

Research article

Economic Impact of Small-Scale Mining in Northern Mindanao, Philippines

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Abstract

Small-scale mining has been identified as a potential sustainable livelihood option to alleviate the poverty faced by populations in many developing countries, including the Philippines. The study was conducted to determine the contribution of small-scale mining in the achievements of sustainable goals in reducing poverty and eradicate extreme hunger, particularly in Northern Mindanao. Survey interviews were administered to 630 respondents in the three (3) small-scale mining sites in Northern Mindanao. Focused Group Discussion among selected respondents were also conducted to obtain more detailed information. Results of the study revealed the minimal contribution of small-scale mining to the Philippine economy. Whereas, it contributed positively to the local economy through job creation and increasing economic enterprises. Most of the small-scale miners' earnings remained at subsistence level and the miners are trapped in the cycle of poverty. In terms of alternative livelihood, options should be made available to the small scale miners and subsidies and incentives from government and private sectors are needed to entice small-scale miners to undertake a more secure and sustainable livelihood other than mining. **Copyright © WJAERD, all rights reserved.**

Keywords: Small-scale gold mining, sustainable development, sustainable livelihood, economic impact, poverty alleviation.

INTRODUCTION

Poverty is a complex multi-dimensional problem faced by the developing countries such as the Philippines. Many national and international poverty programs in the past decades were initiated in the hope to alleviate poverty situation and eradicate extreme hunger. Agenda 21, a blueprint document adopted during the 1st Earth Summit held at Rio de Janeiro, Brazil in 1992 devoted Chapter 3 of its Agenda on strategies to combat poverty. Eradication of

poverty was one of the indicators in achieving sustainable development, a notion espoused by the Brundtland Report. According to the Report, "Sustainable Development requires meeting the basic needs of all and extending to all the opportunity to fulfill their aspirations for a better life."(WCED, 1987:40). Agenda 21 emphasized the need for economic development and resource management and the important role of marginalized groups such as women, indigenous people and local communities in the management of resources.

In 2000, another global agreement was signed by 189 world leaders -the Millennium Development Goals (MDGs), of which the No. 1 Goal was to eradicate poverty and hunger by 2015. After 15 years, an assessment was conducted globally to ascertain the progress of the MDGs. A significant decline of extreme poverty was noted globally, but poverty remains unresolved. In the Philippines, progress in poverty alleviation has been very slow and persistently high in rural areas because they are more vulnerable by natural calamities and climate change. About 60% of the Filipinos live in rural areas and depend on the natural resources such as land, forest and marine for their livelihoods.

Building on the successes of the Millennium Development Goals, leaders from 193 countries of the world formulated and signed the Global Agenda 2030 during the United Nations General Assembly on September 25, 2015. The Global Agenda 2030 contains the 17 Sustainable Development Goals (SDGs). The SDGs are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity (UN, 25 September, 2015). The British Department for International Development (DFID) has developed a 'Sustainable Livelihood Framework' (SLF) which is one of the most widely used livelihoods frameworks in development practice. A livelihood comprises the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base."(DFID, 2000).

Livelihood security refers to the sufficient and sustainable access of income and resources by households or individuals to meet basic needs for their well-being such as potable water, adequate access to food, health, educational, housing, rights of ownership, adequate time for participation and social integration.

The risk of failure in livelihood of households or individuals determines the level of vulnerability of their income, food, health and social insecurity. Therefore, to have secure livelihoods, households or individuals need to have secure access and ownership of resources and income-earning activities, such as reserves and assets, in order to balance risks, alleviate shocks and meet contingencies (Franken Berger & Mauston 1998:1-3).

To reduce the absolute poverty, countries should have a sustainable economic growth. As defined by Edward Barber, sustainable economic growth is economic development that attempts to satisfy the needs of humans but in a manner that sustains natural resources and the environment for future generations. Economy and Environment is inseparable. The ecosystem provides the factors of production that fuels economic growth: land, natural resources, labour, and capital. Sustainable economic growth means managing these resources in a manner that they will not be depleted and will remain available for future generations (Barber, 2015).

Although not known nationally to have many small-scale mining operations, but based on interviews, a number of small-scale gold mining are operating in Northern Mindanao. Mining activities are noted in the municipalities of Valencia, Libona, San Fernando in Bukidnon; Opol, Gingoog, Naawan in Misamis Oriental, and in the cities of Cagayan de Oro and Iligan, among others. These small-scale mining operations have been operating for many decades. This study assesses the contribution of small-scale mining to the Philippine Economy, and in particular, to the economy of Northern Mindanao. This study also looks at the potential of small-scale mining as alternative livelihood and determines the contribution of small-scale mining in the achievements of sustainable goals of reducing poverty and eradicating extreme hunger.

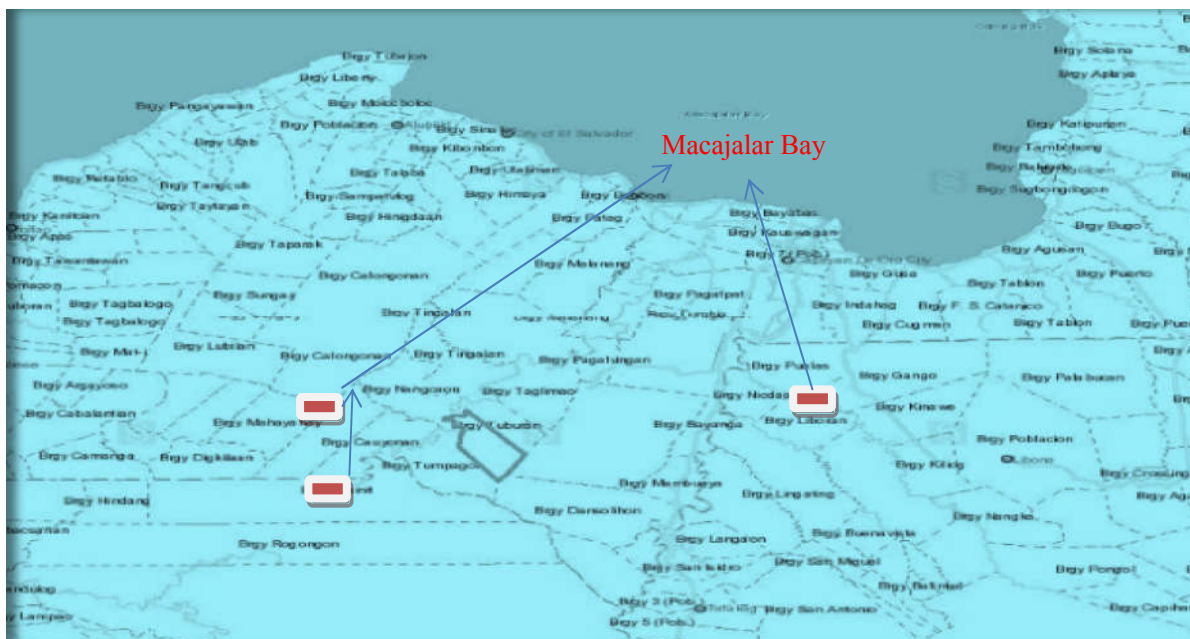
MATERIALS AND METHODS

Description of Study Sites

The study areas are the three (3) small-scale mining sites located in Sitio Malauyan, Barangay Gango, Libona, Bukidnon; Barangay Tumpagon, Cagayan de Oro City; and Barangay Nangaon, Opol, Misamis Oriental (Please see map below).

These three (3) areas were selected because of the following reasons:

- The mining sites in Nangaon and Tumpagon drain their mining wastes directly to Iponan River; while the mining site in Gango drains their mining wastes to Bigaan River.
- Bigaan and Iponan Rivers are two major systems that drain all mining waste waters and sediments to Macajalar Bay.
- The two mining sites (Tumpagon and Nangaon) are IP communities while Malauyan, Gango Mining Site is generally inhabited with non-Lumad “*Dumagat*”; and
- Both upstream and downstream communities of Iponan and Bigaan Rivers were heavily affected by typhoon Sendong in 2011 and Typhoon Vinta in 2017.



 **Figure 1: The three Study Sites**
Source: Google Map

Tumpagon, Cagayan de Oro City

Tumpagon has a total population of 3,120, of which 1,541 are females and 1,579 are males. Eighty percent (80%) are indigenous peoples belong to Higaonon Tribe. The Higaonon, are people who moved away from the plain and now dwell in the mountains. Half of the population are Roman Catholic while others belong to other Christian denominations, such as Baptist, Jehovah’s Witness, Seventh Day Adventists and Pentecostal. Half of the households live in semi-concrete houses, 20% of the households live in houses made of concrete materials, while the rest of the houses are made of light materials such as amakan, cogon and bamboo.

In the past years, most of the residents were full-time miners and only a few cultivated their land holdings due to difficulty in bringing their products to the market center of Cagayan de Oro and to the high cost of transporting the

products. However, after the devastating effect of Typhoon Sendong in 2011, the city government under the administration of Mayor Oscar Moreno banned mining activities in the hinterlands of Cagayan de Oro. Due to the lack of alternative livelihood, most of the residents surreptitiously continue to mine illegally.

Tumpagon can be reached through a public motorcycle, locally called “habal-habal” and public jeepney. There is only one jeepney that provides public transportation to and from the barangay. During the rainy season, only the “habal-habal” can sustain the bumpy trip due to bad road conditions and the steep terrain.

Mining operation in Tumpagon is typically gold panning. Some local miners have employed hydraulic mining which they learned from the Chinese and Korean miners who had mined in the hinterlands of Cagayan de Oro for several years.

Nangkaun, Opol, Misamis Oriental

Barangay Nangcaon was founded in 1950. It is 38 kilometers away from the center of the Municipality of Opol. It has a total land area of 787.5 hectares. It has 1,843 total population with 434 households. Forty Seven (47%) are women. Ninety percent (90%) are indigenous peoples (IPs) belonging to the Higaonon tribe and are mostly engaged in small-scale mining activities.

Gold panning is the typical mining method commonly applied by Nangcaon residents. The sitios which have been heavily involved in gold panning are Sto. Nino, Pigtao, Tagculot and Tawili.



Photo 1. Gold Panning in Nangana



Photo 2: Example of a melted area for SSGM

During the field research phase of this study, a Chinese Investor, Mar. Vicente Cheng conducted an exploration in a 400 hectares for possible presence of nickel, chromite and black stones. The permit issued to them by MGB Region 10 allowed them to excavate in the area for two (2) years.

Gango, Libona, Bukidnon

Gango is one of the 14 barangays of the municipality of Libona of the Province of Bukidnon. It has a population of 6,173 (NSO, 2015), of which 45% are women. The barangay has a total 1,670 households spread over in seven zones. The barangay has an abundant supply of mineral resources found in Zone 6 (Malauyan) particularly gold, chromite, industrial lime and other minerals. Small-scale mining activities is located in Zone 6, Malayan, about 20 kilometres from Cagayan de Oro City. The mining site used to have a population of more than 3,000, but about half of them already left the area after Secretary Gina Lopez, the former Secretary of the Department of Environment and Natural Resources (DENR), ordered to close all illegal mining operations in 2017.

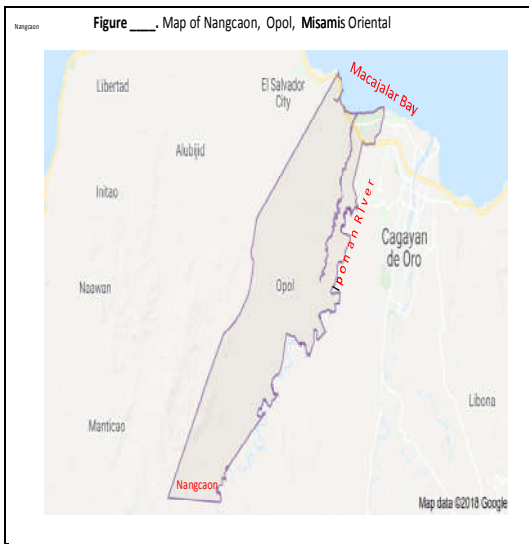


Figure 2: Map of Tumpagon, Cagayan de Oro

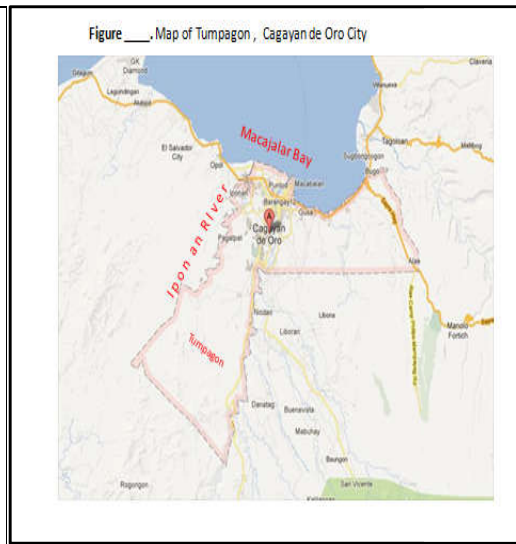
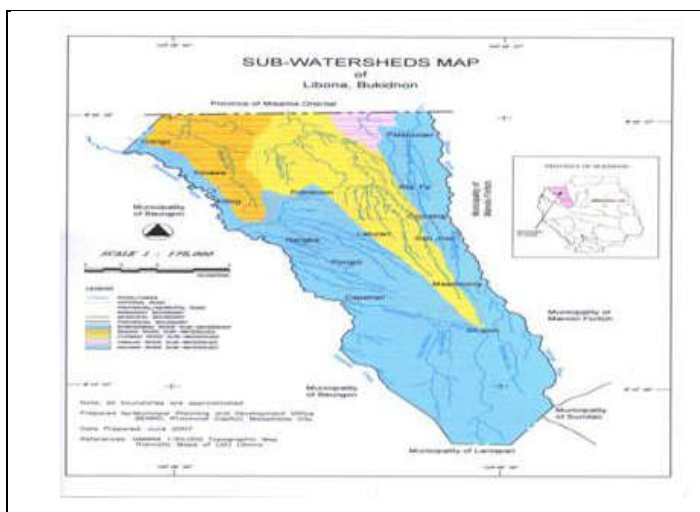


Figure 3: Map of Nangaon, Misamis Oriental



Photo 3: Malayan Gango Small-scale mining Site



Map 4: Malayan Gango Mining Site

Research Methods

To generate the needed data and information, this study has applied a combination of quantitative and qualitative research methods to include focus group discussions, structured interviews and field Observation. A total of 630 respondents were interviewed from the three (3) study sites, of which 30% are women. This represents about 10% of the total population of the three mining sites. Table 1 below shows the breakdown of the respondents.

Table 1. Number of respondents by barangay in the study sites of Northern Mindanao areas.

Barangay	Mining Population	Respondents	Percentage
Tumpagon	3120	225 –Interview 25 - FGD	8 %
Nangaon	1843	200 -Interview 8 -FGD	11%
Malauyan, Gango	1500	165 –Interview 7 - FGD	11%
TOTAL	6463	630	10%

On structured interview, a purposive sampling technique was applied. Respondents from the different sectors were selected to obtain a different perspective from respondents. Using a Questionnaire as guide, the following sectors were interviewed: male miners, female miners, and tribal leaders, and Barangay officials, business persons operating within the mining sites, the youth and the elderly.

Another method applied was Focused Group Discussions (FGD). There were three (3) FGD groups conducted in Tumpagon attended by tribal leaders, women, and youth (See Table 1). Only one (1) FGD was conducted in Malauyan and Nangaon (see explanation in Table 1.6 below). The FGD is an organized discussion attended by not more than 10 respondents aimed at providing opportunity for all respondents to express freely their views and allowed the Researcher to ask follow through questions.

Field Observation enabled the observation of the living conditions, mining method applied, mining operation, other sources of livelihood, and other farming activities

Review of Secondary Sources was also undertaken from concerned government agencies such as Environment Management Bureau (EMB), National Economic Development Authority (NEDA), Phillipine Statistic Agency (PSA) and among others. Socio-economic data from the barangay and municipal development plans of the three sites were also reviewed. Small-scale mining cases within the Philippines and other countries were also reviewed.

Data Collection

Data Collection was planned to start in September 2016. However, the free prior informed consent (FPIC) processes were required by the tribal chieftains of barangays Nangaon and Tumpagon, and the National Commission of Indigenous Peoples (NCIP) in Region 10. FPIC application was sent to NCIP Region 10 in November 2016. In May 2017, six months after the filing of the application, the NCIP had conducted the community validation in Nangaon and Tumpagon. FPIC was obtained a month after, in June 2017. The data collection started in July 2017 and completed in November 2017.

Data Processing

To facilitate faster processing, the Statistical Package for the Social Science (SPSS) Program was used in processing and analysing data per study site. While the spreadsheet computer program was used in the consolidation of data from three (3) study sites and over-all analyses.

RESULTS AND DISCUSSION

These subsequent sections present the findings of the study conducted in the three (3) mining sites. As explained in the previous section, three types of mining methods have been employed in the study sites. Underground drift mining is commonly practiced by the miners in Malauyan, Gango, Libona Bukidnon. Gold panning is commonly employed by small-scale miners in Tumpagon and Nangaon. However, there are a few individuals in barangay Tumpagon who employ hydraulic mining method (see Chapter 4 for detailed definition of each method).

Contribution of Mining Industry to the Philippine Economy

The Philippine Gold Mining Industry is considered as a major economic activity that supports more than a million people as well as thousands of small-scale enterprises. The Philippines' gold reserves has been estimated as PhP7.36 trillion, (US\$16.873 billion) or about 76 percent of the country's GDP of PhP9.73 trillion in 2011 (NSCB, 2012). According to the National Statistical Coordination Board (NSCB), the amount is enough to completely eradicate poverty in the country. World Bank also believes that mining is potentially a great source of wealth which could generate tremendous economic benefits for poor countries (Pegg, S., 2004). The World Business Council for Sustainable Development (WBCSD) also recognized that small-scale gold mining (SSGM) as a significant source of employment and has potential to alleviate poverty and could be a tool for sustainable development (Hentschel, et al, 2003).

For the last two decades, however, the contribution of the mining industry to the national economy has been minimal. From 1997 to 2016, mining had only contributed an average of 0.7% to the country's Gross Domestic Products (Mines and Geosciences Bureau (MGB), Aug. 5, 2016; and Feb 9, 2017). It was only in 2010 and 2011, that contribution of the local mining industry reached one (1) percent. The number of metallic mines operating in the country increased from 17 in 1997 to 41 in 2016, of which 10 are gold mines. Despite the increase in the mine operations, there was no significant increase in the contribution to the Philippines. The total taxes, fees and royalties collected by national government and LGUs in the same period was only PhP 22,408.90 Million or an annual average of only PhP 6,800.49 Million.

In terms of employment, the mining industry has only 0.6% contribution to the country's employment between 2011 and 2015 with an averaged 236,400 jobs annually (NEDA, 2015). While about 500,000 are working in small-scale mining operations (MGB, 2016).

Contribution of the industry to exports is also insignificant. Only an average of 3.6% annually, from 1997 to 2015. In 2016, the contribution of mineral products to the country's total exports was only 4%.

In comparison, the agricultural sector had contributed 14.8% in 1995 to the country's GDP; 13.3% in 2015 and 9.3% in 2017 (PSA, 2017). Agriculture has also generated more employment compared to the mining industry. In 1980, 51.8 % of employment came from the agriculture sector. However, employment in the agriculture sector declined significantly through the years as many shifted to other employment sources such as mining and services. As of 2017, employment in the agriculture sector has reduced to 26%.

According to Cielito, Habito, the former NEDA Secretary (Habito, 2010), mining has minimal contribution to national development even in 1970s and early 1980s when the mining industry was highly profitable. The mining industry has remained to be an extract-and-export-ore activity and there has been no significant industrialization footprint. Nelia C. Halcon, executive vice president of the Chamber of Mines of the Philippines (COMP), argued that mining could not be expected to contribute more to the GDP because the product was raw or semi-processed and processing was not yet viable for Philippines-based miners.

Due to limited data on small-scale mining, the contribution of the small-scale mining to the country's Gross Domestic Product (GDP) could not be accurately determined. However, it can be noted from the MGB reports (MGB, Aug. 5, 2016; MGB, Feb 9, 2017), that the small-scale mining had contributed a total gross production value of PhP1,160 Billion from 1997-2015, 29% of the total gross production value of the metallic mining. Particularly on gold production, from 2005-2015, a total of 30,733 kilograms of gold were produced (MGB, 2015), 62.7% came from the

small-scale mining. This figures indicate that small-scale gold mining has a high potential to contribute more to the country's GDP if they pay the government's taxes and fees. According to Nelia C. Halcon, the government lost almost P1 billion in revenue in 2010 from gold-producing small-scale gold miners because of non-paying of taxes and selling of gold to black market (Olchondra ,R.; PDI, 2012).¹Because of lower price offered by Central Bank and its stringent registration requirements, most small-scale miners prefer to sell directly to the black market.

BSP Assistant Governor Manuel Torres confirmed that in 2012 smugglers control 95% of Philippine gold trade (Lucas, D. PDI, 2012). Small-scale gold miners are selling their gold on the black market, either directly to tourists, or to middlemen who smuggled the gold and sold it to the world market.

Small-scale mining as main source of livelihood

MGB (2017) estimates that there are at least 37 provinces in the country where small-scale gold mining are operating. Some of these places are: Benguet; Labo, Camarines Norte; Llorente, Eastern Samar; Lakewood, Zamboanga del Sur; Diwalwal, Monkayo, Boringot, Pantukan and Compostela, Davao del Norte; Kalapagan and Tagobo, Davao del Sur. MGB Records do not have data on small-scale areas in Northern Mindanao.

When many large scale mines were closed in the late 80s, it was the small-scale sector who saved the industry. Particularly for the indigenous communities, small-scale gold mining has been their alternative source of income. When the Philippines encountered an intense economic crisis in 1980s, more farmers, industrial workers and unemployed became small-scale miners (Bugnosen, E, 2001). Through the years, enormous number of families shifted from farming and other manual jobs to small-scale mining activities. Approximately, more than half a million people depend on small-scale mining for their livelihood and incomes and approximately 75% are in subsistence level (MGB, 2016; Bugnosen, E, 2001). The real number of small-scale gold miners in the Philippines is still undetermined because most of them are unregistered and illegal.

Contribution of Small- Scale Gold Mining to the Philippine Economy

In the study conducted by AFRIM (2012) in Benguet and South Cotabato, the small -scale gold mining in these areas have contributed to the local economy through job creation and increasing economic activity in the communities. In another study conducted by the Philippine Institute of Development Studies (PIDS, 2000), SSGM had created enormous number of workers since the discovery of gold in Mt. Diwalwal in 1980s. A gold rush was triggered to an area of 729 hectares. According to the study, the rush increased the number of miners, from 40,000 in 1980s, to more than 100,000 in 2012.

In other countries, small-scale gold mining also provides employment for about 13 million workers and their families particularly in Brazil, China, Colombia, Congo, Ghana, Ecuador, India, Indonesia, Madagascar, Tanzania and among others (Weber-Fahr, et al, 2001) . The experiences of Ghana and Tanzania on small-scale gold mining revealed that their communities are economically better off than other communities which are not into mining (Mwaipopo, R. , et al 2004; Hilson, G. , 2002). Efforts have also been done in some countries to reduce the adverse effects of small-scale mining to the environment. Many small-scale miners in Ghana are now using an environment -friendly technology using Retorts to reduce the negative effects of mercury (Amankwan, et al, 2004, Esdale, et al, 2018). The tin-fish-tin retort has also been used in Papua New Guinea (PNG) to reduce the adverse effects of the use of mercury. The retort is a condenser apparatus that cools mercury vapor produced when the amalgam heated in a sealed crucible or container, returning the metal to its liquid form for reuse. When they are used properly, retorts reduce mercury gas emissions, with some designs enabling more than 90 % of mercury recovery (Esdale, et al, 2018). Another cheap technology to extract gold without using chemicals was discovered by the Northwestern University using a sugar named alpha cyclodextrin, which is derived from corn starch (Liu, Zhichang, et al, 2003). In the Philippines, the Department of Science and Technology (DOST) and University of the Philippines (UP) also developed a technology to process gold without using cyanide and mercury, and it uses an integrated tailing, disposal and treatment system (Ronda, R. Philippine Star, May 17, 2014). However, this technology has yet to be widely disseminated because it requires technical and financial resources to massively apply the technology.

Small-scale mining is part of the traditional culture of many indigenous communities which has been handed down for generations. Kankana-ey and Ibaloy communities of Benguet, for example, view their ancestral lands as communal

properties and the resources found in them. Gold panning using simple tools, was the most common mining technique employed by the traditional miners. Though, the technique did not produce a large quantity of gold, the miners were contented as long as they can provide the basic needs of the family and would not create tremendous damage to their natural environment (see Caballero,E,2004, AGHAM, 2015) .

In the case of this study, particularly in barangays Tumpagon and Nangcaon who are inhabited mostly by Higaonon, gold panning is still practiced by some miners. However, the new generation of miners no longer observe the traditional practices of mining. Some small-scale gold miners in Tumpagon are using the sluice box, machines and huge hydraulic hoses to wash down gravel on hillsides in order to produce gold quickly. While in Gango, underground drift mining is a common method employed by most of the small-scale miners.

Of the total 630 respondents interviewed, only 40% sourced their income from farming before they became small-scale miners. Most of them are from barangays Nangcaon and Tumpagon. Sixty five (65%) percent of the respondents in Nangcaon, 38% in Tumpagon and 6% in Gango sourced their Income from farming before they worked in the mining site. While 76% of the respondents in Gango had previously already depended on mining as their source of income before they moved to Gango as their present mining site.

Other respondents worked as laborers or vendors before they joined in small-scale gold mining. This phenomenon can be explained by the fact that most of the Lumads in Tumpagon and Nangcaon have lands to cultivate while in Gango, most of the respondents do not own land to cultivate and only depend on mining as their livelihood (Figure 10).

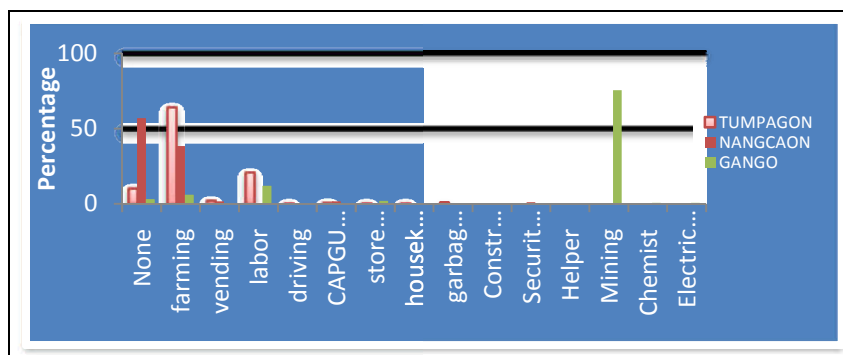


Figure 10: Source of Income before mining in the study sites, By Percentage

As shared by the participants during the FGD session (July 2017), gold panning in Tumpagon (*as they preferred to call it* instead of SSGM) started in 1930s even before the World War II and was the main source of livelihood of their forefathers, using simple tools such as a pan made of coconut shell and wood for digging. This finding has confirmed the results of other studies that small-scale gold mining has contributed to the local economy in terms of employment generation and economic activities.

In this study, particularly in barangays Tumpagon and Nangcaon who are inhabited mostly by *Higaonon*, gold panning is still practiced by some miners. With the new technology which make the extraction of gold quicker. The new generation of miners does not anymore observe the traditional practices of mining. Other new generation miners are using the sluice box, machines and huge hydraulic hoses to wash down gravel on the mountainsides in order to produce gold quickly. Communal system and community sharing mechanisms are no longer actively practiced within the mining site. Some participants during the FGD activity in Tumpagon said rituals are no longer practiced before the start of the mining activities. In barangay Gango, most of the miners are working in the underground tunnels as labourers excavating soil to unearth ores with gold.

In the Philippines, particularly in Mt. Diwalwal, it was the financiers and middlemen who “made it big” or “became rich”, and later on, put up their legitimate mining corporations. Some of them have associated with local mining corporations who are now the main miners in Mt. Diwalwal which have mining permits approved by DENR during the administration of the then Pres. Gloria Arroyo (see Doyle, et al). However, the study of Doyle, et al

(2007) revealed that most of the small-scale gold miners remain at subsistence level due to the exploitative relations with their financiers. They cited Mt. Diwalwal, Monkayo, Davao Del Norte as case in point, where the financiers and middlemen benefited the most.

Contribution of Small Scale Gold Mining to Northern Mindanao

In terms of contribution to the local economy in Northern Mindanao, the data from the Philippine Statistic Office (PSA, 2015) showed that the contribution of small-scale gold mining in Northern Mindanao, in terms of Gross Domestic Product (GDP) has been minimal. GDP is a monetary measure of the market value of all the final goods and services produced in a period of time. Only an average of 3.84 percent from 2010 to 2014 had been contributed to the country's GDP as compared to the agriculture sector. In the same period, the agriculture sector had contributed an average of 8.88 percent. A number of studies have also shown that the social and environment cost are higher than the benefits of small-scale mining (See Bugnosen, E, 2001; Huescha E. ,2013; Doyle C. et al 2007; Maramba, N. ,et al, 2000; UNIDO, 2000 and Agham, 2005). This means that aside from insignificant earnings from SSGM, the government has to spend resources to rehabilitate the environment and support for health care.

Motivation

Poverty (29%) and quick money (31%) are common motivation why the respondents work as miners for long periods. About half of the total respondents became miners because of the influence of their parents, grandparents and relatives who were miners themselves. The practice of small-scale gold mining as livelihood has been handed down by generation to generation.

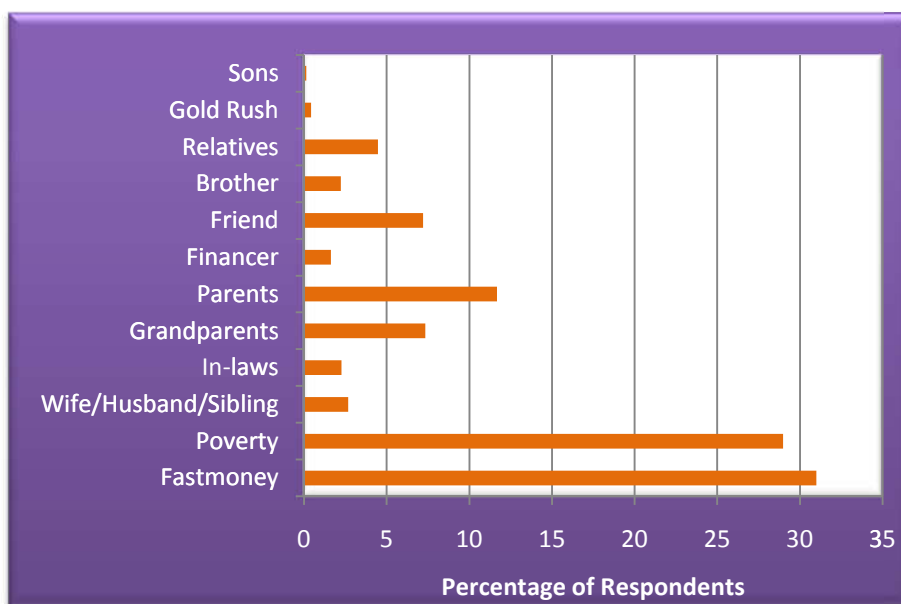


Figure 11: Motivation of the Respondents to go into Mining, By Percentage

About half (45%) of the respondents have been working in the study sites for more than 20 years while 30% have been working for about 10 years. Only five (5) percent work in the study sites for more than 40 years. Majority of the present miners are either children or grandchildren of the previous miners who worked in the same sites. Particularly in Tumpagon and Nangcaon, there are a few respondents who have been mining for more than 50 years while in Gango, there are a few respondents who have been mining for more than 35 years. This data revealed that mining activities have started in the three mining sites a long time ago.

Despite the massive campaign of the local governments and the Department of Environment and Natural Resources (DENR) against small-scale gold mining, there are still 15 percent new entrants who have joined for about two

(2) years and another 8 percent for less than one (1) year (Figure 12). This data indicates that SSGM remain the livelihood option of the small-scale miners due to lack of alternative livelihood.

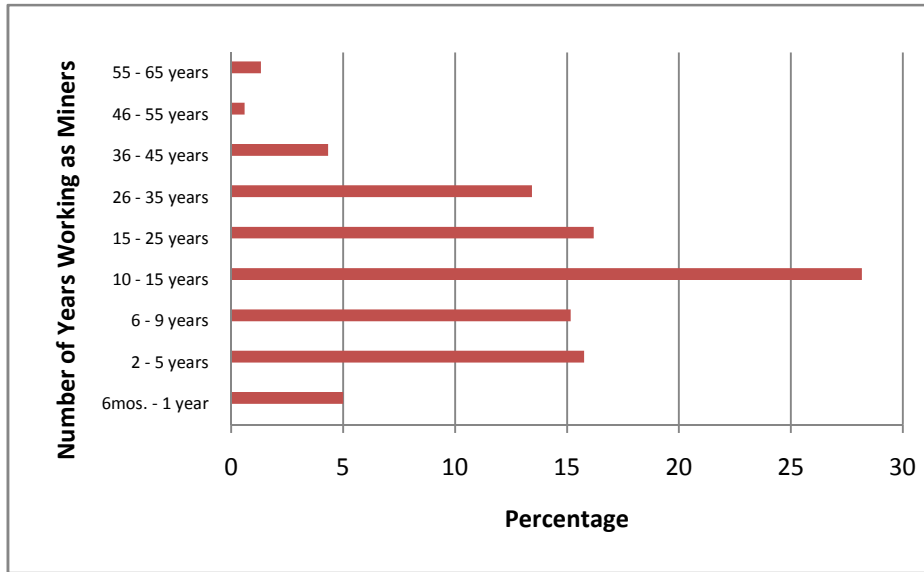


Figure 12: Respondents Length of Stay as Miners

Before working in the present mining sites, 40% percent of the respondents were engaged in farming activities and others were vendors, laborers, drivers, construction workers and among others. Some respondents in barangays Tumpagon and Nangaon shared that they were not motivated to cultivate their farms due to high cost of production and extremely low returns. The high transportation cost has been due to the very bad road condition (see Photo 5 and Photo 6 below). Roads in Tumpagon and Nangaon are very rough, rugged and unpassable during strong rains. On the other hand, most (76%) respondents from Gango claimed that even before working in the present site, they were already miners in the other mining sites (see Figure 12 below).



Photo 5: Road going to Tumpagon. **Photo 6:** Road going to Nangaon

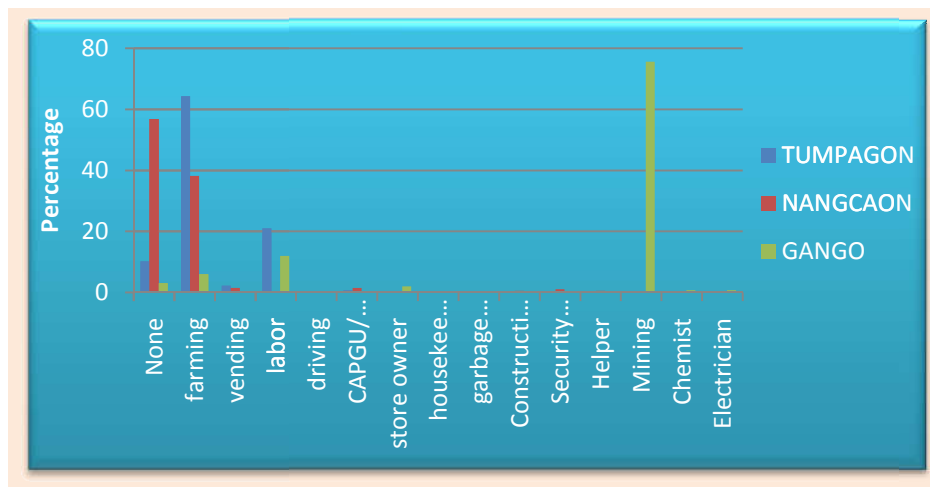


Figure 13: Source of Income before Mining in the Study Sites, By Percentage

Average Gold Production and Income

More than half (55%) of the total respondents earned between Php 500 to 1,000 weekly or 300 to 500 milligrams of gold. More than a quarter (27%) earned between 1000 to 2000 per week or 500 milligrams to 1 gram of gold production. This weekly earning is more or less similar if one is working in non-mining area receiving a minimum weekly wage of Php 2028. Only 14% of the total respondents earned a weekly income between Php 2000-5000 or 1 to 2 grams of gold production per week. Only a very few miners (4%) have income of more than Php 10,000 per week or with an average weekly gold production between 5 to 10 grams (See Figure 14). Of the three mining sites, most respondents from Nangcaon earned very minimal compared with the two mining sites while in Gango, almost half of the miners earned an average weekly income between 2000 to 4000.

Only those with financial investments could earned more income while most of the miners have minimal income. This data has confirmed the findings of Doyle, et al (2007) that most of the small scale miners are subsistence level and are trapped in the cycle of poverty.

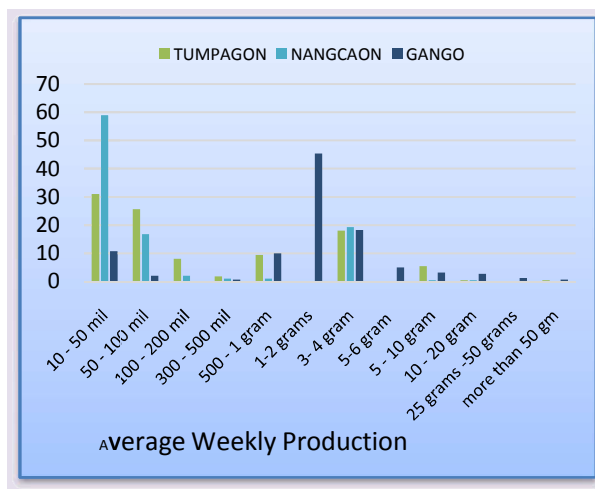


Figure 14: Average Weekly Income of the Respondents, By Percentage.

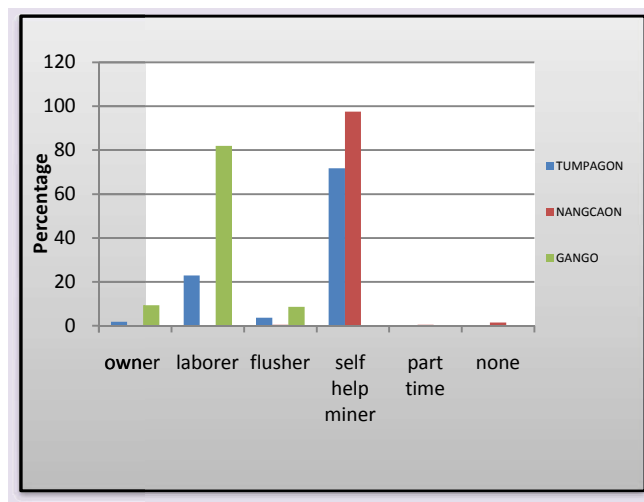


Figure 15: Type of Small Scale Miners, By Percentage

Of the total respondents, fifty six percent are self-help miners specially respondents from Nangcaon and Tumpagon and 35 percent are labourers mostly from Gango. Only 4 percent are tunnel owners and another 4 percent from barangay Tumpagon are using flushing machines (see Figure 15).

In terms of investments (see Figure 16), all respondents in Nangcaon and Tumpagon claimed that they do not have external funders. Only a few invested in flushing machines and boxes to collect more gold. All expenses incurred for their mining activities were personal cost. As discussed above, most of the SSGM in these barangays are gold panners. However, as shared during the FGD conducted in July 2017 in Barangay Tumpagon, there were some residents who used to work as labourers to the Korean and Chinese Miners while they were still operating in the hinterlands of Cagayan de Oro. While in Gango, 89 percent of the respondents said that they have external financiers because they needed investments to establish tunnels and purchase mining equipment. Only 11 percent of the respondents are self-help miners.

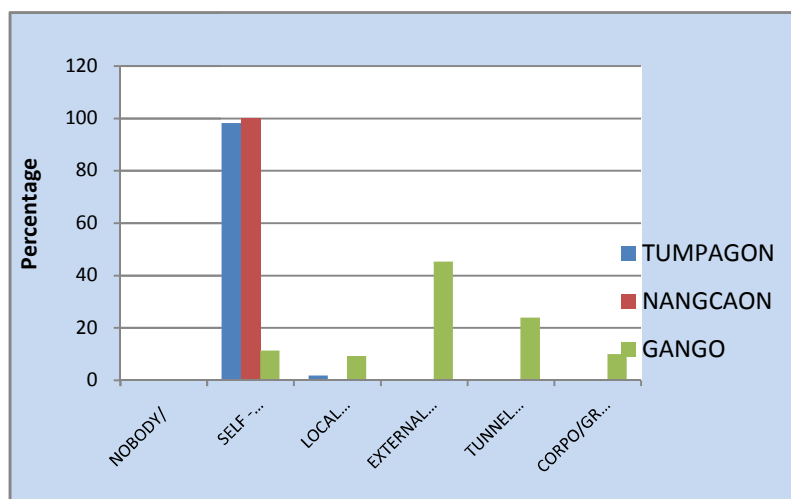


Figure 16: Source of Funding, By Percentage

Benefits of small-scale mining

Majority (60%) of the respondents claimed that there has been no significant changes in their lives compared to the time when they worked elsewhere, not yet in small-scale gold mining. Gold production fluctuates. Production is higher only during gold rush season, which normally happens twice a year. Most of the time, the miners produce gold in small quantities. However, there are 36% who claimed that they are better off now compared before because they have available money for their daily subsistence while another 4% considered themselves well-off because of small-scale mining (see Figure 17). To compare the three mining sites, most of the respondents from Nangcaon and Tumpagon feel that there have been no significant changes on their lives compared before while more than half of the respondents from Gango feel they have minimal improvement now compared before. This can be explained by the fact that almost all respondents from Gango have external funders and they could ask for advance payments for their daily needs while respondents from Tumpagon and Nangcaon are self-help miners who must depend on themselves financially.



Figure 17: Comparative Living Status, Before and After Mining, By Percentage

In terms of savings, 69% admitted that they do not have savings because their income is not even enough for their family needs. Only 21% claimed to have minimal savings ranging from PhP1000-5000. Only 4% claimed with savings between PhP 5000 to 10,000 and 3.67% with savings ranging from PhP16,000 to 20,000. Only 1.2% with savings more than PhP 50,000.00 and 0.67% with savings more than PhP100,000. Respondents with savings above PhP50,000 were from Tumpagon and Gango. The difference in the amount of savings generated among miners in the different sites can be due to the fact that only a few miners in Gango and Tumpagon are using machines and equipment that could extract more gold (Figure 18). For the majority of the respondents, there has been no significant difference among the three mining sites in terms of generating savings.

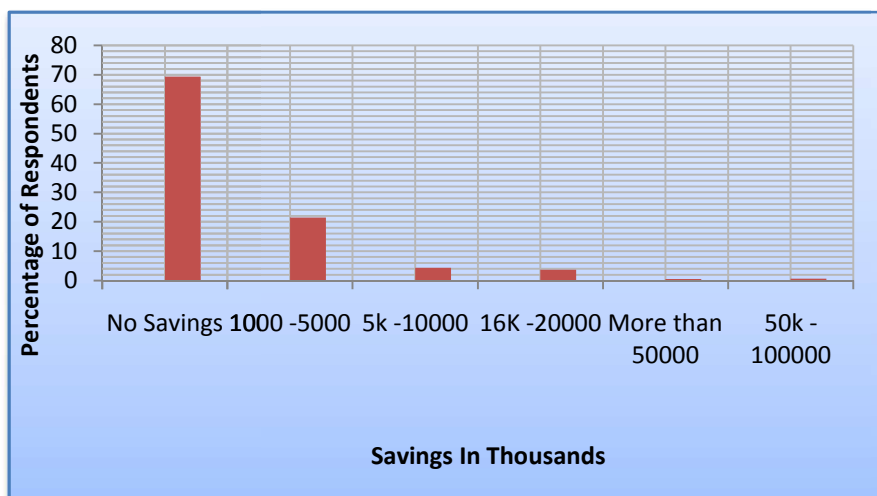


Figure 18: Savings of the Respondents, By Percentage, By Thousands

Sharing system varies depending on the external funders. Sharing arrangement only applicable in Gango because respondents from Nangcaon and Tumpagon are all self-help miners.

Particularly in Gango, 28% of the respondents said that their sharing is 60-40, 22% said that their sharing is 70-30 and 13% claimed that their sharing is 50-50. Only a very few respondents have different arrangements such as 75-25 or 80-20. For example, for 60-40 arrangement, the financier or tunnel owner will receive 40% while the remaining 60% will be divided among the laborers. Each tunnel usually has 10 to 12 laborers. But all expenses incurred by the financiers for operation, including food, electricity, gasoline, have to be deducted before the proceeds are divided. The same formula will apply to all other arrangements. In this arrangement, the share of the laborers who risked their lives inside the tunnels and suffered various illnesses, is therefore minimal. (Please see Figure 18 above).

Despite the subsistence level of the majority of SSGM, for them mining is better than farming because it provides their day-to-day needs while in farming, they would wait three (3) to four (4) months and usually with extremely low returns before they can buy their family needs.

Marketing of Gold Production

RA 7076 requires the small scale miners to sell their gold produce to Bangko Sentral ng Pilipinas (BSP). According to the guidelines from Bangko Sentral ng Pilipinas (BSP), gold may be sold to BSP through its BSP Regional Offices. The BSP will purchase the refined gold in Philippine peso (Php), at the prevailing international gold buying price on a daily basis. Small-scale miners intending to sell their gold shall address and present to the Office of the Regional Administrator, their “Letter of Delivery and Sale” (LDS) clearly indicating that the gold is offered for sale for value on the date of delivery and must be received not later than 2:00 p.m. of the advice date. They are also required to accomplish a “Risk Assessment Checklist for the Source of Origin”.

In the case of the three (3) study sites, eighty six (86%) percent of the respondents sold their produce to gold buyers within the mining sites. All three (3) study sites have gold buyers within the mining sites. Other (11%) miners who have bigger produce, sold their produce directly to Cagayan de Oro and while others (2%) sold their produce to Davao City. There are a few miners (1%) who received cash as their share directly from their financiers or tunnel owners. This means that gold production from these sites were sold outside the Bangko Sentral ng Pilipinas. The small miners prefer to sell their gold at the black market because the black market offer higher price and the miners do not need to comply with stringent registration and regulatory requirements. In the three sites alone, a considerable volume of gold was lost by the Bangko Sentral ng Pilipinas to the black market annually.

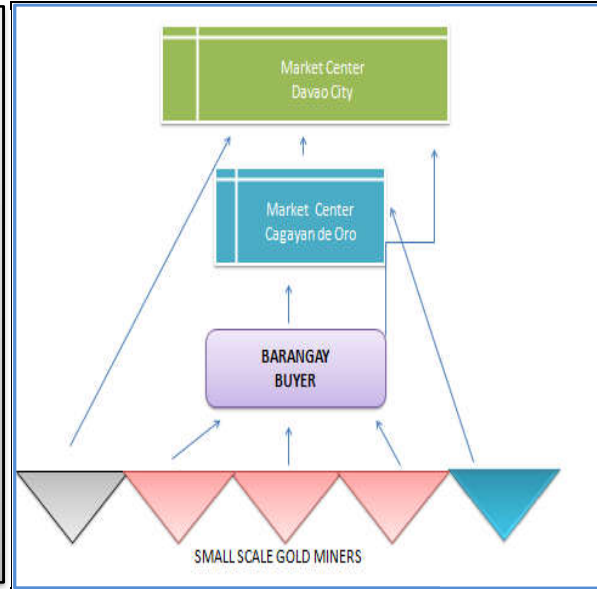
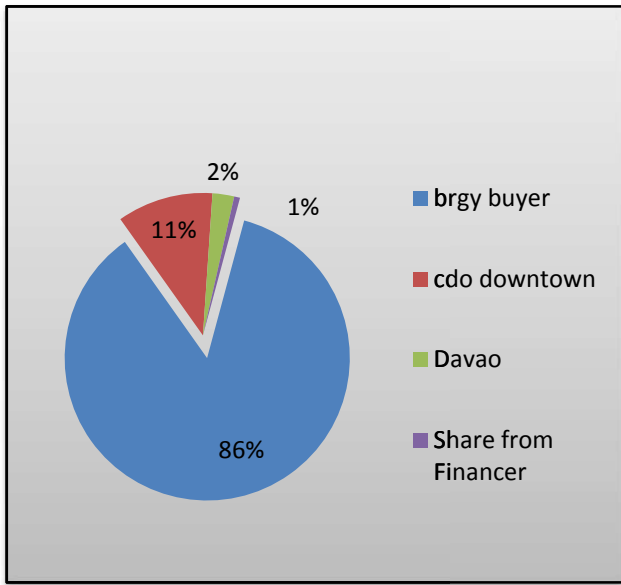


Figure 19: Market Centers of Gold Produced, By Percentage. **Figure 20:** Marketing Flow of Gold Produced

Payments of Taxes and other Fees

Section 28 of the revised administrative order of RA 7076 (DAO 2015-3) requires the small scale miners to pay taxes, royalties and production share. However, almost all (96.73%) respondents claimed that they have not paid taxes or other small scale related fees to their barangay or to the Bureau of Internal Revenue (BIR). Please see Figure 21.

In Barangay Gango, some miners are paying gate pass tickets to the land owner (the incumbent barangay captain) so that they could enter the mining sites. The tunnel owners are also paying a user fee or occupation fee to the IFMA holder. This shows that only private individuals earned from the small-scale mining activities. The government has lost potential revenues from approximately 7000 small scale miners from the three study sites alone.

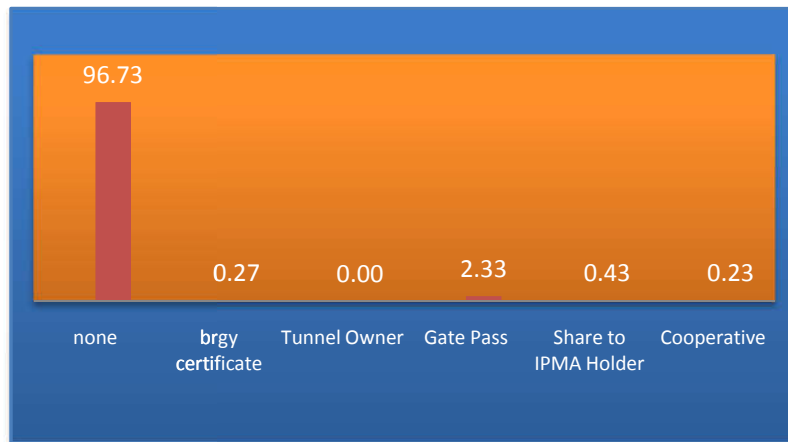


Figure 21: Ppercentage Distribution of Respondents Paying Taxes

Sustainability of Gold Supply

As shown in Figure 22 below, majority (78%) of the respondents claimed that the gold supply in the present mining sites dwindled. Only 7% said that there is no change in gold supply and only 4% claimed that supply of gold has increased. Others (5%) said that the supply of gold is fluctuating because there are weeks when they could dig more gold and there are also weeks that they could not collect any gold. Only respondents from Tumpagon (7.5%) and respondents from Gango (5%) claimed that the gold supply are increasing.

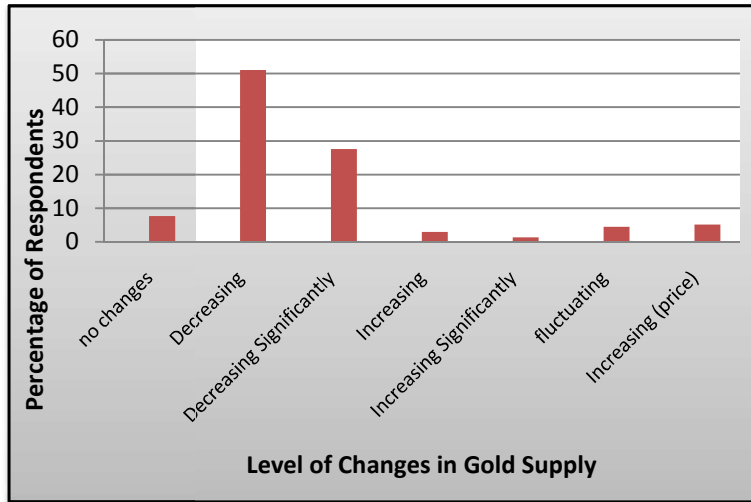


Figure 22: Level of Changes in Gold Supply, By Percentage

How long the small scale miners Intend to Stay

As shown in Figure 23, 48% of the respondents said that as long as there is gold, they will continue mining despite the prohibition from the government because of no alternative source of income. There are 16% who intend to stay 5 or 20 more years before they will look for alternative source of income. Others (35%) claimed that they will stop mining particularly respondents from Nangaon and Tumpagon. There are a few respondents who realized the negative effects of small-scale mining and have expressed support to the local government's efforts in banning mining activities in the hinterlands.

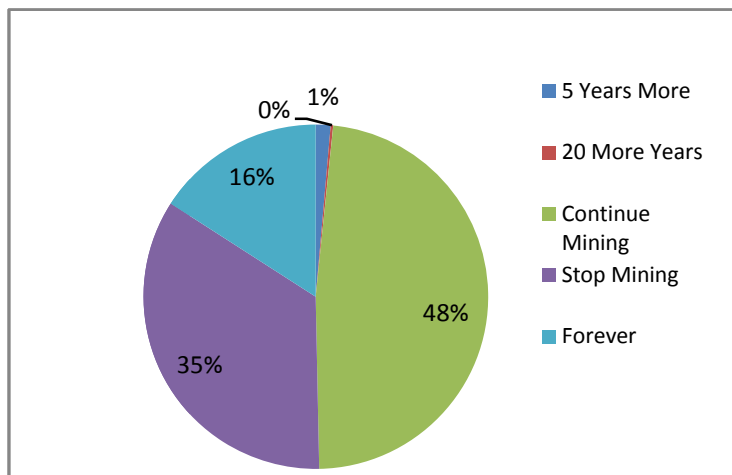


Figure 23: Percentage Distribution of Respondents Working as Miners, By Number of Years

Alternative Source of Income other than Mining

Majority of the respondents (64%) will go back to farming as their alternative livelihood if they leave the mining site especially those from Nangaon and Tumpagon. Only 26% of the respondents in Gango will go back to farming. This is understandable because only 18.7% own a piece of land to cultivate. The rest of the respondents will work as driver, carpenter, farm labourer and other manual service-oriented work. They could not seek higher paying jobs since majority of the respondents have low education. More than half of the total respondents only attained elementary level. Only 11% have completed elementary and 19.30 % reached high school (See Figure 24).

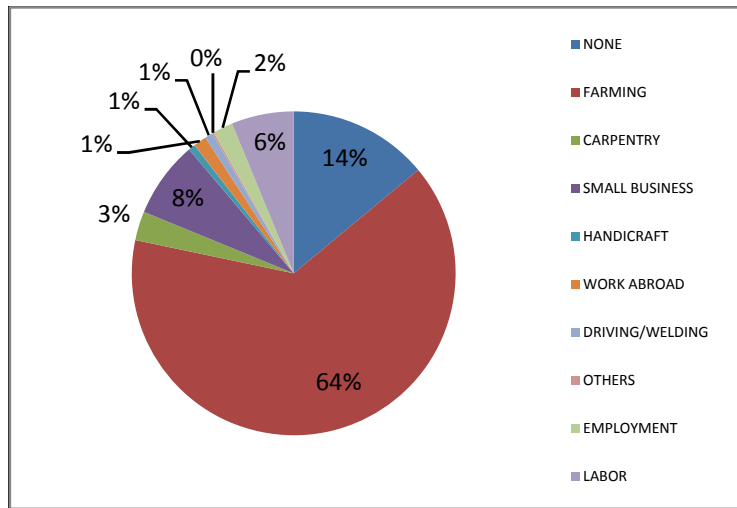


Figure 24: Alternative Source of Income of the Respondents

SUMMARY AND CONCLUSION

The Philippine gold reserves according to the World bank Group and the Philippine Statistic Authority is more than enough to completely eradicate poverty in the Philippines. The World Business Council on Sustainable Development considers small-scale gold mining potential as sustainable livelihood option. However, the actual contribution of the mining sector to the Philippine Economy has been insignificant. Although, at the local level, the small-scale gold mining has positively contributed to the economy through job creation and increasing local economic enterprises. Small-scale gold mining has the potential to contribute significantly to the local and national economies, if the gold produced by small-scale miners are sold directly to the Central Bank, and taxes and local fees are accurately paid. However, due to the stringent requirements of the government in buying gold produced and the low buying price, the small-scale miners prefer to sell their gold to the black market.

Small-scale mining activities in Tumpagon and Nangaon started earlier than in Malauyan, Gango. SSGM activities in Malauyan, Gango only started operation in early 1980’s while in the two barangays, mining activities started as early as 1930’s. Most of the small scale miners in Tumpagon and Nangaon are indigenous peoples belong to Higaonon Tribe while in Gango, they are mostly lowlanders or “*dumaga*”.

SSGM has been the traditional livelihood of many Higaonon living in Tumpagon and in Nangaon using only simple tools and technologies and guided through their cultural and spiritual practices. This traditional livelihood has been handed down through many generations and proved to have lesser negative impact to the environment and to the health of the people. However, with the influenced of *non-lumad* and foreign miners, the young generation of IP miners shifted to new mining methods that could collect large volumes of gold in a shorter period but with high social and environmental cost.

Some respondents from Tumpagon admitted to have used a combination of gold panning and sluice box to easily capture gold. A few respondents from Tumpagon also confirmed to have adopted hydraulic mining using large water hose and machine to wash down gravel on mountainsides, the skills they acquired from foreign miners. While

in Malauyan, Gango, most of the respondents are laborers working in the underground tunnels to excavate ores, with various sharing arrangements with their financiers. The data have indicated that the use of new technologies have resulted in a relatively higher gold production as compared to the traditional gold panning but also resulted in higher environment and social negative impact (Please refer to Chapter 2 and 3 for the detailed discussions).

Poverty and desire for quick riches drive people to small-scale gold mining as their main source of livelihood. Although, most small scale miners remain marginalized and in subsistence level, they opted to stay despite the high risk to their lives because mining provides them their day-to-day needs and with high hopes that in the future they can dig large volumes of gold and become rich. Some small-scale miners have been trapped in the exploitative relationship with their financiers, but they find it still acceptable than engaging in other livelihood activities with extremely low returns. Most of the miners who have been working for several decades in mining areas still living in poverty and have not experienced significant change in their lives. Only very few miners with capital have substantial earnings and experience high improvement in their living conditions.

Despite the ban of small-scale mining by both local government and DENR, majority still choose to remain in the mining sites because of lack of alternative and viable livelihood. Subsidy is absent from the government and NGOs since most SSGMs are unregistered and illegal. Stringent requirements and lack of technical support also hinder the SSGMs to convert themselves into mining cooperative or “minahan ng bayan”.

The sustainability of gold supply has been a major concern of some miners. Since the past years, gold production dwindled enormously. If mining is no longer profitable, majority of the miners will go back to farming especially the IPs who have farm lands to cultivate since they could not seek high paying jobs due to low education. Others who do not have areas to cultivate will look for other manual jobs.

Is small-scale mining still viable as sustainable livelihood? Has small-scale gold mining (SSGM) contributed to the achievement of Sustainable Goals?

This study concludes that small-scale mining is not viable as alternative and sustainable livelihood in the long term considering the diminishing supply of gold production and insignificant contribution to the local economy. Although, small-scale mining creates job in the rural areas and provides for the daily needs of families, it has not fully eradicated poverty. Most miners remain in the vulnerable situation and trapped in an exploitative relationship.

In the short term, however, it is worth revisiting the traditional mining methods which has been handed down by indigenous peoples. Many studies revealed that these traditional practices and methods for many centuries were employed by indigenous peoples and have proven to have less negative impact. There are also some environment-friendly technologies which have been tested and proven effective by other countries that could collect more gold with less adverse effects to the environment and to people's health, which are worth testing. These group of small-scale miners in other countries such as in Ghana and Papua New Guinea proved that they could continue to engage in small-scale mining activities without resulting in adverse negative effect to the environment and to the health of the people by using more environment-friendly technology. The Philippine Government through the DOST has also developed available environment-friendly technology for small-scale miners, but this has not been disseminated to the grassroots. Financial and technical support from the government and civil society organizations are necessary to enable the small miners to obtain these technologies and apply them in their respective mining sites. Guidelines and requirements of the government should be reviewed and appropriate measures to allow easy access should be done. The government's price of gold should be competitive and buying centers of the Central Banks should be accessible within the mining sites so that gold produced by the small-scale miners are sold directly to governments.

In areas with available farm lands, adequate financial and technical assistance should be provided to those who are willing to go back to farming as their alternative livelihood. Improvement of roads should be a priority to encourage miners to farm. Marketing support and post-harvest facilities should be readily available. Government subsidy and incentives for those who are willing to leave the small-scale mining should be readily available.

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