



# ‘Mining Farmers’ or ‘Farming Miners’: The Dynamics of Livelihood Diversification in Rural Agricultural Communities of Insiza District, Zimbabwe

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## Abstract

Land ownership remains critical in the Global South, where smallholder farming is prudent for sustaining household food production and income. In the recent past, mining activities have increasingly substituted farming activities, rendering lands unusable. The proliferation of small-scale mining activities has led many households to abandon their agriculture. This raises concerns regarding rural food security and poverty reduction. This study investigated the drivers of diversification into small-scale mining and its implications for household agricultural activities in selected wards of the Insiza District in Zimbabwe. Drawing on rich qualitative data gathered through a combination of focus group discussions, in-depth interviews, and key informants, our findings show that participants have varying views on the implications of small-scale mining on smallholder agriculture. Some participants prefer small-scale, as it offers them guaranteed income compared to smallholder agriculture. However, some participants suggested that small-scale mining disrupted their traditional livelihoods, leading to land degradation, pollution, and displacement. There is an urgent need for the government and other stakeholders to prioritize training in sound environmental and mining practices so that both small-scale mining and smallholder agriculture can co-exist in this drought-prone region.

## Keywords

Diversification, Small-scale mining, Small-holder agriculture, Sustainable development

## INTRODUCTION

Agriculture has historically been the primary source of livelihood for many communities in sub-Saharan Africa (Nyathi, 2024). However, the 21st century has seen an increase in small-scale mining, particularly in countries such as Zimbabwe (Brown, 2020). This shift has been criticized for causing environmental damage and encouraging informal mining

practices (Berkvens, 1997). Nevertheless, in regions where rain-fed agriculture faces numerous challenges, small-scale mining often serves as a supplementary source of income rather than a replacement for agricultural activities. Consequently, small-scale mining, whether legal or illegal, has become an important means of livelihood and strategy for alleviating poverty in developing nations. Hilson (2016) points out the widespread nature of artisanal and small-scale mining (ASM) in Sub-Saharan Africa, while Dalu et al. (2017) highlighted that during Zimbabwe's economic crisis, increased illegal mining of newly discovered diamond and gold deposits provided local people with a means of subsistence. This study focuses on the adoption of small-scale mining by households in Zimbabwe's Insiza district and examines its impact on agricultural activities in selected wards. It aims to understand the relationship between small-scale mining and household agriculture, and to identify measures that could prevent small-scale mining from negatively affecting smallholder farming.

## BACKGROUND

Either out of choice or necessity, diversification is a common livelihood strategy in developing countries (Overseas Development Institute, 1999; Masumba, Palm, Komarek, Mutuo and Kaya, 2012; Loison, 2015; USAID, 2017; Abera, Yirgu and Uncha, 2021; Nyathi and Ndlovu, 2022). The research attention that livelihood diversification has received in the past decades is a result of the belief that its promotion is a way to reduce poverty and promote economic growth (Loison, 2015). In sub-Saharan Africa, livelihood diversification has been the focus of poverty alleviation initiatives and other broad developmental interventions (USAID (2017). Although agriculture remains an important rural livelihood, rural areas cannot rely on agriculture alone as a means of poverty reduction, achieving food security, or improving livelihoods (Overseas Development Institute, 1999; Abera, Yirgu and Uncha. 2021). Despite their potential to contribute to household food security and resilience to shocks, livelihood diversification may not be an option for very poor households. Lack of assets, markets, and access to credit prevents poor households from diversifying their livelihoods (Nyathi and Ndlovu, 2022). As a result of these constraints, most rural communities have not benefited from an increase in income and wealth due to livelihood diversification. It is the relatively well-off who have assets that can enable them to take advantage of opportunities and synergies between farm and non-farm activities (Loison, 2015).

In sub-Saharan Africa, there has been a significant shift from agriculture to small-scale mining among many smallholder farmers. This sector accounts for 15–20 percent of global mineral and metal production (Poignant, 2022). Small-scale mining is responsible for producing approximately 80 percent of sapphires, 20 percent of gold, and up to 20 percent of diamonds (Estelle Levin Ltd, 2012). It is a major economic activity in over 80 countries and often serves as a primary livelihood. In the Central African Republic (CAR), approximately two-thirds of the population is directly or indirectly dependent on artisanal diamond mining, which contributes an estimated \$144.7 million to the economy (Eftimie et al., 2012). The rise in artisanal and small-scale mining in various African nations has been attributed to factors such as high unemployment rates and soaring gold prices (Brown, 2020). Although rural livelihood diversification patterns in the region are increasingly documented, artisanal and small-scale mining, despite being key rural non-farm activities, remain underrepresented in this body of knowledge (Hilson, 2011). In the process of livelihood diversification, smallholder agriculture has somehow lost significance, especially regarding household income. Hilson (2016) argues that artisanal small-scale mining has taken an income-earning role, replacing the role traditionally played by farming, which is increasingly viewed as a source of food for household consumption rather than for markets. For example, Poignant (2022) asserts that small-scale mining leads to households allocating fewer resources to agricultural production, thus reducing agricultural output.

Agricultural activities in some Zimbabwean rural communities remain essential sources of livelihood. However, different factors, including climate change and migration, have lessened their importance, and as a result, have influenced the shift to small-scale mining as an alternative source of livelihood. Mabhena (2010) suggests that most households in Matabeleland South, including the Insiza District, now rely on off-farm livelihoods such as small-scale mining and migration to neighboring countries, including Botswana, Namibia, and South Africa. This situation arises from extensive expropriation of commercial farms. The households in Southern Matabeleland have not reaped substantial benefits, as both village settlements (A1 farm models) and small-sized farms (A2 farm models) have received limited support. Additionally, the impacts of climate change have been recognized as a key factor contributing to the growing trend toward small-scale mining (Maponga and Meck, 2003). In Zimbabwe, gold panning is primarily a dry season activity, and its upsurge has been attributed to seasonal droughts. A study conducted by Murwendo *et al.* (2011) on the role of small-scale gold mining in sustaining livelihoods in Kadoma District indicated that it became an essential source of income for poor members of the community, especially during periods of drought and economic crises. It has also been noted that small-scale mining often acts as a safety net for people who lack diversified livelihood strategies and are affected by retrenchments. The study noted that small-scale gold mining was one of the meaningful livelihoods in Kadoma District, mainly because of the challenges affecting the viability of smallholder farming.

Hilson (2016) pointed out that smallholder farmers have always diversified to other sources of income to guard against risks. Many have turned to ASM, often mining in the dry season and using the income earned to support agriculturally based livelihoods. Small sizes of arable land owned by many rural community members in Sub-Saharan Africa, often leading to insignificant outputs, have also encouraged diversification to small-scale mining and other livelihood options. Data collated by Hilson and Garforth (2012) show that smallholder farmers struggle to produce sufficient crops for the market because they work in undersized plots. In addition, when plot sizes shrink and rural

families struggle to increase productivity and secure support, farming is undertaken to satisfy the consumption demands of the household, with non-farm stream activities such as ASM increasing (Banchirigah and Hilson, 2010).

## LITERATURE REVIEW

The number of people engaged in artisanal and small-scale mining (ASM) has increased in the past 20 years. However, they continue to be an understudied population experiencing high rates of malnutrition, poverty, and food insecurity (Zhang, Koroma, Fofana, et al., 2020). Several reasons have been given to explain why there is an increase in SSM diversification in the Sub-Saharan region. In most African countries, such as Ghana, Madagascar, and Zimbabwe, small-scale gold mining has become essential due to escalating poverty and lack of employment opportunities in the formal sector (Logan, 2004). The existing literature generally presents competing views on whether small-scale mining competes with or complements agricultural activities (Dondeyne and Ndunguru; Hilson, 2016; Ofonsu et al., 2020). The literature highlights both the negative and positive impacts of ASM on smallholder agriculture. The positive impacts include boosting farming equipment using the profits from the Small-Scale Mining (SSM). In Mozambique, small-scale gold mining at Chazuka has enabled individuals to buy fertilizers and other crucial farm inputs (Dondeyne and Ndunguru, 2014). Dondeyne and Ndunguru (2014) further revealed that in Mozambique, gold mining has enabled rural people to build better houses and buy livestock. Some have been able to buy cars and enter the transportation business. According to Maponga and Ngorima (2003), in the early 2000s, proceeds from gold sales in Zimbabwe reportedly 'lubricated' communal and resettled farmers' agricultural activities, helping them purchase fertilizers. Hilson (2016) believes that small-scale mining complements agricultural activity. He observed that artisanal small-scale mining (ASM) has rapidly become one of sub-Saharan Africa's most important livelihood activities in revitalizing and sustaining subsistence agriculture. Hilson (2016) adds that hundreds of thousands of rural families generate disposable income from ASM and use portions of this earnings to sustain their farm activities. Bansah et al. (2023) believed that small-scale mining improves smallholder farmers' socioeconomic conditions. Some writers (Omotehinse and Ogunlade, 2022; Ofonsu et al., 2020) argue that ASM enhances agricultural productivity and contributes to rural development in general. While experts have highlighted the positive contribution of ASM to agriculture in donor and policymaking circles, there is very little commitment to broadening the understanding of the dynamics of the range of different operators and practices that fall under this sector (Hilson, 2011).

Some negative impacts of small-scale mining on smallholder agriculture have been observed. These include land degradation, which makes it difficult to carry out farming activities and trap livestock such as cattle, and the fast cash that leads to the neglect of agricultural activities. Murwendo et al.'s (2011) study in the Kadoma District of Zimbabwe revealed that traditional livelihoods such as agriculture were neglected because of the quick money from mining activities. Small-scale mining has also been studied as a standalone livelihood option that no longer complements smallholder agriculture, but directly competes with and challenges it. Maponga and Ngorima (2003) investigated how involvement in the small-scale gold mining sector became an exceedingly vital coping strategy as a seasonal, part-time, and permanent livelihood activity in Zimbabwe during the 1990s and the early 2000s. Most rural dwellers have turned to small-scale mining as another livelihood because they quickly provide cash. According to Hilson (2016), in sub-Saharan Africa, artisanal small-scale mining (ASM) provides direct employment to tens of millions of people and creates jobs for many millions of ancillary industries.

Households in Insiza District, which relied on rain-fed agriculture, continuously faced food insecurity due to increased crop failure. ZIMVAC (2009) further revealed that over the past decade, subsistence agriculture has continued to decline due to frequent droughts experienced in the province. Participants estimated that less than half of the area's population produces enough harvests for consumption and sale, even during a good season. This has forced many households to diversify into small-scale mining along the Insiza and Umzingwane Rivers and in disused mines. As observed by Zhang, Koroma, Fofana, et al., (2020), communities engaged in ASM tend to be impoverished and dependent on livelihoods with questionable sustainability. The ZIMVAC study showed that households that depend on agriculture in the study area benefit from the food and money they generate. Bryceson (1999) argues that poverty-poor households, more vulnerable to the climatic fluctuations of the agrarian calendar, harvest less in bad weather years and have little choice but to pursue non-agrarian income-earning activities in easy-entry, already saturated markets, especially at times of the year when local purchasing power is depressed due to agricultural cycles. He further argues that diversification into non-farm activities like small-scale mining is part of the long-term de-agrarianization process, where smallholders abandon farming because of its persistent challenges. Thus, over time, this diversification may worsen rather than reduce household economic inequality. This is also supported by Berkvens (1997), who suggests that diversification detracts from Zimbabwean households' achievement of higher agricultural productivity by diversifying labor and capital from farming.

In a study by Mkodzongi and Spiegel (2018) on artisanal gold mining and farming in Zimbabwe's Mhondoro Ngezi farms, it was discovered that among the peasantry, artisanal small-scale gold mining provides an opportunity to diversify livelihoods when agriculture alone does not provide a secure form of livelihood. For some, such as unemployed youth, it is a source of income, given the high levels of unemployment in Zimbabwe's urban areas. Scoones (2014) observes that the growth of the artisanal or small-scale mining is one of the features of the post-2000 economy in Zimbabwe. This is mainly attributed to the decline in the agricultural sector, which is a livelihood for most households in rural areas. The miners interviewed in Mkodzongi and Spiegel (2018)'s research on artisanal gold mining and farming in

Zimbabwe's Mhondoro Ngezi farms indicated that they felt that although farming was a comparatively low-health risk occupation, it had 'low returns' compared to mining.

The advantages of small-scale mining often surpass those of smallholder agriculture, leading to a noticeable shift towards this sector. Mawowa (2013) highlights that, in Zimbabwe, small-scale gold mining has generated numerous businesses, such as shops and hotels, thus distributing wealth across various segments of the economy. Additionally, Murwendo et al. (2011) observed rapid growth in the small-scale gold mining industry in Kadoma District, noting that it offers quicker financial returns and higher potential income than traditional livelihoods. Some miners even experienced dramatic financial success, with some becoming wealthy quickly and using their earnings to acquire assets such as cars and start businesses. This shift towards mining has also been driven by severe economic challenges in other parts of Zimbabwe (Dreschler, 2001).

## **THEORETICAL FRAMEWORK**

The study was guided by the Rational Choice Theory (RCT). An RCT is underpinned by the assumption that humans are rationally self-interested beings who make choices to maximize their utility or outcomes (Goldthorpe, 1998). According to this theory, individuals decide on actions that will yield the best outcomes or highest benefits, given their preferences and priorities (Elser, 1989). Mogu (2013) argues that RCT provide a useful framework for understanding individual human behavior and decision-making dynamics. Unlike some perspectives that view human actions as driven primarily by emotions, habits, or external forces, RCT posits that behavior is mainly motivated by reasoned self-interest on the part of the acting individual. From this standpoint, humans are considered deliberative decision-makers who engage in conscious cost-benefit analyses to choose alternate courses of action. The actor will select the option perceived as providing the highest net benefit or utility after weighing the various potential costs and outcomes associated with each choice (Hedstrom & Ylikoski, 2014).

In applying RCT to understand small-scale farmers' livelihood decisions, it can be inferred that moving away from agricultural production towards activities such as artisanal and small-scale mining (ASM) represents rational choices to maximize benefits. Agriculture may provide lower and less certain returns for rural households facing economic challenges compared with ASM opportunities, which have grown in the study area. The RCT suggests that farmers carefully consider investment requirements, effort levels, income prospects, and risks associated with various livelihood strategies before deciding to partially or fully substitute farming with mining. Therefore, their choices are not random or driven purely by non-rational impulses but reflect rational self-interested assessments of how best to optimize household welfare and secure greater economic returns given their goals and constraints. However, RCT do not properly account for non-economic factors, such as risk preferences, social relationships, and cultural norms, that also guide decision-making. Nevertheless, it offers a useful lens for initially exploring the motivations behind farmers' livelihood portfolio adjustments in the study context.

## **SETTING AND METHODOLOGY**

The Insiza District, located in Matabeleland, South Province of Zimbabwe, is situated in natural region IV, a midland and highland agro-ecological zone. This area, like that of Matabeleland South, suffers from consistently poor crop yields and frequent food shortages (Onema, 2004; Mamba et al., 2007). According to ZESN (2011), poverty levels in the district have likely exceeded the 80% mark recorded in 2003 due to Zimbabwe's economic difficulties over the past 20 years. Consequently, the Insiza community faces significant poverty due to limited resource access, environmental degradation, and low living standards. A CSO (2012) report indicated that the district's population exceeded 99,793. Most residents are subsistence farmers who experience unreliable crop production due to inconsistent weather patterns. The main sources of income for the district include gold panning, cattle rearing, and crop farming (Love et al., 2005). This study was conducted in communal wards 1 and 2, selected for their high concentration of small-scale mining activities compared with other wards.

A qualitative approach was used to obtain an in-depth understanding of the phenomena under investigation. Specifically, we employed in-depth interviews, focus group interviews, observations, and key informant interviews to collect the data. Purposive sampling of participants was performed with the assistance of traditional and local leaders. Therefore, data were collected from 37 in-depth interviews, eight key informant interviews and two focus group discussions. We conducted a focus group discussion for each ward. Each focus group had eight participants, including men, women, and youth, who comprise most of those involved in small scale mining. The data were analyzed using a thematic approach. The initial stage of the analysis involved transcribing the recorded interviews into text. This presented a challenge because the analysis was conducted in English, whereas the interviews were conducted in Ndebele, the native language. The next step was to examine the content of the discussions and interviews to identify recurring themes from the gathered information.



**Fig. 1** Insiza district map (*Source: Authors*)

## **DOMINANT LIVELIHOODS IN INSIZA DISTRICT**

The study found three dominant livelihoods in the Insiza District. In order of priority, they were small-scale mining (SSM), small-holder agriculture (SHA) and vending. The following subsections present these livelihoods in order of priority.

### **Small-Scale Mining**

Increasing evidence on the relationship between mining and farming in Africa has largely portrayed artisanal mining as a substitute for or threat to peasant farming, rather than a complementary activity (Hilson, 2011; Poignant, 2022). These perspectives have sometimes led to calls for fundamental reassessment of how mining and farming interact in African settings. The study showed that people in the area diversified from smallholder agriculture to small-scale mining because of persistent droughts, which always lead to crop production failure. Generally, farmers in this area do not abandon agricultural activities entirely. Instead, during the farming season, they go to the fields in the morning and then do small-scale mining in the afternoon. Some embark on small-scale mining activities to get money to hire labor for their fields and procure inputs after selling their proceeds from mining.

The study discovered that young men and women are the most active participants in small-scale mining, largely because of the physical demands of the work, which requires a vigorous workforce. Artisanal miners, who generally use minimal or no machinery, invest significant energy in tasks such as digging hard soil, breaking and transporting rocks, and processing them to extract ore. The research further indicated that this form of employment remains unaffected by drought, unlike smallholder farming. One participant noted that the SSM provides job opportunities for many young people who would otherwise be unemployed. In addition, households turn to this activity to boost their income. One female participant mentioned that small-scale mining is a durable livelihood option that has positively impacted the lives of its practitioners. In Zimbabwe, mining and agriculture often coexist along with various informal income-generating activities. The study also highlighted that small-scale mining has led to the creation of additional livelihood opportunities.

### **Small-Holder Agriculture**

Small-holder agriculture is another livelihood option for this area. However, the majority often harvest enough or less for household consumption. One participant stated the following:

*Nxa izulu line kuhle lapha bakhona abalutshwana yibo abangenelisa ukuthola okokudla babuye bathengise mbijana kodwa inengi lingathola nje okokudla kuphela* (In a good rainy season, only a few get enough harvest with some surplus for sale. Most households struggle to obtain even a bucket of maize).

Participants also discussed the challenges associated with agricultural activities. They cited changing climatic conditions as the primary reason for the failure of productive agricultural activity. One respondent stated that:

*Lapha vele asisavuni kuhle amabele avele atshe emancinyane ngenxa yokuswela izulu, milutshwana iminyaka esithola khona amabele amanengi. Sokuvame ukuthi sivune amajodo lalonyaka silawo manengi* (in this part of the district, we no longer harvested as expected. Because of drought, crops wilt before maturity, and there are few years of good harvest. We are used to harvest melons, for instance, and we have plenty of them this year).

Livestock keeping is another agricultural activity that is practiced in the study area. The study showed that households keep animals, such as cattle, sheep, goats, chickens, and donkeys. In the study area, cropping was almost twice as popular as livestock farming. This was attributed to the rampant stock theft cases blamed on villagers from neighboring wards in the district. Therefore, several farmers ended up shunning cattle rearing in the district. The participants revealed that for farmers who still rear livestock in the face of challenges due to both drought and stock theft, the majority would sell three beasts per annum, primarily through public auctions between US\$300 and \$400 per beast, or to private abattoirs for up to US\$600 per animal. The participants also pointed out that livestock are sold to, among other things, pay school fees for children or buy food. Further probes revealed that although livestock remains a source of wealth and prestige in the study area, droughts, limited grazing land, and the 'January Disease' (that killed animals in the study area) discouraged farmers from keeping big herds of cattle.

However, the majority have sufficient or less food consumption. One participant stated the following:

*Nxa izulu line kuhle lapha bakhona abalutshwana yibo?? abangelisa ukuthola okokudla babuye bathengise mbijana kodwa inengi lingathola nje okokudla kuphela* (in a good rainy season, only a few can obtain enough to have a surplus to sell; the majority often obtain only enough for their family's consumption).

### **Vending**

Many women were not directly involved in mining. They buy items such as clothing, foodstuffs, and tobacco to resale to miners. This is how they make a living: One participant indicated that women faced several challenges in terms of sustaining their livelihood portfolios in the study areas. Specifically, it emanated that a number of them venture into vending because it is seen as the easiest livelihood option that requires insignificant start-up capital. In one conversation, a female participant stated the following.

*Lapha omama balobunzima okuziphilisa. Ubunzima bakhona ubonakala kulabo abangendanga abazimele bodwa. Ukulima kuyabahlupha ngoba bengela okokulimisa njalo lokungena kuvele kulohlupho lwezulu. Yikho okwenza uthole omama sebethengithengisa bezama ukuziphilisa* (In this community, women face challenges especially those single and heading households. Farming has proven to be a hurdle for those with draught power challenges, a situation that is further complicated by erratic rainfall. This is why most of them are vending for survival purposes).

Dzimbo et al. (2019) substantiate the study results, arguing that women in the Global South face various economic hurdles resulting from limited access to and control of productive resources and information. Scholars further argue that "in many cases, such as that observed in Zimbabwe, traditional beliefs prevent women from utilizing these economic factors, denying them any control over earnings." Nel et al. (2012) allude to the fact that the ability of women to venture into lucrative economic activities, such as mining, is compromised by their inability to invest in equipment needed in such a sector. Vending, therefore, has become the last resort meant for survival by poor women.

### **THE POTENTIAL OF SSM AS A LIVELIHOOD IN INSIZA DISTRICT**

Approximately one-third of the households in the study area depended on SSM. The availability of gold ore on external surfaces in wards 1 and 2 of Insiza indicates its potential for livelihood. Despite being prohibited by Zimbabwe's mining regulations, artisanal small-scale mining (ASM) has grown into a prevalent economic activity involving diverse groups of people with varying levels of education and economic status. It was clear from this study that most male-headed households lived on SSM as a form of self-or occupational employment. Participants in the study stated that it was difficult to find people not in the SSM in the area. One young person explained:

*Ah!, lapha akulamuntu ongatsheketsiyo, wonke umuntu uyagebha, kungaba emfuleni kumbe phandle* (Ah! In this area, nobody is engaged in the SSM. Everyone works either in the river on alluvial or reef gold mining.)

This statement underscores the perceptions of most respondents in the study area that almost all people are directly or indirectly involved in small-scale mining as a livelihood. Evidence from this study shows that the factors that brought hardships to smallholder farmers in the study area, leading to diversification of SSM, include recurrent droughts that paralyze traditional crop farming, the allure of quick cash from SSM, ever-growing unemployment, and the lack of productive agricultural inputs. These were the top driving factors for smallholder farmers to diversify into small-scale mining.

### **FACTORS THAT DETER DIVERSIFICATION FROM SHF TO SSM IN INSIZA DISTRICT**

The study revealed several factors that prevented a shift from smallholder agriculture to small-scale mining. The participants indicated that agriculture is a livelihood with less labor requirements than small-scale mining. The participants highlighted the demanding nature of small-scale mining, which often involves strenuous manual labor and long working hours. This discrepancy in labor intensity is a deterrent for individuals considering a transition, as they may prefer relatively less physically demanding agricultural work. Another deterrent is the difficulty in acquiring permits coupled with stringent Environmental Management Agency (EMA) requirements. Bureaucratic processes and meticulous scrutiny of the EMA were considered major barriers. The participants highlighted the time-consuming and challenging nature of permit processing, discouraging individuals from pursuing legal avenues for small-scale mining. Participants

reported the high costs of acquiring mining equipment and machinery, making it financially unfeasible for many individuals to venture into small-scale mining. Moreover, inadequate enforcement of health and safety regulations in small-scale mining operations has raised concerns among potential entrants. The perceived risks and hazards of mining activities further deter individuals from considering this livelihood option. Respondents viewed stringent permit processing procedures as the leading cause of the illegal sale of gold on a small scale, as their trade was criminalized. One respondent said,

*Obulele umuntu uyathoniswa aphiwe le bail out, kodwa ungaficwa utsheketha awuthoniswa yi 5 years entolongweni isigwebo sakhona* (A murderer is tried and given bail, but a non-registered small-scale miner, if apprehended, there is no bail for them. They were instantly sentenced to five years in prison).

The criminalization of their trade due to difficulties in obtaining permits led to a lack of formalization and regulation, perpetuating informal and illegal gold markets. Respondents said that this was one of the most critical policy issues that they expected the government to address.

## **IMPLICATIONS OF SSM ON HOUSEHOLD AGRICULTURAL ACTIVITIES IN INSIZA DISTRICT**

The investigation revealed that artisanal mining activities have precipitated a notable augmentation in households' economic status. A proportion of the revenue generated through these endeavors has been allocated for the acquisition of agronomic supplements as well as for the fulfillment of domestic and societal requisites, which has culminated in an enhancement of living conditions. The study also documented the construction and refinement of residential edifices financed by artisanal mining. Furthermore, the research indicated that a number of miners have invested in the acquisition of livestock; an investment they surmised would have been unattainable through agricultural ventures alone. The researchers also observed shops constructed through SSM proceeds. One respondent remarked,

*Uyawabona ama shops wonke lawa alapha, phose wonke akhiwa ngemali ephuma esitsheketheni* (Do you see all these shops, almost all were constructed using income from small-scale?).

This scenario agrees with that described by the scholars above, who cited many examples of income from SSM used to finance various household needs.

However, negative consequences of small-scale mining on smallholder agriculture have been identified. Some participants pointed out that small-scale mining had replaced smallholder agriculture in some households. Some smallholder farmers get so preoccupied with mining that they never get a chance to go to the fields. Regarding whether or not the government should discourage smallholder farmers from diversifying into small-scale mining, one of the respondents opined that: *"The government must empower small-scale mining activities through skills training, funding, and decentralising legalisation to improve accessibility."* The other negative of small-scale mining noted by the participants was environmental and ecological challenges emanating from the activity. The participants indicated that the rivers and dams were threatened by siltation, and livestock pastures and farming land were reduced through massive pits, holes, and waste from gold processing. One study participant posited that:

*Otsheketha seabulele indawo yonke le; akusela lamadlelo enkomo. Sekugejiwe iganga lonke leli njalo into yakhona iyasihlupha ngoba inkomo ziyawela emagodini.* (These miners damaged most of our grazing rangeland. There are pits and holes in several places close to the river and pasture lands, and our cows and calves fall into them.)

## **PREVENTING ADVERSE EFFECTS OF SMALL-SCALE MINING ON SMALLHOLDER AGRICULTURE**

Most participants felt that it was the duty of the government to rectify the challenges emanating from small-scale mining and smallholder agriculture, and to create a policy environment that allows both activities to operate side by side without adversely harming the environment and the ecology of rural spaces. The district's general climate and soil conditions make farming extremely risky, compelling many farmers to seek livelihoods on marginal lands exposed to annual droughts, floods, and bushfires. The study participants felt that the government should be urged to hasten the legalization of small-scale mining by improving access to small-scale mining permits through decentralization. It was also suggested that relevant authorities provide mining skills, funding, and equipment through simplified loan schemes for many miners in the Insiza area. The participants suggested that the Environmental Management Agency (EMA) could also run training workshops for small-scale miners on how they could benefit from environmental conservation and how they (miners) could sustainably mine without depleting the environment. According to the study participants, the small-scale mining capacitation skills program they suggested to be run by the EMA and other stakeholders in environmental management could include environmental management and natural resource conservation, mining techniques, ecological rehabilitation, health and safety, professional prospecting and proper pegging, business management, and investment skills for small-scale miners.

## **CONCLUSIONS AND RECOMMENDATIONS**

Small-scale mining, smallholder agriculture, and vending are the main livelihood options in the Insiza District. However, small-scale mining has become the dominant livelihood option. This constitutes a shift from smallholder agriculture as the dominant livelihood. Crop farming, which is the second most common livelihood, is almost twice compared to livestock farming, even though it has been, from time to time, subjected to irregular and erratic rainfall patterns. The reasons behind

the diversification from smallholder agriculture to small-scale mining include easy access to quick cash for daily household income and expenditure compared to unreliable farming production, poor harvests, and slow grain sale earnings. The availability of gold ore on the external surfaces of Insiza District soils has become a reliable source of employment, partially reducing the total reliance of household livelihoods on agriculture to around one-third of the study population. Women do not like labor-intensive activities compared to men; evidence from the study shows that more men are involved in small-scale mining than women are. Female-headed households seem to be stuck in agriculture as their primary source of livelihood, surviving poverty by engaging in other petty livelihood alternatives, such as vending their wares near mining areas. The factors that encouraged smallholder farmers to diversify to small-scale mining in the Insiza District include drought, which directly affects crop production, and the potential for fast cash provided by SSM.

Obtaining a mining permit to legalize mining operations on a small-scale is centralized and complicated. The processes do not even occur closer to the mining areas but in towns with government complexes quite far from the mines. Such processes prevent small-scale mining development and discourage community members from shifting to gold mining. The community members believe that the government must encourage and empower small-scale gold mining activities by providing mining skills training, funding, and decentralizing the legalization process to simplify accessibility to small-scale mining in the Insiza District. The study discovered that small-scale mining hurts smallholder agriculture as it tends to remove the agricultural household workforce from the field to the mine, thus suspending farming activities in a sizeable community at any one time. The environmental and ecological challenges from gold mining in the area include river and dam siltation, diminishing livestock pastures, and land degradation.

The government should consider the two sources of livelihood—smallholder agriculture and small-scale mining—equally in policymaking for long-term sustainability. It should also ease the legalization of small-scale mining and improve people's access to permits and other supporting documents by decentralizing the mining ministry departments to the Rural Development Council (RDC) level. Development actors and agencies should consider providing relevant mining skills, training, funding, and equipment to ensure that SSM is a safe, viable, and sustainable livelihood. The Environmental Management Agency (EMA) must run awareness campaigns on river and dam siltation and land degradation occasioned by gold mining and urge communities to conduct sustainable mining activities. SSM capacitation must include environmental management, natural resource conservation, mining techniques, ecological rehabilitation, health and safety, professional prospecting and proper pegging, business management, and investment skills. To prevent the total abandonment of smallholder agriculture in the context of growth in SSM, the government should promote the latter by constructing dams and setting up irrigation schemes, promoting research on drought-resistant crops, and encouraging the growth of small grains and other cash crops.

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