; Jeroen Cuvelier, 'Work and masculinity in Katanga's artisanal mines', *Afrika Spectrum* 49, 2 (2014), pp. 3-26.

¹⁸ Katja Werthmann, 'Gold rush in West Africa: The appropriation of "natural" resources: non-industrial gold mining in South-Western Burkina Faso', *Sociologist* 50, 1 (2000), pp. 90-104; Katja Werthmann, 'Cowries, gold and bitter money: Gold-mining and notions of ill-gotten wealth in Burkina Faso', *Paideuma*, 49 (2003), pp. 105-124; Andrew Walsh, 'Hot money and daring consumption in a Northern Malagasy sapphire mining town', *American Ethnologist* 30 (2003), pp. 290-305; Tilo Grätz, 'Moralities, risk and rules in West African artisanal gold mining communities: A case study of Northern Benin', *Resources Policy* 34, 1/2 (2009), pp. 12-17.

¹⁹ Katja Werthmann, 'Working in a boom-town: Female perspectives on gold-mining in Burkina Faso', *Resources Policy* 34, 1/2 (2009), pp. 18-23; Hannelore Verbrugge, 'Just picking up stones: Gender and technology in a small-scale gold mining site', in Anne Coles and Janet Momsen (eds) *Gender Handbook* (London, Routledge, 2015), pp. 173-182.

²⁰ Sabine Luning, 'Corporate social responsibility (CSR) for exploration: Consultants, companies and communities in processes of engagements', *Resources Policy* 37, 2 (2012), pp. 305-211; Sabine Luning, 'Processing promises of gold: A minefield of company-community relations in Burkina Faso', *Africa Today* 58, 3, (2012), pp. 23-39; Sabine Luning, 'The future of artisanal miners from a large-scale perspective: From valued pathfinders to disposable illegals?', *Futures*, 62, (2014), pp. 67-74.

²¹ Hilson, 'Small-scale mining, poverty and economic development in Sub-Saharan Africa'.

mining” as a historically contextualized form of mining, using our field case study material from western Tanzania and the eastern DRC. These two neighbouring, gold-producing countries have been chosen because their distinctively different contexts (history, political evolution, legal frameworks and absence/presence of conflict) provide interesting contrasts for facilitating an understanding of artisanal “labour transformation” in Eastern Africa.

We argue that while engagement in artisanal mining may be an individual livelihood choice, it initiates a process in which individuals’ skill acquisition, economic exchange, psychological re-orientation and social positioning evolve towards a shared occupational identity and professional norms, taking shape outside of state regulation. Comparing Tanzania and the DRC’s “artisanal frontier settlements”, we find that they shared three essential commonalities. First, the miners acted primarily as self-directed agents. Second, they engaged in a process of labour transformation whereby their skill acquisition, professional norms, ethics and group identity were converging in an *ad hoc* fashion while working together. Third, they were mining in country settings where there was a weak bureaucratic state presence, leaving scope to devise their work relations on a trial and error basis. We document strong similarities in labour organization in both country contexts, despite the legacy of conflict mineral production in Congo and the two countries’ distinctly different political histories during the twentieth century. Our argument has broader relevance beyond Eastern Africa and can be useful in conceptualizing African artisanal mining more generally.

In the next sections, we construct our concept of “artisanal frontier mining” before introducing the case study countries. The core of the article focuses on a description of the artisanal labour process and analyzing labour transformation, and then tracing the evolution of frontier mining sites. In concluding, we reflect on the frontier’s temporality, as well as potential future pathways for artisanal miners.

Identifying “artisanal frontier mining”

Artisanal frontier mining pivots on the personal agency of miners who are willing to work in remote, difficult and often dangerous contexts, being highly motivated to take risks, endure deprivation and work hard with the aim of “striking it rich” or at least gaining higher earnings. Over time, the artisanal frontier mining experience is more challenging as artisanal miners contend with the progression of the mineral extraction trajectory. Classic gold rushes began with placer deposits, primarily involving panning for gold in riverine environments. However, this source of supply tends to be quickly exhausted and leads the determined eventually into hard rock excavation, which is likely to be considerably more difficult and unsafe, as the mine depth extends downwards to the

limits of hand-held and simple mechanical technology. All along this descent, the artisanal miners are adapting to changing mineral availability through teamwork and a specialized division of labour encompassing drilling, excavating and mineral processing work, and dealing with market agents.

The labour transformation at the heart of artisanal frontier mining can be seen as a process in which individuals' skill attainment, economic interaction, psychological outlook and social positioning evolve towards a shared occupational identity that becomes an integral part of their social being.²² While occupational trajectories are often heavily typified by a specific gender, age, level of education and class, enigmatically this tends not to be the case in frontier gold mining. True, men are the fastest to gravitate to gold rush sites, but their age, level of education and even class tend to vary across a wide spectrum. For this reason, frontier mining is often associated with a democratic, social leveling effect, in which physically fit, risk-taking men from across the social spectrum start working as amateur miners with little or no experience. Prior specialized training is not requisite for the work, and minimum capital is required. Class and educational advantages are not a barrier to work entry or decisive for economic success. Demographically and organizationally, African gold rush artisanal mining sites resemble those of nineteenth century miners who spanned a very broad range of income levels and occupational categories, willing to travel to and contend with relatively inaccessible and sometimes treacherous areas.²³

Mining frontiers in California (1849), Australia (1852), New Zealand (1861) and the Yukon (1896), were composed primarily of cosmopolitan, white male migrants mining gold in remote, sparsely populated areas. They encroached on traditional lands of non-mining native populations pursuing agrarian or hunting and gathering livelihoods in territories of relatively new nation-states and commonwealth countries where governments had yet to assert their bureaucratic presence. Thus, incoming migrant miners officially staked mining claims but thereafter had wide scope to devise their own *modus operandi* with respect to work and self-governance.

For Frederick Turner, the American western frontier was an area of untapped potential and a creative arena for a new democratic society based on the hard-earned efforts of migrant settlers.²⁴ As the gold rush unfolded, national governments gradually took cognizance of gold miners' digging activities. The eventual imposition of a territorial government administrative presence increasingly circumscribed artisanal miners, occasionally sparking intense moments of contestation, as exemplified by the 1854 Ballarat gold rush miners' uprising in Australia, considered an historical

²² Deborah Fahy Bryceson, 'Africa at work: Transforming occupational identity and morality', in Deborah Fahy Bryceson (ed.) *How Africa works: Occupational change, identity and morality* (Practical Action Publishing, Rugby, 2010), pp. 3-26.

²³ Charlotte Gray, *Gold diggers: Striking it rich in the Klondike* (Counterpoint, Berkeley, 2010); Brian Roberts, *American alchemy: The California gold rush and middle class culture* (University of North Carolina Press, Chapel Hill, 2000).

²⁴ Frederick Jackson Turner, 'The significance of the frontier in American history (1893)', in Ray Allen Billington (ed.), *Frontier and section: Selected essays* (Prentice-Hall, Englewood Cliffs, 1961), pp. 28-36.

landmark in Australia's democratization of voting rights for every citizen, with the notable exception of the native population whose rights continued to be transgressed.²⁵

Igor Kopytoff fashioned a politico-spatial concept of pre-colonial African frontiers that was characterized by political expansion of African kingdoms into peripheral spaces, arguing that the frontier territorially spread existing patrimonial cultures more widely rather than creating new social and cultural norms.²⁶ Privileged status arose from being first-comers who could claim authoritative legitimacy and power in the destination areas based on the transferal of governance practices from their place of origin. Turner's and Kopytoff's historically specified uses of the frontier concept identified markedly different politico-spatial outcomes, serving to illustrate that the source, destination and purpose of frontier movement are critical to understanding any specific frontier.

More recently, Tilo Grätz has utilized a frontier concept in his insightful analysis of the West African artisanal mining frontier in Benin, Burkina Faso and Mali.²⁷ In contrast to Kopytoff, he argues that frontier communities are characterized not only by technical and economic, but also cultural and social innovations, resulting in the creation of a particular "socio-economic field".²⁸ He focuses on movements of migrant miners, their "appropriation of new territories", their role as "pioneers" of new markets and societies and their interaction with "local settlers", traditional and political authorities.²⁹ Primary frontiers with recent massive influxes of gold miners are distinguished from secondary frontiers where there have been "previous encounters and conflicts" with migrants miners and where local people as well as local authorities are highly involved in mining.³⁰

Our concept of mining frontiers is different in purpose given that we are tracing the transformation of work activity and the historically specific form of artisanal mining rather than places. People move to mining areas to mine and are focused on mineral availability rather than the geographical location *per se*. In many African countries people have moved from smallholder peasant agriculture to artisanal mining, which they see as a more remunerative livelihood.³¹

²⁵ Jerome O. Steffen, 'The mining frontiers of California and Australia: A study in comparative political change and continuity', *Pacific Historical Review* 52, 4 (1983), pp. 428-40.

²⁶ Igor Kopytoff, *The African frontier: The reproduction of traditional African societies* (Indiana University Press, Bloomington, 1989).

²⁷ Tilo Grätz, 'The "frontier" revisited: Gold mining camps and mining communities in West Africa' (ZMO Working Papers 10, Berlin, 2013).

²⁸ Grätz, 'The "frontier" revisited', p.14.

²⁹ Grätz, 'The "frontier" revisited', pp. 10-14.

³⁰ Grätz, 'The "frontier" revisited', p.16.

³¹ Hilson, 'Once a miner, always a miner'; Hilson, 'Artisanal mining, smallholder farming and livelihood diversification'; Hilson et al 'Going for gold'; Paul Justice Kamlongera, 'Making the poor "poorer" or alleviating poverty? Artisanal mining livelihoods in rural Malawi', *Journal of International Development* 23, 8 (2011), pp. 1128-1139; Roy Maconachie, 'Re-agrarianising livelihoods in post-conflict Sierra Leone? Mineral wealth and rural change in artisanal and small-scale mining communities', *Journal of International Development* 23, 8 (2011), pp. 1054-1067; Gavin Hilson and Chris Garforth, 'Agricultural poverty and the expansion of artisanal mining in Sub-Saharan Africa: Experiences from Southwest Mali and Southeast Ghana', *Population Research and Policy Review* 31, 3 (2012), pp. 435-464.

Relative to the life of a farmer relying on the seasonal rhythm of agriculture, a settled community life, common ethnic identity and tribal leadership, artisanal frontier mining affords miners relatively independent exercise of agency in the pursuit of their mining activities, free association and considerable room for collective self-governance. This clearly contrasts with the coerced, alienating and degrading mining conditions of large-scale, colonial and apartheid mining during the twentieth century and the forced labour circumstances of conflict mineral mining.

Artisanal frontier mining's take-off in Tanzania and the DRC³²

Artisanal gold mining activities emerged in several African countries during the 1980s, stimulated by the rising global market price for gold combined with the detrimental effects of structural adjustment programmes on rural agriculture. The price continued to rise throughout the 1990s and 2000s and interplayed with government-implemented neoliberal policies aimed at privatization and attracting foreign direct investments. Since 2013, however, the gold price has declined.

Tanzania and the DRC are among a number of African countries that have witnessed very pronounced mining booms over the past two decades. Tanzania's economy in the 1980s was dominated by a peasant agricultural sector that was unraveling in the inhospitable policy climate of structural adjustment.³³ It is currently the fourth largest gold producer in Africa, with a large-scale gold mining sector encompassing seven mines producing approximately 35 tonnes of gold in 2012. It is estimated that more than one million people are engaged in artisanal mining in Tanzania, of which roughly two-thirds are gold miners.³⁴ In the DRC, an estimated two million people are directly dependent on artisanal mining activities (mainly gold, cassiterite, coltan and diamonds). In the eastern Kivu provinces, artisanal miners may number as many as 300,000.³⁵ Industrial gold production is now resurging after a decade-long conflict destroyed all industrial installations.³⁶

As neighbouring countries, both endowed with the geological riches of the East African Rift, Tanzania's and the eastern DRC's resource base is similar, but their past political trajectories have been markedly divergent with repercussions for the evolution of artisanal mining forms. Tanzania has maintained political stability since independence. The Kiswahili language unites its ethnically

³² The sections that follow are based on data collection in western Tanzania (2005-2012) and eastern DRC (2008-2012). This encompassed qualitative interviewing (including semi-structured interviews with local leaders and key informants, focus group discussions and oral histories), and quantitative survey work in Tanzania (145 households in 2005, 108 miners in 2006-2008, and 216 households in 2011-2012) and DRC (258 miners in 2011).

³³ Deborah Fahy Bryceson, 'Household, hoe and nation: Development policies of the Nyerere era', in Michael Hodd (ed.), *Tanzania after Nyerere* (Frances Pinter, London, 1988), pp.35-48.

³⁴ Hayes, 'Artisanal and small-scale mining', p.12.

³⁵ Pact, 'Promines study. Artisanal mining in the Democratic Republic of Congo' (Pact Congo, Washington and Kinshasa, 2010), p. 21.

³⁶ Sara Geenen, 'Dispossession, displacement and resistance: artisanal miners in a gold concession in South Kivu, Democratic Republic of Congo', *Resources Policy* 40 (2014), pp. 90-99.

diverse population of over one hundred different tribes. As an overwhelmingly peasant agriculture-producing country, the oil crisis of the late 1970s and the subsequent structural adjustment cutbacks on peasant crop input subsidies destabilized peasant production causing agrarian involution that the country has yet to recover from. During the 1980s, the national government, in the interests of trying to resuscitate the rural areas, tacitly allowed farmers to pan and excavate gold on their property and in nearby areas. The 1979 Mining Act and the Small Scale Mining Policy Paper of 1983 gave artisanal mining room to manoeuvre at a restricted scale of operation.³⁷ Artisanal mining activities expanded during economic liberalization in the 1990s.

Meanwhile, new investor-friendly legislation enticed a surge in foreign mining investments. Between the late 1990s and 2005, export revenues from large-scale gold mining companies rose from 1 to 50 percent. Numerous permits were granted to large and medium-scale companies or to juniors, speculating in mining licenses. This left artisanal miners with very little chance to obtain their own mining licenses. Over time, fierce criticism of the government's mineral governance erupted with respect to the limited national benefits from large-scale mining, unjust resettlement processes, and disregard of artisanal miners' interests. In response, legislation was passed in 2010 that adjusted some of the previous malpractices, but remained investor-friendly.³⁸

As the world price of gold escalated, rush migration was ignited in a proliferation of gold-rich sites in what is northwestern Tanzania's "ring of gold".³⁹ Most of the gold sites are near or sometimes within existing villages, which raises the issue of the role of local leadership. Tanzania is unusual in Africa in implementing policies that circumscribed the role of tribal chieftaincy just before national independence. Chiefs are recognized as cultural representatives of their tribes but they are barred from being hereditary political rulers. Village leaders are popularly elected and have no influence on artisanal miners' acquisition of mining rights.

The current Mining Act provides scope for artisanal miners to apply for Primary Mining Licenses (PML) for seven years for up to ten hectares. Originally the Commissioner of Minerals in Dar es Salaam granted them, but Assistant Commissioners of Minerals in each of Tanzania's eight mining zones now have the power to sign PMLs.⁴⁰ While the legislation is fairly unambiguous, only a very small minority of practicing artisanal miners hold PMLs and mine legally. The fee for obtaining a PML is negligible, but most artisanal miners, working at remote sites, do not have knowledge of mining claim availability relative to medium and large-scale mining investors who

³⁷ Chachage 'The meek shall inherit the earth'; Jesper Bosse Jønsson and Niels Fold, 'Dealing with ambiguity: Policy and practice among artisanal gold miners' in Bryceson et al (eds), *Mining and social transformation in Africa*, pp. 113-29.

³⁸ Bryceson and Jønsson, 'Mineralizing Africa'.

³⁹ Jesper Bosse Jønsson and Deborah Fahy Bryceson, 'Rushing for gold: Mobility and small-scale mining in East Africa', *Development and Change* 40, 2 (2009), pp. 249-79; Deborah Fahy Bryceson, Jesper Bosse Jønsson, Crispin Kinabo and Mike Shand, 'Unearthing treasure and trouble: mining as an impetus to urbanization in Tanzania', *Journal of Contemporary African Studies* 30, 4 (2012), pp. 631-49.

⁴⁰ Jønsson and Fold, 'Dealing with ambiguity'.

keep in close contact with government officials. The Ministry of Minerals and Energy is located in Dar es Salaam, hundreds of kilometres from the gold fields. There are eight Zonal Mining Officers with minimal capacity for on-the-ground law enforcement. Furthermore and significantly, although the Tanzanian government has been legislatively supportive of artisanal miners, artisanal mining generates extremely small amounts of government revenue relative to large-scale mining and therefore tends to be overlooked.

Historically the DRC (formerly Zaire) had been a mineral rather than agricultural-export country. After a period of heavy industrial exploitation during the colonial period, the neo-patrimonial policies of the Mobutu regime, combined with fluctuating international commodity prices, produced a massive economic and financial crisis, slowly dismantling the country's industrial mining infrastructure and encouraging hundreds of thousands of people to engage in artisanal mining and smuggling. The 1982 law allowing all Congolese citizens to apply for mining and trading licenses further stimulated them. This law prompted the first dramatic expansion in artisanal mining production.

A second surge occurred during the 1998-2003 war. Industrial mining came to a complete standstill, while artisanal mining and trade in gold, diamonds and coltan (especially after the "coltan boom" in the early 2000s) became an intrinsic part and driver of a war economy involving Congolese rebel groups supported by neighbouring Uganda and Rwanda as well as the national army.⁴¹ Violence and insecurity in the countryside made agricultural production, as well as trade between the interior and the cities, very difficult.⁴²

After the end of the war in 2003, large-scale mining companies regained their interest in the DRC's mineral deposits, first in the copper and cobalt-rich province of Katanga and subsequently in gold in the Kivu provinces. This renewed interest was related to international commodity prices and the 2002 Mining Code, which created an attractive environment for foreign investors. Artisanal miners, although recognized by the Mining Code, have very few possibilities to gain official mining licenses because there are hardly any "artisanal mining zones" in which they can legally work. Moreover, obtaining licenses is costly and time-consuming. Thus, in practice they are working unlicensed and in contravention to a number of Mining Code regulations.

Although pockets of violence persist and rebel groups remain active in places, most artisanal miners are now working in post-conflict frontier settings of varying degrees of stability and security.⁴³ Agents of mining services, attempting to complement their meagre and irregular salaries,

⁴¹ Stephen Jackson, 'Making a killing: Criminality and coping in the Kivu war economy', *Review of African Political Economy* 29, 93/94 (2002), pp. 517-36.

⁴² Koen Vlassenroot and Timothy Raeymaekers (eds) *Conflict and social transformation in Eastern DR Congo* (Academia Press, Ghent, 2004).

⁴³ The persistent labeling of all Congolese minerals as 'conflict minerals' blurs over empirical realities and requires nuance both in space and in time. In this sense we do not entirely agree with Meagher's categorical interpretation of

levy payments (illegal taxes, bribes) on a daily basis at these mining sites. Unlike Tanzania, the role of customary chiefs in the organization of artisanal mining is significant. Legally, they hold an ambiguous position arising from national land legislation that has never been properly implemented. However, in practice customary arrangements from the colonial and pre-colonial period partially persist, albeit in adapted ways.⁴⁴ Artisanal mining in eastern DRC is governed by flexible interpretation of the law and extra-legal taxation, which creates considerable scope for artisanal miners' agency. Working in a border area of a very large country with a lax and corrupt bureaucracy that does not or cannot adhere to its own rules and regulations, artisanal miners have evolved organizational practices and norms amongst themselves that creatively address the prevailing institutional and economic constraints they face. In brief, Congolese artisanal gold mining is remarkable for having emerged from a background of both colonial large-scale mining and conflict mineral practices that have now been restricted to a minority of sites with relatively limited numbers of people involved.

The artisanal labour process

In alluvial mining, panning or sluicing techniques are used to extract gold from placer deposits. This extraction mode requires little investment, but returns are relatively small. While this mode is not common in Tanzania due to its semi-arid climate, in the DRC alluvial mining may employ younger, inexperienced and/or seasonal miners. Yet most miners are employed in underground mining. This requires a considerable investment of manpower, time and money for working the underground veins in addition to harsh, physical labour. The labour process is similar in Tanzania and the DRC.⁴⁵ The organization of gold extraction follows a three-tier division of labour with financiers, organizers and labourers. Financiers in Tanzania are the Primary Mining License owners, who are rarely actively involved in the organization of mining activities and often subcontract or informally lease their claims to pit holders or (foreign) firms.⁴⁶ In the DRC, financial capital is provided by traders, who do not hold any title to the land, but use these investments to guarantee a supply of gold.⁴⁷

eastern DRC's mineral economy as a militarized and criminal one; see Kate Meagher, 'Smuggling ideologies: From criminalization to hybrid governance in African clandestine economies', *African Affairs* 113, 453 (2014), pp. 497-517.

⁴⁴ Sara Geenen and Klara Claessens, 'Disputed access to the gold mines in Luhwindja, Eastern DR Congo', *Journal of Modern African Studies* 51, 1 (2013), pp. 85-108.

⁴⁵ Also in West-Africa the labour process is similar; see Grätz, 'The "frontier" revisited'.

⁴⁶ Bryceson and Jønsson, 'Mineralizing Africa'.

⁴⁷ Sara Geenen, 'Relations and regulations in local gold trade networks in South-Kivu, Democratic Republic of Congo', *Journal of Eastern African studies* 5, 3 (2011), pp. 427-446.

Pit holders organize the work inside the pits. They usually have many years of experience in (gold) mining or related activities (processing, trade), including some who worked for large-scale mining companies before the war in the DRC. Nonetheless, pit holders can, as well, experience a run of poor returns and be relegated to digging. There is fluidity in the work hierarchy arising from performance. Pit holders shoulder the brunt of financial risk for the mining operation. They hire labour, buy the necessary tools and conduct the mining. As such they are responsible for finding gold, so much of the risks and costs related to fruitless periods fall upon them. Generally pit holders provide some equipment, batteries for torches, food and medicine for the diggers in periods of no mineral output. As these periods may last for several months or even years in some cases, costs can mount to high sums.

Diggers can be divided into different categories, depending on the type of work they do. The drillers (*foreurs* in DRC, *waponjaji* in Tanzania), who work their way into the rock mainly with hammer and chisel, are typically young men with some experience in mining and aged between 18 and 40, as the work is physically very demanding and potentially dangerous because of collapsing tunnels. The *vutafelo* (Tanzania) or *peleteurs* (DRC) remove the waste material and gold-bearing rocks in wheelbarrows or jute bags out of the pit. They are typically younger and/or less experienced and receive a smaller share in the production. In addition, specific tasks are carried out by specialized workers, who are usually paid a certain amount of cash or quantity of rocks. These tasks include security, pit supervision, construction of wooden support structures, blasting, electrical drilling, transportation, manual ore crushing (which is done by women in some sites), operation of ball mills, and separation of gold through washing and amalgamation.

Generally, diggers are not paid in cash, but in a quantity of rocks or sand, or more precisely a number of bags containing rocks or sand. This ensures visibility, making output distribution of the collective work effort transparent and less liable to theft, but individual profits are very unpredictable and dependent on the quality of the bagged rock. Systems vary between sites, but typically financiers take one third of the extracted ore, pit holders or managers take one third, and another third is distributed among the diggers. However, workers with more hazardous or specialized tasks receive larger quantities and some are paid a fixed quantity per task. Within the teams there is some hierarchy related to different specializations or payment. Anyone who is physically not able to do the hard work in the underground pits will not last long. Everyone who works underground faces the same harsh working conditions, which tends to level out status differences between the men.

Labour transformation

Miners acquire necessary mining skills and form vital social contacts at their mining site through informal apprenticeship.⁴⁸ While some fail and drop out, others are in a position to move to new sites and embark on an artisanal career thanks to a good skill base and network ties. Their career progression goes hand in hand with increasing specialization, improved material rewards, spatial and social mobility and a psychological orientation towards a new professional identity as a miner. Their professional identity is defined by the artisanal labour process, a strong sense of self-making as miners and men, social solidarity and preference for economic autonomy. It should be highlighted that this process of labour transformation is not without problems, failures and disappointments, as the labour process is harsh, dangerous and uncertain. Our aim is not to romanticize artisanal frontier mining, but to demonstrate its transformational potential, despite its negative environmental, health, social and economic consequences. First, labour transformation involves profound social transformation for the individual miner. Young men see artisanal mining as an outlet for breaking away from parents' or elders' control and village social pressure. The mining site offers a place where they can be anonymous and chart their own lives, defying familiar social hierarchies and levelling access to privileges. Congealing occupational and social groupings are typically more urban, cosmopolitan and multi-ethnic than those miners knew in their home communities. Gold mining is a relatively open entry activity for diggers. They do not require a large amount of starting capital. Instead they must exert physical energy and a willingness to work under difficult conditions. The harsh circumstances and unpredictable mining outcomes are the same for everyone, keeping social differentiation in check and encouraging egalitarianism, a sense of fairness, camaraderie and democratic potentiality.⁴⁹

Second, miners' self-making is propelled by an optimism that their mine work will prove to be economically advantageous. Earnings in artisanal mining are unpredictable, as production depends on a mix of experience, skills and luck related to various controllable and non-controllable factors notably: the presence of rich gold veins, capital to invest, available manpower, technical support, and climate conditions. High production periods are interspersed with preparatory works and low production periods, but miners are driven by a constant hope of striking gold and getting rich. The names of some of the Congolese pits reflect this. In Mukungwe, for example, a newly opened pit was named *Kitumainiya kesho* (Tomorrow's hope).⁵⁰ In Kamituga one can find pits like *Bana espoir* (They have hope)⁵¹ and *Qui cherche, trouve* (He who seeks shall find).⁵² In order to

⁴⁸ Deborah Fahy Bryceson and Jesper Bosse Jønsson, 'Gold digging careers in rural East Africa: Small-scale miners' livelihood choices', *World Development* 38, 3 (2010), pp. 379-392.

⁴⁹ Bryceson and Jønsson, 'Mineralizing Africa'.

⁵⁰ Geenen fieldnotes, Mukungwe, 31 May 2012.

⁵¹ Geenen fieldnotes, Kamituga, 09 April 2008.

⁵² Geenen interview, pit manager, Kamituga, DRC, 22 January 2012.

compel their luck, some miners call upon supernatural forces based on traditional beliefs and the intercession of *waganga* healers.⁵³

Third, psychologically artisanal miners tend to project a strong masculine identity, as Jeroen Cuvelier and Filip De Boeck have argued in the context of the DRC.⁵⁴ For Congolese men it is very important to prove that they are capable of earning money and providing for a family. In interviews they often state that they are *des responsables*, husbands and fathers with a responsibility vis-à-vis their families. The notion of paid work (*kazi*) constitutes an important source of masculine identity and status.⁵⁵ In the current Congolese context, however, with a generalized lack of formal employment, this notion has been hollowed out and artisanal mining now constitutes ‘an attempt to retain a sense of individual achievement and masculine working pride’.⁵⁶ Many miners indeed spend part of their earnings on family needs: food and drinks, school fees for the children, clothing and health care.

Yet solvent miners are also prone to spending money on immediate consumption, including alcohol, drugs, women and entertainment. Often labelled as wasteful or moral decay, this behaviour supports male solidarity as gold-striking miners are seen to be not only celebrating but sharing their mining success with other less well-off miners, rewarding hard work as a spur to future team effort, encouraging good will and cooperation.⁵⁷ Alongside paid prostitution, large numbers of miners are involved in co-habitational relationships with women whereby the male miner relies financially on his girlfriend’s daily earnings from service sector work while the woman benefits from the sporadic higher earnings of her mining boyfriend.⁵⁸

But conspicuous largesse focussed on the social collective, contrasts paradoxically with the general reluctance of miners to display their wealth at an individual level. Many exercise great discretion with regard to the safe-keeping and ultimate expenditure of their mining income. Some whisk away their earnings to their home areas whereas the big earners are most likely to invest in housing in a nearby regional town, away from the direct observation of fellow miners. These behavioural patterns are understandable in the context of remote mining sites where there is no

⁵³ Deborah Fahy Bryceson, Jesper Bosse Jønsson and Richard Sherrington, ‘Miner’s magic: artisanal mining, the albino fetish and murder in Tanzania’, *Journal of Modern African Studies* 48, 3 (2010), pp. 353-382.

⁵⁴ Jeroen Cuvelier ‘Men, mines and masculinities: The lives and practices of artisanal miners in Lwambo (Katanga province, DR Congo)’ (Catholic University of Leuven, unpublished PhD dissertation, 2011); De Boeck, ‘Domesticating diamonds and dollars’.

⁵⁵ Cuvelier, ‘Men, mines and masculinities’, p.28.

⁵⁶ Cuvelier, ‘Men, mines and masculinities’, p.29.

⁵⁷ Deborah Fahy Bryceson and Eleanor Fisher, ‘Artisanal mining’s democratizing directions and deviations’, in Deborah Fahy Bryceson, Eleanor Fisher, Jesper Bosse Jønsson and Rosemary Mwaipopo (eds) *Mining and social transformation in Africa* (Routledge, Abingdon, 2014), pp.179-206; Geenen, ‘The political economy of access to gold’; Katja Werthmann and Tilo Grätz, *Mining frontiers in Africa: Anthropological and historical perspectives* (Köppe, Köln, 2012).

⁵⁸ For more details on the complex dynamics and uncertainties of conjugal relations in mining settlements see Deborah Fahy Bryceson, Jesper Bosse Jønsson and Hannelore Verbrugge, ‘Prostitution or partnership? Wifetypes in Tanzanian artisanal gold-mining settlements’, *Journal of Modern African Studies* 51, 1 (2013), pp. 33-56.

banking system, unreliable road infrastructure, pervasive insecurity and fear of theft or capricious state intervention.

Fourth, artisanal miners' economic autonomy is believed to be critical to achieving a better life. Artisanal miners value their economic independence, which they contrast with wage labourers in mining companies who are subject to capitalist contractual conditions and a chain of command leaving no scope for decision-making about their work.⁵⁹ In rush and boom settlements, autonomy is reflected in miners' movement from site to site in response to the relative availability of minerals. The wisdom of their locational decision-making has a major influence on their earnings. In the words of one Congolese commentator:

An artisanal miner is free. In our conception, a miner is a rich man if he does not work for another person. He goes to work when he wants, if he wants; he may work for two hours and if God blesses him he may find enough money to buy a car.⁶⁰

While miners' original motivation to work is based on individual choice, the nature of mining lends itself to the development of collective norms in the face of uncertainty, hardship and danger. Some of the collective norms demonstrate the practical value of honesty, trustworthiness, responsibility and loyalty in an occupation that demands teamwork for economic advance and physical safety. Since mining team projects may have a long duration, there are periods in which the team is hardly producing. In the DRC, the miners who are working hard to open up the tunnel and proceed in the direction of the gold vein, are called *souffrants*, or those who suffer. On the other side, some miners are observed to only show up and offer their services when a pit is about to reach peak production. They are pejoratively called *kanyata na fine* (those who go along with the fine gold), with a bad reputation for being opportunists. As a deterrent, some pit managers have devised an internal order of business whereby a miner who is absent from the pit for three months is declared to be a deserter. One mine pit manager stressed: 'everyone has to be aware of his obligations towards the other'.⁶¹

So without wanting to romanticize the sector, these collective norms evince movement from individual livelihood choices to collective professional and social identities, from diversification to specialization, and from apprenticeship to skill development. This process of occupational change suggests professionalization of the artisanal mining sector led by the miners rather than the state or customary institutions, an observable phenomenon in several mining areas in Africa, and clearly distinguishable from conflict mining which still exists in some localities of the Congo, albeit much less widespread than before. Meanwhile, large-scale corporate mining expansion has accelerated

⁵⁹ Bryceson and Jønsson, 'Mineralizing Africa'; Geenen, 'The political economy of access to gold'.

⁶⁰ Geenen interview, customary chief, Luhwindja, DRC, January 2011.

⁶¹ Geenen interview, pit manager, Bukavu, DRC, 9 June 2012; interview, local leaders, Mukungwe, DRC, 31 May 2012.

recently, existing uneasily side by side with artisanal frontier mining. However, it would be myopic to overlook the profound changes associated with artisanal mining that are influencing millions of people economically and culturally on the African continent.

Evolving artisanal frontier mining settlements

Artisanal gold mining settlements are necessarily locationally specific given gold availability. The frontier form of such sites arises from: first, gold's discovery and accessibility to artisanal miners using basic tools, and second, the window of opportunity afforded artisanal miners operating relatively free of state control and large-scale mining competition, giving scope to individual and group labour transformation. Given the high value placed on gold, such fortuitous circumstances for artisanal miners occur rarely, usually in remote, sparsely populated locations, and are of limited duration. The temporality of artisanal frontier mining modulates the social and cultural evolution of the mining sites-cum-settlements. There are three main artisanal frontier forms: the rush site, the boom settlement, and eventually a permanent settlement if and when non-mining activity becomes rooted at the location.

Artisanal frontier settlements' political context is critical to whether a site can take root, grow and evolve into boom and permanent settlements. As already mentioned, scope for the exercise of miners' individual agency, creation of a collective identity and evolution of professional norms is made possible by the weak bureaucratic presence of the central state. State agents, especially in the DRC, have a physical presence in the settlements but they are primarily engaged in collecting illegal payments, rather than implementing national laws, taxation and service provision. This is illustrated by artisanal miners' extreme difficulties to obtain legal titles to mineral rights in accordance with the Mining Code. In Tanzania, the government's field staffing is skeletal with only eight Zonal Mining Officers covering the vast expanse of the gold fields throughout the country. While access to artisanal mining rights is highly restricted, prohibition of illegal mining is necessarily light-touch, such that the vast majority of artisanal miners are mining informally. It is estimated that less than one percent of artisanal miners had licenses in 2010.⁶²

As the term implies, "rush sites" originate from artisanal miners' dash towards what they presume to be a promising mineral discovery.⁶³ Mobile phone communication amongst miners can

⁶² Only 3932 artisanal miners of all mineral types held licenses, out of an estimated total 685,000 artisanal mining population (Tanzania, Ministry of Energy and Minerals, 2010).

⁶³ See also Katja Werthmann 'Gold rush in West Africa'; Christiana Panella (ed.) *Worlds of debts. Interdisciplinary perspectives on gold mining in West-Africa* (Amsterdam, Rozenberg Publishers, 2010); Robert Pijpers, 'When diamonds go bust: Contextualising livelihood changes in rural Sierra Leone', *Journal of International Development* 23 (2011), pp. 1068-1079; Andrew Walsh, 'After the rush: Living with uncertainty in a Malagasy mining town', *Africa* 82, 2 (2012), pp. 235-251.

catalyze mass movement and extremely rapid population growth. For example, the discovery of gold at Ikuzi, an uninhabited forested area in Tanzania, generated a sudden rush in July 2010. The site is proximate to a small agro-pastoralist village in Geita, a mining region in northwest Tanzania. Within weeks, the incoming migrant miners led to a fluctuating population concentration of between 9,000 and 13,000 people, in an area without sanitary facilities or residential services. When the site was surveyed in 2012, artisanal mining was ongoing but gold discoveries had subsided. The number of miners had decreased such that the total population including the original villagers constituted an estimated 5,000 and 6,000 people. At the mining site, young men were most numerous, living as bachelors with no on-site family ties.⁶⁴ Much of the housing accommodation still consisted of tarpaulin tents. Villagers from the nearby settlement were selling food and water to the miners. The main income of heads of household in Ikuzi was overwhelmingly artisanal mining (69 percent) with trade (19 percent) trailing far behind. Most of those who had not listed mining as their primary occupation (17 percent) had it as their secondary income.⁶⁵ The miners' lifestyle was one of hard work during the day and pleasurable pursuits at night. Having started as a self-governed site by miners, the site's interdependence with the nearby village brought about power-sharing governance by local leaders and the miners.⁶⁶

Evolving from rush sites, boom settlements are testimony to the fact that gold has pulling power for mining and non-mining populations alike. The latter are attracted by the business opportunities arising from miners' gold-backed purchasing power. With the inflow of non-mining migrants, the demographic profile of the settlement takes on a more balanced pattern in terms of gender and age. Boom settlements wax and wane with the gold supply. Nyarugusu, a mature artisanal gold mining settlement in northwest Tanzania, experienced its big rush and consequent boomtown existence in the 1980s, following multiple gold discoveries. By the mid-1990s people were starting to fall back on agriculture. In 2012, the population retained a strong migrant character. The settlement had the atmosphere of a small commercial town surrounded by agricultural farms and artisanal mining ventures further afield.

The sex ratio was almost balanced. Forty two percent of household heads pursued artisanal mining as their primary income source, with farming equally strongly represented.⁶⁷ The rest had a variety of operations in trade and services. In the preceding ten years, 61 percent of the interviewed household heads reported mining as their main income source with only 22 percent relying

⁶⁴ The average duration of residence in Ikuzi was 1.7 years. There was a high sex ratio of 130 males to 100 females and an extremely low dependency ratio of 9.8 percent (DfID-ESRC funded *Urbanization and Poverty in Mining Africa* (UPIMA) project data, 2014).

⁶⁵ Jesper Bosse Jønsson, Deborah Fahy Bryceson, Crispin Kinabo and Mike Shand (forthcoming) 'Getting grounded? Migrants' household and occupational formation in Tanzanian mining settlements', in *Urbanizing mining settlements in 21st century Africa*, derived from UPIMA 2011-12 project data.

⁶⁶ Bryceson and Fisher, 'Artisanal mining's democratizing directions'.

⁶⁷ Jønsson et al, 'Migrants' household and occupational formation'.

primarily on farming. Despite diminishing mineral availability, Nyarugusu residents survived or thrived as a settlement through diversification of their livelihood strategies. The settlement was in a position to benefit from gold rushes at outlying sites in a radius of 10 to 20 kilometers. Miners from the new rush sites patronized the existing shops, bars and restaurants of Nyarugusu. In so doing, Nyarugusu avoided sliding into being an agricultural backwater or ghost town, and instead edging towards permanence. Its traders and service providers were doing reasonably well, albeit the rising incidence of farming suggests that not all residents were engaged in the entrepreneurial boom.

In permanent settled sites such as Kamituga in the DRC, the population consists of a mix of local and migrant men, women and children. Kamituga currently has about 100,000 inhabitants, compared to an estimated 56,000 in 1999 and 33,000 in 1992.⁶⁸ Although historically a colonial mining town, two moments in recent history catalyzed an acceleration and intensification of artisanal frontier mining: liberalization in the early 1980s and the wars in the late 1990s, which both provoked declining attractiveness of agriculture and public sector employment. As industrial mining activities were heavily affected by the country-wide economic and political crisis, artisanal mining gradually became the dominant activity and a hereditary occupation, generating an experienced and skilled workforce, living and working in close interaction with one another.

Legally, Kamituga remained part of an industrial concession, but weak enforcement on the part of the company as well as the Zairian state created considerable scope for artisanal miners to organize their work, in consultation with customary chiefs and individual state agents. After the end of the war, there has been a change in attitudes. Conspicuous consumption is still part of young men's lifestyle, but the earnings from gold are also invested in their own or their children's education, in business, a house, livestock or agricultural field, or, as one of the more popular investments, bridewealth. More recently, a transnational gold mining company has started exploration in the Kamituga concession, suggesting the temporality of artisanal mining despite its generational transmission in this settlement.

Conclusion: The fading frontier

In this article artisanal frontier mining is conceived as a process of occupational rather than spatial transformation, emphasizing the significance of labour activities and the internal dynamics of relations between the miners. The emergence of an artisanal mining group identity crystallizes as a distinct occupational frontier juxtaposed to the agrarian work regime and social relations of local

⁶⁸ Geenen, 'The political economy of access to gold'.

farming communities, expressed in the collective interests that artisanal miners pursue in their encounters with the state and the local population.

The frontier's temporality emanates from gold as an ephemeral natural resource whose physical availability becomes more elusive as extraction deepens. The occupational development and settlement patterns that evolve on this material foundation are best understood as a process with uncertain timing but inevitable eventual decline. It is therefore tempting to depict the artisanal mining frontier as flaring with the discovery of gold, igniting the rush for gold, reaching full combustion during the boom when mining and non-mining livelihoods expand alongside rising mineral extraction, but eventually extinguished by changing physical and political circumstances.

Tanzania and the DRC, for different reasons, have had a limited or ineffectual state presence in the gold fields, providing a window of opportunity for artisanal miners over the past decade. Nonetheless, mineral-rich African states are keen to attract foreign mining investment, attuned to the far higher royalty and tax-generating potential derived from large-scale mining's excavation of deep seams of gold-bearing ore.⁶⁹ The artisanal mining frontier erodes in the face of a growing political coalition between the state and large-scale corporate mining, which includes both legal contractual and corrupt alliances. This globally recurring historical pattern affords artisanal frontier mining at best a few decades to operate.

What is the future for artisanal miners in the face of the frontier's inevitable demise? In Tanzania and DRC, artisanal miners have five main pathways. First, they may move to areas designated as artisanal mining zones by the government. This will only work if those zones prove to be productive and accompanied by sufficient incentives in the form of technical, material and financial support for artisanal miners. Second, the miners may reside adjacent to large-scale mines and endeavor to gain a livelihood from processing mine-owned tailings or deposits either legally or illegally depending on the policy of the large-scale mine, but often under highly uncertain, contestable circumstances. Third, they may remain *in situ* or move elsewhere to farm. This is likely to be a fallback measure of necessity rather than choice. Fourth, some artisanal miners who have planned ahead and managed to accumulate savings during their mining careers may invest in business ventures, often in nearby regional towns. This avenue generally results from the miners' anticipation of the limits of their physical capacity as they age and their awareness of marginalization by corporate mining. A few of the entrepreneurially-minded artisanal miners may have ways, means and energy to follow a fifth path, that of becoming medium-scale miners deploying intermediate mining technology between large and small-scale techniques of gold production.

⁶⁹ Bonnie Campbell, 'Introduction' in Bonnie Campbell (ed.) *Mining in Africa: Regulation and development* (Pluto Press, London and New York, 2009), pp. 1-24.

From flare to fading flame, all of the above alternative strategies point to the eventual subsidence of artisanal frontier mining, and the gradual demise of an era. The frontier fades as artisanal mining *per se* persists uneasily or covertly in the shadows of large-scale mining, either on the basis of miners' processing industrial mine tailings or on gold excavation in reserve areas that the state or an industrial mine has set aside for them. Fundamentally, this transition to non-frontier artisanal mining incurs the loss of miners' labour autonomy and restricted scope for achieving their mining objectives.

The parallel evolution of artisanal mining frontier sites in Tanzania and the Congo, despite the latter's relatively recent experience of conflict mineral production, and the uncanny similarities between them and artisanal mining experiences elsewhere in the world over the past two centuries is due to the convergence of international market forces expressed in a rising gold price. The high price provides the incentives for people without previous artisanal mining experience to try their luck in the context of a relative absence of large-scale mining interests and the local and national state. The occurrence of these conditions trans-historically and spatially have given vent to the spontaneous evolution of frontier artisanal mining briefly until, the gold supply dips beyond an accessible depth for artisanal miners, the international gold price, which has been slipping for the last two years, becomes unremunerative or the nation-state and corporate mining interests block its further development. However long it lasts, it constitutes a pivotal interlude, offering an ethos for new forms of African work creativity during the twenty-first century.