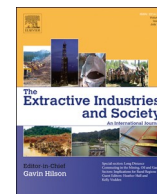




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Gender and artisanal and small-scale mining: implications for formalization

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ABSTRACT

This paper explores the gendered contexts of artisanal and small-scale mining in sub-Saharan Africa, and traces how women are likely to be excluded from current policy pushes to formally regulate the sector. Drawing on qualitative and quantitative research results from six artisanal and small-scale mining (ASM) sites, two in each of Democratic Republic of Congo, Rwanda and Uganda, the paper traces how the gendered organization of mining roles, when viewed in relation to women's disproportionate household and care work, and the gendered norms around what women *should* do, devalues and delimits women's mining work. The result, we argue, is that most women will be unlikely to access mining licenses or join and effectively participate in decision-making in miners' associations/cooperatives. Seemingly neutral interventions like licenses or grouping miners into cooperatives may thus incorporate while normalizing existing gendered exclusions. The paper argues for a recalibration of ASM formalization to ensure that gender is placed at the centre of design and implementation.

1. Introduction

Efforts to formally regulate artisanal and small-scale mining (ASM) have proliferated in recent years, with state and donor-funded ASM interventions unfolding in various countries in sub-Saharan Africa. The focus on 'formalizing' ASM – integrating it into the formal economy through legal regulation (licenses, for example), taxation, financing, and technical improvement – is not new. Various attempts to increase state regulation of the ASM sector have been underway since at least the 1990s and even the 1980s, with uneven effects (Hilson and McQuilken, 2014: 108–9; Perks, 2013). Formalization continues to be the primary framework in which current approaches to regulating the ASM sector are envisioned, and there is now a renewed momentum around formalization plans and discussions (Hilson and McQuilken, 2014; Marshal and Veiga, 2017).

The current push for formalization is unfolding at the same time that 'gender and women' are also being included in policy frameworks and some ASM interventions (see e.g., Mosi-oa-Tunya declaration),¹

sometimes only in the form of textual additions. The African Mining Vision (African Union, 2009), for one, calls for "gender equity" in ASM and the "empowerment of women through integrating gender equity in mining policies, laws, regulations, standards and codes" (2009, 32). The gendered effects of efforts to formalize ASM, however, have received limited attention (but see Fisher, 2007; Bashwira et al., 2014; Hilson et al., 2018). This paper draws from qualitative and quantitative research on women's ASM livelihoods carried out between 2015–2017 in six artisanal mine sites in Democratic Republic of the Congo (DRC), Rwanda, and Uganda, to consider women's ASM livelihoods and the implications for women's ability to benefit from formalization schemes. While this study is not about how formalization initiatives unfolded in these sites, it offers an assessment of how gender operates to organize women's ASM activities and relations in ways that make it unlikely women will access ASM formalization efforts particularly those focused on mining licenses and establishment of mining associations.

The first substantive part of the paper provides an overview of ASM formalization as a policy objective and some of the challenges facing

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formalization efforts in sub-Saharan Africa and elsewhere. Feminist political economy and gender and development scholarship on social reproduction and women's household labour is also introduced. We argue that gendered divisions of labour within the home and mine site are interwoven with implications for the ways in which women navigate their ASM work. Drawing from our quantitative and qualitative research we explore in the third section how the gendered organization of mining roles, when viewed in relation to women's disproportionate household and care work, and the gendered norms around what women *should* do, devalues and delimits women's mining work. Women's ability to access the networks and skills needed to develop other mining roles, build mining "occupations" or "careers" (Bryceson et al., 2014: Ch.'s 2, 3), and take advantage of emerging mining opportunities are also circumscribed, as discussed in section four.

Section five considers authority structures found in our study mining areas as themselves gendered institutions in which women have limited voice or participation. These very same structures, and the individuals (usually elite men) who occupy them, however, are often in the strongest position to access licenses and lead the miners' associations prioritized in some formalization initiatives. We explore in this section how authority and decision-making structures in the study sites remain out of reach for most of the women, and some of the men.

1.1. Methodology

Research was conducted in six mine areas: a cluster of gold sites in Ituri province and a cassiterite and wolframite mine in South Kivu, DRC; a wolframite mine in northern Rwanda and a cassiterite and coltan site in the south; a gold site in central Uganda, and a cassiterite site in the west. Research methods included participant observation in six sites which then informed a survey (878 people were surveyed over the six sites plus a seventh site in eastern DRC), followed by focus group discussions (60 over six sites, involving over 400 participants), and finally life history interviews (28 in total) (see: Buss et al., 2017).

Local research teams, hired in each country/region, visited the mine sites multiple times over a 2.5 - year period (2015–2017). Different mining community members thus participated in the distinct stages of the research. The survey, translated from English into French and Kinyarwanda and then into appropriate local languages, included a sampling strategy specifically designed to over-sample women, and to sample women and men across a range of mining roles including in ancillary economies. Focus groups also were organized to include women and men from a range of activities. Most, but not all groups were single-sex, with participants working in similar tasks (i.e., a group of women processors; one with male diggers or buyers; another with women vendors). The three countries in the study are members of the International Conference on the Great Lakes Region, a regional interstate body endeavoring to harmonize mining laws across member states including laws aimed at addressing linkages between mining and armed conflict. As such they were involved in regional and national discussions about ASM formalization. Legal frameworks and some mining institutions in the three countries have continued to change since the research was completed.

2. Introducing ASM formalization and social reproduction

'Artisanal and small-scale mining' (ASM) refers to a form of mining that generally uses minimal technology, requires large amounts of physically demanding, even dangerous labour, and is routinely undertaken at the margins of formal economies and formal legal sanction. The term 'ASM' problematically merges different forms of mining – artisanal and small-scale – at a time when they are being differentiated in legal and policy interventions, while also potentially lending an "ennobling connotation" to mining understood as artisanal (Lahiri-Dutt, 2018: 3). We use 'ASM' because it is in wide circulation particularly in relation to the current momentum around formalization.

Formalization activities in sub-Saharan Africa have tended to focus on legalization; introducing more laws and policies that define the conditions in which ASM activities will be formally legal. Requirements for ASM mining licenses and the formation of miners' associations, together with prescriptions on mining methods and locations predominant in formalization initiatives. Various scholars and advocates (see e.g., Barreto, 2011; Marshal and Veiga, 2017) have argued that formalization must be more than legalization, and should include, for example, interventions to improve access to finance, credit, markets, as well as training on mining techniques, formation of associations or cooperatives, and minimizing environmental impacts (see UNITAR and UN Environment, 2018: 19 as one example of expanded formalization recommendations).

The recurring policy push for ASM formalization is often framed in terms of either or both promising greater *potential* (economic, fiscal, social) if and when formalization is properly carried out, or *problems* (environmental, economic, social, security) inimical to ASM and which will be unaddressed if formalization is done improperly or never attempted (see for example, The Africa Mining Vision, AU 2009: v). Sometimes the potential for ASM is explained in terms of the growing numbers of individual women and men working in ASM (see e.g., Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development IGF, 2018a), or the economic value to rural communities that is largely undocumented and ignored (see e.g., Barreto et al. 2018b). Discussed in these terms, ASM is seen as linked to rural livelihoods, absorption of under-employed labour, and poverty reduction (see for e.g., Economic Commission for Africa, 2011: 75). Formalizing ASM thus offers a significant potential to provide a livelihood to many, while also delivering – as yet 'untapped' – source of revenue for the state.

But ASM's *problems* also are cited by many as lending urgency to formalization efforts. These include environmental pollution and degradation (in which ASM is linked to mercury and cyanide use, water pollution and destruction of landscapes); economic barriers for expansion of the individual miners as well as limited economic benefit to the fiscus of the central or local government; armed conflict and peacebuilding (in which ASM-linked revenues are said to either fuel armed conflict when controlled by militias, or help peacebuilding when accessed for service provision); and entrenched social and economic marginalization (cycles of poverty, sexually transmitted diseases, and alcoholism said to be linked to ASM; for a discussion, see Huggins et al., 2017). Here too, formalization is seen as offering a route forward by allowing for increased state control over ASM activities (through, e.g., the power to grant or with-hold licenses), and through outreach services, so that ASM's imputed problems can be rectified (by, e.g., educating – and some might say disciplining – miners on safer or more effective mining techniques and health practices).

Broadly, the arguments in favour of formalization tend to hew to either or both these justifications; ASM as a potential boon for the state (in terms of taxation and related revenue streams), and as a means to address various problems (rural poverty, environmental pollution and degradation, persistent armed conflict). Though, as various ASM researchers have noted, both of these overlook the complex role of domestic and provincial state actors in producing the conditions in which ASM has expanded in size while remaining largely informal (see e.g., Verbrugge, 2015: 1027; Geenen, 2011: 429–430; Kelly, 2014: 102; Hinton, 2011; Perks, 2016: 332; 2013; Hilson and McQuilken, 2014: 11–112). In this contradictory context, scholars tracking formalization plans in various locations have raised concerns about their effectiveness.

Licensing regimes, to begin, have been poorly designed with high license fees (Spiegel, 2015), and "cumbersome" licensing processes (that require travel to provincial and national capitals; education and information technology skills) making it almost impossible for mining populations to comply with licensing requirements (Hilson et al., 2018: 326). Further, licensing tends to unfold in ways disconnected from

more complex property and social relations in which mining rights and title are understood and navigated by community members (Verbrugge et al., 2015; Geenen, 2012), and which shape how individuals may (or not) choose to formalize. The result is that mining licenses in some cases have increased the conditions of illegality; perversely pluralizing the ways mining populations contravene the law (Hilson and McQuilken 2014, 111–112).

The mandated formation of miners' associations and cooperatives, in turn, have tended to exclude rather than include individual miners (see e.g., De Haan and Geenen, 2016).² While the potential of miner-led organizations to offer a platform for self-advocacy and collaboration is significant, some scholars argue that formalization efforts have not realized these benefits in part because they take a top down approach to cooperative building that is in tension with existing authority structures within mine sites (see e.g., Geenen and Radley, 2014: 61).

Compounding this dynamic of state entanglement in ongoing informality of ASM is the highly technocratic approach to formalization predicated on legalization. Licensing regimes, even when specifically directed at artisanal as distinct from small-scale mining, are often expensive and bureaucratic, as are some outreach services. These regimes, and efforts to extend state monitoring (however varied and uneven), can unfold in rural contexts where typically many state services – education, health, food and personal security – are lacking or severely deficient.

Finally, ASM formalization interventions may be disconnected from changing rural labour dynamics, and could exasperate, rather than redress, forms of social inequality and marginalization. ASM populations, far from being homogenous, are stratified by a range of social differences including gender, age, ethnicity, place of birth, and so on. ASM is expanding and so too is investment in ASM by various national, regional or international actors. Boris Verbrugge's research on ASM in *Philippines* (2015: 1030) for example, finds that “the injection of outside capital has led to a growing differentiation among ASM operations in terms of their level of capitalization and professionalization, but also between a nascent group of ASM entrepreneurs and a poverty-driven workforce.” Access to permits or other mining rights available through formalization tends to be limited to ASM “entrepreneurs” with the labour force remaining informal (Verbrugge, 2015: 1039; see McQuilken and Hilson, 2018, for similar findings in diamond ASM in Ghana). This ‘persistent informality’ is shaped by social and other differentiations (Fisher 2007). The ASM sector in Tanzania, Eleanor Fisher finds (2007: 751), “is highly differentiated: according to mineral type, scale of operations, geographical location, miners' socio-economic backgrounds, and individuals' social identity and role within the labour process. Thus, in practice, the system favours small-scale operators with education, assets and experience of interacting with officials.”

While there is now an emerging scholarship on ASM populations and the conditions that impact their access (or not) to mining rights, few explicitly consider gender in relation to formalization (but see Hilson et al., 2018; Bashwira et al., 2014; Fisher, 2007). This research gap is significant in a context where formalization is still broadly endorsed by many policy actors and some researchers (see e.g., Marshall and Veiga, 2017) as the best means for harnessing ASM's imputed potential while redressing its presumed problems. At the same time, ‘gender mainstreaming’ is also embraced in various policy documents, including mining policies in sub-Saharan Africans that are ‘domesticating’ the Africa Mining Vision (UN Women, 2016: 24–25). Rwanda, in particular, has taken several steps to extend its gender mainstreaming policies to the mining sector including setting a target for 20 – 30% women in the mining workforce (for a discussion see Nsanzi-mana, Nkundibiza and Mwambarangwe, forthcoming). Yet, the

justifications for and portrayal of women's ASM involvement in various policy contexts reinforce the ‘either/or’ narrative structure typically deployed to promote formalization: women are either part of the untapped potential of ASM (hence ASM formalization will strengthen women's economic empowerment) or are a further reason for correcting the ills of ASM (in which ‘women’ figure primarily as victims or linked to child labour). While these different characterizations of ‘gender mainstreaming’, like ‘ASM mainstreaming’, cleave to state and donor agendas framed in terms of ASM's ‘potential’ and/or ‘problems’, what is remarkable is how little gender inclusion, even at the level of rhetoric, is found in research, design, or implementation of formalization schemes.

In the following discussion, we draw on field research in six artisanal mine sites (two in each of DRC, Rwanda and Uganda) to explore how gendered norms and relations, and women's social reproductive roles shape women's mining-related livelihoods revealing distinctly gendered challenges for formalization interventions. There are some limitations in our data for this purpose. Our study was not designed as an exploration of formalization efforts per se. Further, the study was focused on specifically women's ASM-related livelihoods to understand how gender operates to structure how women navigate those livelihoods. Gender also shapes men's ASM livelihoods, directing young men to hard and dangerous digging work for example (Fisher, 2007: 741; Cuvelier, 2016; Bryceson et al., 2014).

Nonetheless, tracing how women currently navigate ASM livelihoods illuminates the operation of gender norms and structures within which ASM sites are organized, offering an important vantage from which to consider how formalization schemes inattentive to gender inequalities and the operation of gendered institutions, are likely to sediment or even exasperate inequality. We look more specifically at the significance of social reproduction in shaping and constraining women's ASM work, with important implications for women's potential to benefit from, or even participate in formalization efforts.

Social reproduction in feminist political economy scholarship refers to “the activities and attitudes, behaviours and emotions, responsibilities and relationships directly involved in the maintenance of life on a daily basis, and intergenerationally...” (Laslett and Brenner, 1989: 382, quoted in Luxton, 2006: 35–36). What makes social reproduction more than “a fancy term to describe the ordinary activities of daily life” is that it explores how the “production of goods and services and the production of life are part of one integrated process” (Luxton, 2006: 37; Battacharya, 2017; Bakker, 1994). Recognizing the imbrication of social and economic structures, scholars in the field of ‘gender and development’ (Rai et al., 2019; Pearson, 2014; Beneria, 2003; Kabeer, 1994: Ch 5; Moser, 1989; Mies, 1986), have explored the persistent, gendered allocation of household and care activities to women in the global South, and the impacts this allocation has in shaping their “time poverty” (Ringhofer, 2015), hence the time available for other income earning activities (Zacharias, 2017). Some scholars map the impact of women's ‘double burden,’ while others, like Caroline Moser (1989, 1801) refer to women's “triple role” that includes women's grassroots organizing to address “inadequate state provision of housing and basic services such as water and health.”

In the sections that follow, we examine women's ASM livelihoods in the study sites in terms of women's social reproductive roles, limiting our attention to women's double burden. While gender inequality is clearly evidenced by national and mine site education levels, and the gendered organization of mining roles, the relationship between these and women's mining livelihoods needs further interrogation. As Meg Luxton notes (2006: 31), sexual and gendered divisions of labour “do not necessarily produce gender inequality. Rather, women's oppression emerges in relation to specific forms of social organization and subjectivity.” Asanda Benya (2015), exploring women's employment in underground mining roles in large-scale platinum mines in South Africa, tracks how women are isolated, alienated and ultimately excluded from key mining roles. We find analogous processes and explore

² The gendered impacts and differential experience of women and men miners excluded through cooperative formation has not, however, been addressed by these scholars.

in this section how a gendered division of labour is *re-created* in our study sites which, together with time limits imposed through household obligations, restrict women to mining roles that mirror domestic responsibilities of helping and taking care of men. These factors, then, limit women's access to mine work, knowledge and relationships that would facilitate their move into other roles, acquire more advanced mining skills, and take advantage of "opportunities embedded in the collegial networks" that Bryceson and colleagues (Bryceson et al., 2014: 9; Ch. 2) say is the case for men miners in some ASM sites.

3. Structural inequality and exclusion from access and rights over mineral resources

Women in the three countries in this study – DRC, Rwanda and Uganda – all face marked inequalities in economic, educational, personal and political spheres. Each of the three countries is ranked as "low development" in the United Nations Development Programme's (UNDP) Human Development Index (2018).³ While all legally recognize women's formal equality rights, women still have lower educational and income levels than men, and experience high rates of inter-personal violence (see UNDP, 2018). These gendered differences in equality and human development metrics all point to persistent gender norms, relations, and practices shaping women's lower educational levels, higher child and household caring obligations, and lower pay and access to well-paying jobs. For example, in a 2010 study (Slegh and Kimonyo 2010: 41) just over 70% of men, and 80% of women in Rwanda "totally agreed" with the statement that "a woman's most important role is to take care of her home", while just over a third of men agreed (with 28% women concurring) that "a wife who earns more than her husband provokes violence".

A 2014 version of the same study in eastern DRC also found that both women and men believe there should be different, unequal roles for women and men in private and public life. Men, the report found, "are generally skeptical about gender equality, and women have internalized many of the norms that sustain their subordinate position relative to men" (Slegh et al., 2014: 8). As in Rwanda, many women and men in eastern DRC agreed (totally or partially) that "a woman's most important role is to take care of her home" (74% men, 86% women) (2014: 32). In interviews, "most men" expressed the view that women "should not receive as much education as men" (36), with about a third of men surveyed, and a quarter of women did not support a law guaranteeing women equal salaries (37). In a Ugandan social institutions and gender survey (OECD/Uganda, 2015: 14), 45% of survey respondents felt that girls should be married by the time they reach 18 years (but that men should be married later), with 57% agreeing that sometimes domestic violence against women is justified.

The effects of structural disadvantage in the seven⁴ survey sites echo these national trends. For example, the women and men surveyed had marked differences in education. Women were consistently more likely than men to have no schooling at all, while men were much more likely than women to have completed elementary/primary or beyond (see Table 1).

The family unit, as Maria Mies (2014 (1986): ch. 3) so powerfully demonstrates, is a crucial structure shaping women's position within gendered divisions of labour, and this appears true also in our research sites (see further discussion below). As predicted by scholars like Chant and Brickell (2014), family structures not adhering to a patriarchal, married model, particularly female-headed households, were present in the sites studied, but with different implications for women than men.

³ Rwanda has the highest ranking of the three at 158 out of 189 countries, Uganda at 162 and DRC at 176. In the 2018 Statistical Update, all three remained at or near their 2016 ranking (see p. 24).

⁴ While six sites were the focus of both survey and qualitative research methods, a seventh site, in eastern DRC, was surveyed only.

Table 1

Descriptive statistics by gender and by country (Mean or %).
Source: Own data (2015)

	Rwanda		DRC		Uganda	
	Males	Females	Males	Females	Males	Females
Age (years)	32.2	33.0	36.3	35.3	34.7	31.1
(SD)	11.0	11.3	11.2	11.4	10.7	10.8
Marital Status						
Married	56.0	31.7	55.2	42.8	78.7	50.8
Cohabiting	6.0	12.2	29.7	26.3	8.3	15.4
Not Married/Cohabiting	38.0	56.1	15.1	30.9	13.0	33.8
Multiple Wives	5.6	7.7	13.2	24.2	18.5	30.2
Education						
No schooling	10.7	27.7	8.6	42.0	3.7	21.5
Some elementary/ Primary school	36.7	33.7	31.0	29.3	47.2	50.0
Elementary/Primary school completed	37.2	18.1	10.1	6.9	21.3	9.2
More than Elementary/ Primary school	15.4	20.5	50.3	21.8	27.8	19.3
Presence of Child < 18	60.2	79.5	83.9	89.2	89.8	85.4
Sample Size	171	83	192	194	108	130

Women surveyed were much more likely than men to be either divorced/separated, widowed, or never married: 36% of women compared to 22% of men (see Table 1). Qualitative data, discussed further below also underscores that women's household responsibilities (children, house and home, likely agricultural work) was a significant focus of their time (see Tables 4 and 5). While both women and men reported having multiple children in the household, women spent less time in the mine site than men, citing family obligations and seasonality as the main determinants of their time doing mine work (see Tables 4 and 5). There is clearly need for more research and analysis on marriage and other conjugal relationships in mining zones (see e.g., Bryceson et al., 2013), but this data points to a sizable number of women accessing ASM who are on their own, without male support, or in less secure/formalized conjugal arrangements, and balancing their livelihoods with significant home and childcare responsibilities.

The survey data also revealed a gendered division of labour operating across the mine sites. Women were found primarily in processing roles or selling food and related services, as demonstrated in Table 2. While there were clear differences in the roles performed by women and men in different mining areas, strongly held normative injunctions against women going into mine shafts (galleries, pits) or doing particular mining roles, were found across the sites (see Buss et al., 2017).

In the following discussion, we explore in more detail the gendered norms and institutions that women navigated, and in ways that combined to structure their ASM livelihoods. Gender and sexual-based violence were raised in some of the research, with some women speaking of issues concerning intimate partner violence, rape, theft of mining earnings, fear of attack in mine sites, as challenges they negotiated in their livelihoods. These issues, while clearly important were not a main focus of our research and we do not explore them in detail here (but for more analysis, see Kelly et al., 2014).

4. Women's Mining Roles and Gendered Divisions of Labour

The social and normative constraints on women's mining roles that effectively cluster them into marginal processing roles, with digging and related work reserved for men, has been well demonstrated (e.g., Rutherford and Buss 2019; Hinton 2011; Hinton et al., 2003; Yakovleva 2007: 34). In this section, we explore some of the implications of these constraints. While differences in income might be an obvious outcome with women having less time for the mining work that earns them more money than available alternatives (see Table 3), we argue here that equally important, if not more so, are impacts on how women's work is

Table 2
Activities at mine site by gender (%).

	Male	Female
Head of mining team/chef d'equipe/head of mill	11.04	1.97
Digger	63.91	14.25
Washing the ore	4.67	14.50
Grinding the ore	1.70	20.39
Sluicing	9.98	0.74
Panning	25.69	19.66
Carrier of ore	9.77	27.52
Carrier of water or firewood	6.37	18.67
Administrative work	1.06	1.47
Trading in the mineral/product	7.43	7.86
Selling food/water for personal consumption	1.49	23.59
Selling other provisions for either personal consumption/ production	1.49	8.85
Selling services (including sex)	2.34	4.42
Open cast mining	0.42	3.93
Other	3.40	2.70
Sample size	471	407

Table 3
Average Mine Site earnings (USD, 2015) by gender and country.
Source: Own Data (2015)

	Rwanda		DRC		Uganda	
	Males	Females	Males	Females	Males	Females
Monthly Earnings	110.92	109.63	264.66	133.30	497.50	408.17
(SD)	97.56	110.85	345.51	138.70	845.58	1318.04

perceived and valued in the sites studied. The types of mining roles performed, and the way these roles are organized in the six study sites reinforce a characterization of women's mining work as supplementary to the main mining activity. Further, women's mining roles, combined with strong social norms governing their home and childcare responsibilities, impacts women's access to training, knowledge and networks.

4.1. Gendered Divisions of Labour: Income and Time

The normative demarcation of women's mining work that consistently limits their access to digging roles has various consequences. To begin, the quantitative and more so the qualitative data from our study suggest that the exclusion of women from some of the more well-remunerated roles (digging, for example) adversely affected their income levels. The mean monthly income reflected in Table 3 is less for women than men in all three countries, but because of the large dispersion in reported income, we cannot conclude that the average income is different for men and women.

In qualitative research (focus groups and participant observation) from the six sites, however, women and men often asserted a clear difference in mining pay. A male leader in the Uganda gold mine site, after explaining that the bar on women going into shafts is both a cultural norm and a formal rule in the site miners' association, said "of course it affects their income because they fail to get money they would have got like men." Rwandan women made similar observations, noting that women "cannot dig" and "they cannot do panning. These works are done only by men". Women work at transporting or removing ore from the tunnels, but "this activity does not pay as much as digging or panning. Currently, diggers and panners are paid 2000 (Rwf/day; USD 2.62), while transporters of ore materials are only paid 1000 (Rwf/day; USD 1.31) which is not enough to survive."⁵

Across the sites surveyed, women worked fewer hours and days at

mining than did men (see Table 4), and family obligations and other income activities were the main determinants of their mining time (Table 5). One woman in the Uganda gold site captured this dynamic noting that women earn less than men not only because men can "work harder" and are able to dig deeper in mining activities, but also because men "are not disturbed by domestic chores. For me, I have to first attend to children and do domestic work. Men also do mining all days from Monday to Saturday. For me, some days can be very busy and I don't go to mine; I kill a day to dig in the garden."

The second highest determinant of hours worked for both women and men is seasonality (see Table 5). This refers to the role of the rainy and dry seasons in shaping work in ASM sites and other livelihood activities such as farming. As noted by others (for a brief review and discussion, see Hilson and Garforth 2012, 448–451), in some artisanal mining sites the rainy season altered the type and intensity of mining activities and the importance of non-mining livelihoods like farming for some women and men who otherwise would be mining. For example, in the Ugandan tin mine fewer women did mine work during the rainy season as women more than men had more tasks in the gardens and farming plots. Most of the people working at this mining site lived in, and were from, farming villages adjacent to the tin mines. Similarly, men and women in the South Kivu cassiterite and wolframite ASM zone noted that the productivity of the mine rose during the dry season, while during the rainy season there was less work being done and thus fewer people working.

The limits on women's time in the mine site has enormous implications for their earnings. Survey data on income earned from non-mining activities across the seven mining areas (see Table 6), reveals that men earn more than women in all three countries from these other livelihoods, and, notably, women and men's mining incomes are higher than earnings from outside activities (except for males in DRC). Particularly striking is the ratio of earnings at the site to earnings outside the mine site. This ratio is markedly higher for women than men, meaning that mining livelihoods are relatively more valuable for women than men. In Rwanda, men earn approximately 30% more at the mine site compared to non-mining activities, while women earn 223% more, and in Uganda men earn 64% more at the mine site while women earn 335% more. In this context, women's household obligations that reduce their time in the mine site and/or divert them to non-mining activities has an exponential effect.

4.2. Gendered Division of Labour at Home and Mine

The gendered norms that govern where and how women work not only exclude them from some jobs, they cluster women into activities that are generally seen as supplementary to, but not the core activity of, mining. For example, in the hard rock gold mining sites in Ituri, DRC, most women worked as *butufé* (crushing and grinding stones left by diggers); assisting male teams of diggers by transporting stones or washing the sand from crushed stones; as *moto- pompistes*, assisting male diggers remove water from shafts; cooking and selling food (*restaurants de fortune*); or in some combination of these roles. In these roles, women worked on their own, or assisted husbands or male family members, but they were not considered part of the team of diggers, who were all men, often family members or friends from the same ethnic group (for more discussion of male teams in this general area, see De Brier and Merket 2017, 20–21).

The roles that women do mirror some of their household responsibilities (carrying water, providing food, supporting others), and are accorded less value than other mining roles. For example, women in the two DRC sites, were not listed as part of the mining labour force on official documents, and nor were they expected to have an artisanal mining card. In the DRC tin site, women did not need to pay a tax (or share) to the chief as the men did (though they paid other taxes). While offering some obvious advantages, this omission meant that women were not seen or recorded as 'miners' meaning they would not be

⁵ Based on average exchange rate of 0.00131 as of Jan/February 2016, when this field research was conducted.

Table 4
Hours worked at the mine.

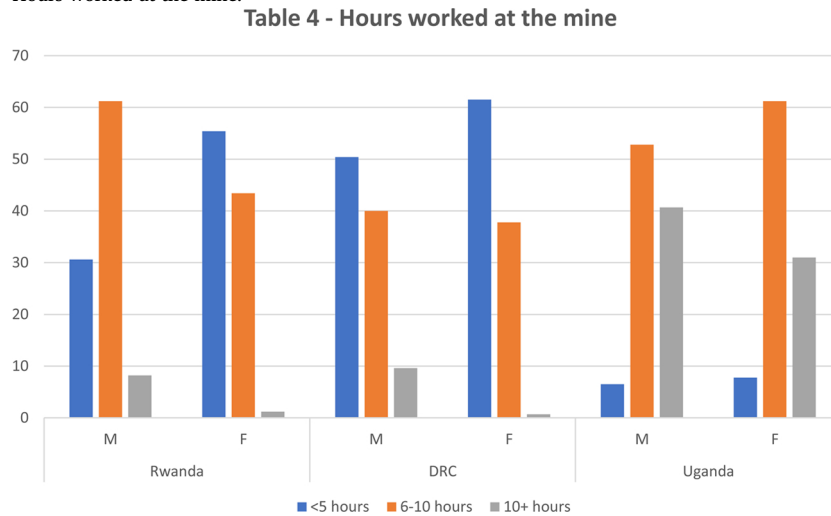


Table 5
What determines hours worked by gender (%).
Source: Own Data (2015)

	Male	Female
Set by Supervisor	26.51	8.29
Seasonality	20.44	16.29
Family Obligations	11.85	30.08
Other Income Generating Activities	1.94	10.03
Religious Observance	0.43	4.26
Nature of Work	9.98	9.34
Financial Need	5.10	3.93
Health	6.79	4.91
Husband	0	0.98
Myself	2.76	1.97
Resource Constraints	4.67	5.90
Customer/Demand	2.97	8.11
Other	0.42	1.23

positioned to access formalization initiatives.

Women's obligations in the home also played a significant role in determining how they organize their mining livelihoods, but also how others valued their mining work. In some focus group discussions and

life histories, women and men depicted women as less reliable as mine workers because their household responsibilities meant their work-day was shorter, they arrived late, had to leave early, or had longer absences when pregnant, for example.

Qualities of punctuality, reliability and constancy become the ostensible justification for prioritizing certain (male) workers, effectively erasing the reproductive work that women do (and which makes it possible for men to be at work on time). For example, a male sub-contractor in Rwanda noted that the better remunerated job of digging requires a "long time in the tunnel" and that "women are always rushing; they cannot stay a long time as men [do]." In the Uganda tin site, men said that membership in their mining gangs allowed them to earn more, but that membership was only possible for those who are "punctual at the site so that we start mining early." Finally, a Rwanda woman sub-contractor explained that one of the main reasons women are poorly represented in mining is because "they change styles of life more than men Here I mean that men are always the same and keep being available for any job, whereas when women fall pregnant or give birth, there are changes that would be aligned with their jobs. That is why they are likely to abandon their jobs." Indeed, women in the casiterite site in Rwanda reported that pregnancy was not considered by

Table 6
Average Monthly Earnings (USD, 2015) by gender and country.

Table 6: Average Monthly Earnings (USD, 2015) by gender and country

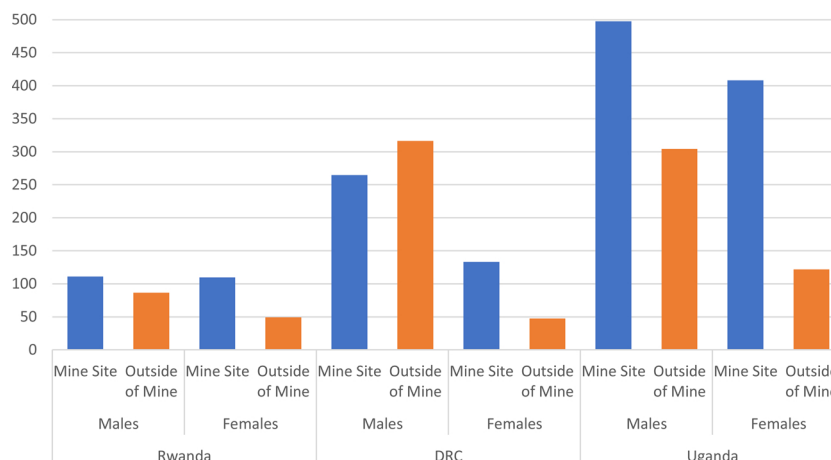
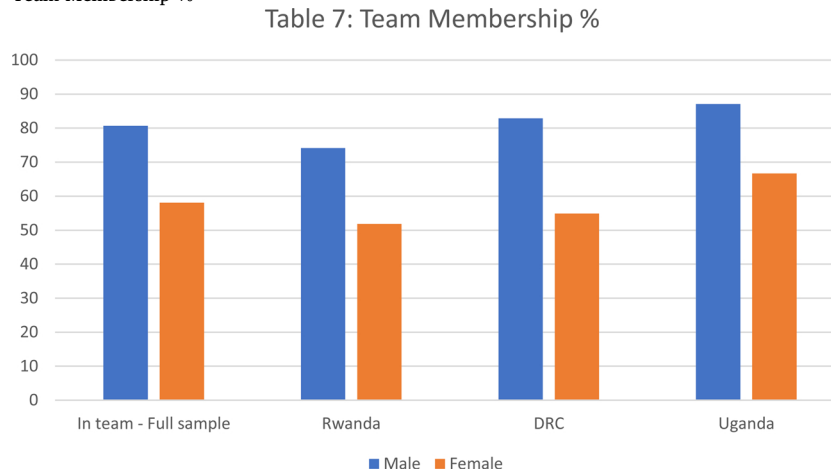


Table 7
Team Membership %



supervisors when assigning mining roles. “There is no issue of consideration, no one is interested in whether we have children or not or if we have husbands or not. Work organization is the same for all workers in tunnel there is no privilege.” In these comments, gender norms infuse expectations of punctuality and constancy in ways that obscure the impacts of gender inequality in household caring work, while ‘gender neutrality’ in work allocation does the same.

4.3. Women’s ASM Roles and Limits of Training and Skills Acquisition

A further exclusionary dynamic facing women in their ASM roles is suggested by their participation in teams when conducting their mining work. Of the men surveyed, 81% said they worked in a team/group, compared to only 58% of women (see Table 7). Women’s livelihoods in ancillary activities, like food preparation or vending do not require working with others in a team or a group. But even for mining activities, women were more likely than men to work on their own.⁶

While some women and men noted benefits to working on their own, such as fewer inter-personal conflicts, women’s lower participation rates in work teams meant they had less access to learning and knowledge transfer that happens when working with others. While very few women or men miners had received training on mining methods, laws, environmental protection, or safety in the survey sites (see Table 8), men were more likely than women (15% and 9% respectively) to access training (which they tended to receive from the mining company or their mineshaft boss).

Without access to formal training, learning takes place largely within mining teams and relationships, to which women generally have less access. Bryceson and Geenen (2018: 309) note that male gold miners in DRC and Tanzania, for example, “acquire necessary mining skills and form vital social contacts at their mining site through informal apprenticeship.” Women’s predominance in roles that are done on their own impacts their access to different mining roles. For example, one Rwandan woman in the cassiterite site noted that while women are not “strong enough” for some roles such as digging, timbering, and panning, they also “don’t have sufficient knowledge to identify mineralized vein so that they can create a new mine/tunnel,” a view that was echoed by other women and men across the Rwanda focus groups.

⁶ The Uganda tin mine studied was an exception. Here, most of the extraction and processing was done in gangs, some of which were mixed women and men, and a few women-only. This site explains the slightly higher percentage of women working in teams (66.67% compared to 54.84 % and 51.85% for DRC and Rwanda respectively).

Table 8

Awareness of mining law, governance and receipt of training for all sites (%).

	Male	Female
Know of mining code	64.38	34.20
Read it themselves ^a	14.63	6.30
Heard about news, or changes to, laws, rules, or regulations related to the mining sector in the last 2 years	22.80	19.27
Received training on mining methods, laws, environmental protection, or safety	17.21	8.73
Ever seen a [government mining office] representative of at your mine?	70.41	55.10
Believe government officials improve miners’ lives	37.01	40.33

^a Of those who know about mining code.

5. Gendered Governance and Mining Authority Structures

ASM sites, and the mining livelihoods of women and men are often governed by various intersecting forms of authority and which often defy easy categorization as either state or non-state, formal or informal structures (see e.g., Peluso 2018: 401; Lund, 2006; Bryceson and Geenen, 2016). These authorities are important contexts in which women and men navigate their mining-related livelihoods (Rutherford and Buss, 2019), and, we argue here, access formalization initiatives.

In the following, we explore some of the authority structures and relations in the study sites, tracing how these are gendered; occupied largely by men and/or are given meaning and assigned traits that define them as masculine, even patriarchal. The range of authority structures, and their governance functions in these sites were varied, including local state structures engaged in policing and tax collection, mine-specific management structures (such as mining committees or miners’ associations or cooperatives, for example), land owners, shaft owners, mine work teams, and family units. Given the space constraints of this paper, we focus only on the authority structures that align with, or are likely to be visible within formalization initiatives, specifically: license holders, mine-site management structures (i.e., committees), and miners’ cooperatives/associations.

5.1. License Holders

Across all sites, state structures (local mining ministry offices) and, if present, customary authorities (chiefs, for example) were male dominated. Women’s lower access to education could be one factor limiting their access to public sector employment, but so too are gender norms. For example, different local and state authorities governing the tin mining area in DRC were all male dominated. When asked in focus group discussions about the role of women in their organizations, the

officials replied “There are no women in these services!” But, they added, sometimes women are hired on a day-to-day basis when there is a large amount of ore production or when they are needed to do an “inventory of all the diggers”. Researchers found women were usually employed in the office, but they were expected to stay in the office, in the background, and undertake only duties to support their male colleagues. Focus group participants said women couldn’t do the work of SAESSCAM⁷ and mining agents because some agents are subject to insult or injury. In the offices of the *chefferie* (chiefdom administrative level), women are hired as cleaners and clerks and secretaries. All the women hired in these roles are from the family of the *mwami*’s (traditional leader’s) wife.

Almost all licenses in the six sites were held by men or by male-dominated corporate bodies. For example, the four *Administrateurs de Foyer Minier* (AFM) in the DRC gold site were men, all of whom had secured state and community level permissions, albeit in forms that may not have strictly complied with the 2002 Mining Code but were seen by local actors as constituting license. Individual diggers, however, did not usually hold the *carte de creuseur* as the Code required, saying these were not necessary as they were working under the AFM’s protection. The AFMs paid varying fees to government bodies, more numerous and complex than can be fully set out here (for a more detailed discussion of fees see de Brier and Merket 2017: 37-40; Omeiyaka and Kebongobongo, forthcoming 2020).

In the Uganda gold mine, a group of five men obtained a location license to mine (see further below; Sebina-Zziwa and Kibombo, forthcoming). Members of the association said in interviews that these five men required USD \$100,000 to acquire three licenses. The official costs of a location license are USD \$300/year or \$450/two years but the fee could vary with the size of the concession (see Barretto et al. 2018a, 9). It is difficult to know if the fee of \$100,000 is an overstatement, or if it represents the full costs including informal payments to state officials and property owners to secure the licenses. In whatever calculus, the fees and logistics involved in negotiating the location licenses for this area required extensive financial and political networks which are out of reach for most women miners.

In Rwanda, artisanal mining licenses were reformed as part of a privatization agenda that reorientated the government’s role from “mineral producer to mining regulator” (Perks, 2016, 331) and which sought to attract investors capable of bringing capital to the sector. The application fee for an artisanal license during the time of the research was expensive at 300,000 Rwf (USD 393), plus Rwf 300/hectare [USD 0.39] of surface area/year.⁸ For a small-scale mining license, the fee was Rwf 500 000 (USD 655) and Rwf 300 ha/year for the license, plus Rwf 300/year per hectare (Ministerial Order #3, 24/04/2015 *Determining Modalities for Application, Issuance and Use of Mineral and Quarry Licenses*, Articles 11, 16). All licenses are held by either co-operatives or corporations, not individuals. While corporate license holders can include women shareholders, a study conducted by IMPACT of mining cooperatives in Rwanda in 2017 found that men were the vast majority of shareholders and only three cooperatives had been managed by women between 2013 - 2016 (see Table 9).

Licensing is not just granted by the state, and permissions can include formal requirements under state law, or those mandated by local authority figures such as the *mwami* (traditional leader) in South Kivu, or landowners in Rwanda and Uganda. Agreement of local government

officials, militias, or mining committees could also be required. Finally, families and familial relations may also constitute a type of authority system issuing or withholding permissions to mine and potentially governing the terms of mining work. To begin with the more formal authority structures, land owner permission was often key to both ‘formal and informal’ licensing processes in the sites studied. Land ownership across all three countries is male dominated. In Uganda, for example, an estimated 65-80% of women (and 90% of rural women) in the labour market work in agriculture (Coffey International Development, 2014: 19), yet 2004 figures reported women owned only 16% of agricultural land (Sebina-Zziwa and Kibombo, 2004). Across that country, most land is already subject to exploration license, significantly limiting the land available for artisanal gold mining (Barretto et al., 2018a, 9), constituting a further barrier to individual women and men seeking access to artisanal gold mining, while also strengthening the power of the mostly male license and land owners. In qualitative answers to survey questions about key challenges facing miners at the Uganda gold site, the role of landlords and lack of coordination between the company, association, and landlords was highlighted by women and men as both a problem and a barrier to change.⁹ For example, some men and women noted that landlords have “a lot of power, can “chase” people away, and can charge “exorbitant” fees. Other respondents noted that landlords do not “allow” change and have a “monopoly.”

For some women, permission to mine may also need to be negotiated from their families and specifically male relatives. One Rwandan woman from the cassiterite site explained in an interview that her husband’s family were strongly opposed to her mining (even though the couple had insufficient money for household expenses) worried that she would leave her husband and “become a prostitute” if she mined. The woman eventually negotiated with her husband a five-month trial period, offering to use her pay for all household expenses, allowing him to save his money. After five months, her husband allowed her to continue mining. In this case, permission to mine was negotiated but at a significant cost in terms of controlling her earnings. Other women are not as successful. A Rwandan male sub-contractor from the wolframite site noted that when women get married they leave mining “because of their husbands who refuse them to work in mining.”

5.2. Mine Site Management Structures

The management structures in place were also male dominated. In the DRC gold site, for example, the AFM, as license holder, appointed a *Président Directeur Général* (PDG, the equivalent of a chief executive officer), who looks after the day-to-day management of the mine. The PDG is normally a male relative of the AFM (son, brother, etc.), and the administrative positions under the PDG (the *camp comander*, *directeur technique*, etc.) were all men with the exception of the *mère cheffe* (mother chief), usually held by the camp commander’s wife. Many diggers said that they had a paternalistic relationship with the AFM like sons to a father. In return, the diggers paid a premium for the “father’s protection” in terms of giving the AFM a percentage of their gold. The management structure in this site was both male dominated but also patriarchal in norms and idioms.

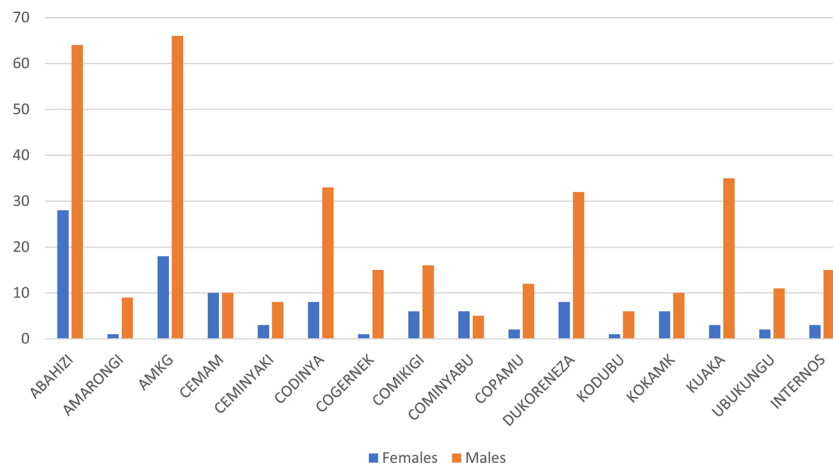
In Rwanda, the license holders managed the mine sites but sub-contracted the management of labourers. Both management and sub-contractors tended to be male, though in the cassiterite site two of the four sub-contractors were women, both of whom were known to the mine owner. In the wolframite site, in comparison, only two of seventeen sub-contractors were women. Sub-contractors in both sites required access to capital (to develop new tunnels, buy equipment, pay for health insurance and so on), the ability to take the financial risk of

⁷ Service d’Assistance et d’Encadrement de l’Exploitation Minière Artisanale et à Petite Échelle, a specialized mining service for artisanal mining. That body changed names after data collection and as of 2019, is known as: SAEMAPE (Service d’accompagnement et d’encadrement de l’exploitation minière artisanale et à petite échelle).

⁸ Based on average exchange rate of 0.00131 as of Jan/February 2016 when field research was conducted. Rwanda’s mining laws and governance structures have changed notably since our research was conducted. We do not discuss these new laws in Rwanda or in the other three countries in this paper.

⁹ The survey questions asked respondents to identify the three changes they would like to see; three barriers to those changes and three things that would help those changes to happen. See further discussion below.

Table 9
WOMEN AND MEN SHAREHOLDERS IN RWANDA MINING COOPERATIVES.
Table 9 WOMEN AND MEN SHAREHOLDERS IN RWANDA MINING COOPERATIVES



Data: IMPACT 2017

making an investment that might not generate sufficient returns, and knowledge of mining and ore seams. All posed specifically gendered challenges for women taking on sub-contracting roles.

Married women told the researchers that they would need their husband's permission in order to become sub-contractors and their husbands may be resistant to them taking on this risk. Further, women may need to pre-finance their sub-contracting work and banks, we were told, would require that loans be authorized by the woman's husband. By law, couples have joint ownership of land or houses and at times husbands were said to be unwilling to let their wives take risks with joint assets (see also [Flaherty, 2017](#)).

Hence, while each of the mining areas studied had different site-level authority structures in place that made decisions about security, movement of people or quotidian aspects of organizing the site, they were all largely dominated by men, or, in some rare cases, the female family members of senior men. These structures were also masculine and patriarchal. For some women, the patriarch in the form of the license holder or senior male mine manager, was one level of male authority they negotiated, alongside the permissions of their husbands or other male family members. Yet, not all women experienced and navigated masculine authority figures in the same way. The wife of the *mwami* in the DRC tin site, or the daughter of the AFM in the Ituri gold site were both seen as authority figures in their own right, in large part because of their family connections.

But even comparatively 'elite' women faced additional barriers to accruing the capital necessary to invest in mining operations, as the example of the woman sub-contractor in Rwanda illustrates. Without access to capital and/or land ownership, women are under-represented as license holders or mine shaft owners. This barrier meant that they are also under-represented in site-level management structures. These exclusions are circular: women's lack of access to certain mining roles impacts their access to capital and mining knowledge, constraining their ability to invest in mining ventures, excluding them from networks of mine owners, thus limiting their access to new associations of miners applying for licenses, reducing the women's chance to invest in new ventures, limiting their access to capital-making opportunities, and on it goes.

These gendered exclusions become both more acute and normalized in the trend to encourage miners' associations or cooperatives that are themselves formed out of the uneven, highly gendered social topography of mining. Even while exacerbating existing, gendered inequalities, the preference for associations and the seemingly communitarian structure of 'cooperatives,' ironically gives them a 'grass-roots'

patina; representative of the 'people' who mine. The literature on cooperatives in other sectors in the region should make one wary of assuming such egalitarian tendencies ([Huggins, 2017](#): Ch. 6). Indeed, across the research sites, there were different examples of cooperatives forming (and sometimes disbanding), each with marked gendered organization and elite dominance. The gold mine site in Uganda offers one such example as discussed below.

5.3. Miners' Associations/Cooperatives

Two of the sites studied formed cooperatives/associations as part of apparent efforts to secure formal state mining permissions. The Uganda gold site, as one example, was under an exploration license but with an arrangement for a group to establish a miners' association to organize the artisanal miners and secure access to a location license (see [Sebina-Zziwa and Kibombo, forthcoming](#)). The Association was initiated by five men, who provided most of the capital, and a further group of about 40 founding members, including some local land owners.¹⁰ The Association initially tried to organize the various miners working in the site,¹¹ levying a fee, relocating sleeping and living quarters away from mining activities. It also collected revenue taxes from the miners on behalf of the local authority who also sent in their own agent to collect taxes from non-mining related businesses such as shops and restaurants. The Association also worked with the police to provide security to the mine (along with private security provision).

In practice, all decisions within the Association were made by the five founding directors, we were told. Over time, the Association's actions, such as levying fees against different businesses, were contested, with some miners and mining businesses paying multiple taxes, and there were disputes with local landowners over perceived land encroachments. As one woman miner (who bought sand for processing) observed, "the Association only calls people when they want money but don't call us to inform us of anything good concerning the mine."

The experience of this Association, with control centered in a core group of men drawn from what de Haan and Geenen (2018: 827) would classify as traditional elites (e.g., landlords, political authorities) and new elites (mine shaft owners/investors) illustrates how gendered

¹⁰ Interviews with Association managers, 26 September 2015.

¹¹ The sub-county for the mine site estimated there were 60,000 people registered as working in ASM in the area; 25,000 directly in mining, and 35,000 in processing and services (ACMP 2017, 11).

exclusions in local authority structures are likely to be replicated and deepened in formalization efforts focused on cooperatives/associations. As women are under-represented among 'traditional' elites—customary authorities, landowners, political leaders – they are unable to access membership through these routes. Female family members of 'traditional' elites may be an exception but without significantly challenging dominant gender norms and institutions. Equally, women's circumscribed mining roles mean they are under-represented as shaft owners and related business owners. Hence, they are generally, with some exceptions, also under-represented as 'new' elites. As mining associations/cooperatives form, such as in the Uganda gold site, they reflect and entrench the gendered exclusions that are already in place, meaning that women, and likely other groups as well depending on the particular social contexts characterizing the mine site, are excluded from cooperative/association membership and decision-making.

In the other mine sites in this research where associations or cooperatives were, or had been in place, this general finding of elite male dominance holds true. At the same time, there is some evidence that associations and cooperatives, if structured to more systematically address elite and gendered bias, were seen by some women as potentially a mechanism for networking, knowledge sharing, and support.

Miners' cooperatives in South Kivu would be one example. In this region, scholars (De Haan and Geenen, 2016; Kelly, 2014) have mapped the ways in which the Congolese government's push for cooperatives as a seemingly 'grassroots' associational form, were in fact elite dominated, including by a combination of customary and political elites, extending rather than diminishing rent seeking practices (see e.g., De Haan and Geenen, 2016: 830).

Women miners in South Kivu spoke of some of these dynamics in focus group discussions. Participants included women miners (*twangeuses*) who were not in a cooperative, as well as two focus groups with women members from each of the two rival cooperatives. A number of women not in a cooperative said they could not afford the cost of joining, while others observed that they did not think women in cooperatives held important positions and nor did cooperatives appear to help women. Even some women cooperative members were skeptical about the benefits of cooperatives for women. "No woman is a mine owner whereas the cooperative should give them advantages and equip them with the means to increase their economic power," one woman said. While a woman was in charge of the Women's Committee that oversees issues such as social sensitization and literacy, some participants dismissed this role as not very important because it was not directly related to mining matters. Decisions were made by mostly male leaders, they said, and this was true of the cooperative headed by the *makamba* (the wife of the *mwami*/chief). As one member observed, the *makamba* "makes all the decisions" with the cooperative members being basically "a labour force under the yoke of the *makamba*. There is no redistribution of wealth".

Yet some women suggested that even in this context, there might be some benefits to cooperative membership. Diggers of the same cooperative would channel their business to the women who were also members, which presumably gave those women at least, more certainty about access to work, albeit from male diggers with whom they may already have had familial or sexual relationships. Another woman noted that by joining a cooperative she acquired more social standing, which was important in a context where being a woman miner was viewed poorly by the community.

In the Rwanda wolframite site, respondents in a focus group told us of an earlier women's cooperative which had disbanded prior to our research. One former member said that the cooperative tried to represent women's interests with the company (by, for example, lobbying – unsuccessfully – for women to have a separate changing room), as well as more immediate benefits such as loans and paying health insurance. Others highlighted the cooperative as a space where women could come together to "talk and to share life's experiences" including on matters they would be "ashamed" to discuss in front of men, such as "something

concerning lives, especially on the issue of family planning." Membership in the cooperative, according to these women, was also accessible, open to any woman miner who could contribute 100 Rwf/month (USD 0.13/month). The focus group participants said they wanted the cooperative back "for women miners so that their problems can be addressed."

These two different accounts of women's experiences in cooperatives between eastern DRC and Rwanda are intriguing but it is unclear what role politics, nostalgia, or grievance may have played in the respondents' observations about the positive and negative effects of cooperatives for women. These comments, and the different pictures they portray, underscore the importance of exploring the gendered contexts of miners' associations before unequivocally embracing these as a component of formalization.

6. Conclusion: Women's ASM livelihoods; Implications for formalization

In a 2018 article, Hilson and colleagues argue that policies aimed at "harnessing the potential" of ASM "could unintentionally further marginalize the more vulnerable groups now rooted in the region's informal economy" (309). Women, they observed, are one such vulnerable group. The authors call for more research and policy-level understanding of, among other things "organizational structures of informal ASM 'spaces' in sub-Saharan Africa and the people who populate them, including more insight into their initial motivations for pursuing work in this sector" (Hilson et al., 2018: 309). The discussion in this paper addresses, in part, these gaps. Drawing on qualitative and quantitative data on women's livelihoods in six ASM sites across three sub-Saharan countries, our objectives here are to consider how trends in women's ASM livelihoods reveal the real potential for women's exclusions from formalization initiatives. We agree with Hilson and colleagues that there is also a need to consider how women could benefit from gender-aware formalization and support to ASM but such interventions need to begin with an understanding of the gendered topographies of ASM and formalization policies.

The discussion above demonstrates some clear gendered patterns in the organization of mining work that will constitute barriers to women's ability to participate as 'licensed' miners. By way of conclusion, we summarize the implications of our key findings for each of these modalities. While not our focus here, the research findings on the operation of gender inequality, norms and institutions also have implications for other formalization elements such as training, or provision of financing, all of which will have their own gendered dynamics.

Licensing: Licenses in DRC, Rwanda and Uganda during the time of our research were expensive, and on this basis alone, out of reach for most women and many men in the study sites. Licensing procedures were bureaucratic, legalistic, requiring literacy, comfort with navigating bureaucracy and interacting with male government officials.

Women's experience of structural inequality means these barriers are likely to have an acute impact. Women have, on average, lower educational levels, hence, less facility with English or French as the dominant language of state bureaucracies. They are less likely to be land owners. Gender norms that equate women in mining with prostitutes may make it more difficult for them to interact with state officials in order to secure a license. Women's household and child care responsibilities will impact their access to capital for a license, as well as their ability to travel to government offices to complete necessary paper work. Gender norms about women's subservience to male family members means that many women will need to secure permission of the male head to apply for a license or invest in a mining venture. If those mining ventures are in partnership with other men, this could pose additional problems.

Further, women's roles in ASM, while varied and sometimes successful (see Buss et al., 2017: 38-47), also pose significant barriers. Women are found mostly in processing roles and many policy makers

see only the act of digging as mining (Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development IGF, 2018b: 1). Women are routinely dismissed as not ‘real miners’ even while their mining incomes are tremendously important for their families (see Buss et al., 2017).

Because women are not seen as ‘real miners’ they often are not included on lists of miners given to officials. While this exclusion may mean women are exempted from some state taxation, women are not then formally visible as miners. The mining roles open to women, which tend to be supporting or supplementing male diggers, contribute to the view they are not ‘real miners’.

Gendered institutions: Key institutions, such as the family and the local mine site committees (or related governance structures) that are male dominated and/or gendered male, also make it hard for women to be seen as real miners, to enter into more lucrative mining work, and to potentially become license holders. In some sites, women work for and at the behest of male relatives, and as a consequence, these women sometimes lose control over their income and decision-making about work itself. Patriarchal institutions like the family also mean that women require men’s permission – from male family members for example – to mine.

Across the six study sites, almost no license holders were women. If formalization efforts continue to unfold, which we anticipate, women’s exclusion from license holding can easily lead to their exclusion from other formalization interventions, such as requirements for miners’ associations and cooperatives, and the provision of mining and business training.

Miners’ Associations/Cooperatives: As with licences, women’s structural disadvantage impacts their participation in miners’ cooperatives and associations. Education levels, linguistic ability, and access to capital all directly impinge on women’s ability to join an association and pay the joining fee. Gender norms limit women’s ability to form associations with men who are not immediate family members. Household and family responsibility constrain the amount of time women spend in mine sites, hence time they have to network with others, to attend meetings, or to participate in other aspects of forming an association.

The gendered delimitation of women’s mining roles are also pivotal. Women do not generally perform mining roles as part of a team. Their work is often piecemeal, individual and done in ways that allow them to balance mining with other household obligations. This reduces their access to networks, but also access to learning about mining laws, policies, training opportunities, and technical improvements.

Women are under-represented in miners’ associations/cooperatives and largely absent from other mine-site organizational bodies, like ‘miners committees.’ Women’s exclusion from digging roles means they generally do not have the knowledge or capital to invest in developing a mine shaft or purchasing equipment that would diversify their livelihoods. License holders, as in the Uganda gold site, are often land owners, or people (usually men) who have access to capital, equipment or knowledge needed to develop a mine shaft. Miners’ associations and cooperatives are often comprised of those who bring one or more of these assets (i.e., land, mine, license, equipment, expertise). Women are systematically deterred from having or controlling those assets.

Women’s absences as license holders and members of cooperatives/associations or other decision-making bodies are often not factored into the design of formalization. The result is that seemingly neutral, even attractive-sounding interventions like ‘miners’ cooperatives’, incorporate existing gendered exclusions. Under the banner of ‘formalization’, with calls to unleash the ‘untapped’ potential of ASM, these gendered exclusions are likely to be normalized, even while the ‘inclusion of women’ is mobilized rhetorically as a justification for formalization. While multiple researchers correctly note that artisanal and small-scale mining is gendered, we also need to recognize that mining law and policy are also gendered. This is perhaps most evidenced by the example of Rwanda, a country that has taken specific steps to ‘mainstream’ women in mining, yet where women, as demonstrated

throughout this paper, remain poorly placed to benefit from formalization.¹² If women are to be substantively included in decisions, policies and interventions in the ASM sector, the existing gendered topography and social hierarchies in play need to be more systematically included in the design and implementation of ASM formalization.

These results, we suggest, call for a recalibration of ASM formalization to ensure that gender is placed at the centre of design and implementation of any ASM interventions. This recalibration will need to be done in ways that *correct for*, rather than merely observe, existing exclusions of women from mining activities, policies, trainings, outreach, and design.

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¹² We thank the anonymous reviewer for drawing this connection to our attention.

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