

# **Situational Analysis on Artisanal and Small Scale Mining**

**in Delanta Woreda of Amhara and Shakiso Woreda of Oromiya  
Regional States**

Financed by  
**PACT**

Conducted by  
**GMH International Business P.L.C**



August, 2015  
Addis Ababa



## ACRONYM

ASM	Artisanal and small scale mining
CSOs	Civil Society Organizations
CO2	Carbon dioxide
CRGE	Climate-Resilient Green Economy
EIA	Environmental Impact Assessment
FGD`	Focus Group Discussions
GHG	greenhouse gas
GDP	Gross Domestic Product
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunity Deficiency Syndrome
MOM	Ministry of Mines
PLC	Private Limited Company
SPSS	Statistical Package for Social Sciences
STDs	Sexually transmitted diseases
SCIP	Strategic climate institutions program
TB	Tuberculoses
ToR	Term of Reference

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## EXECUTIVE SUMMARY

Ethiopia is a nation endowed with various mineral resources owing to vast geological diversity, although not fully explored and exploited. Presently the mineral resources are being mined by state owned corporations, private company and Artisanal and Small-Scale Miners. Artisanal Mining in Ethiopia has been the basic mineral and rocks production and processing activity throughout the older civilization of the country from pre-Axumite kingdom to present time.

Artisanal Miners mine gold from placers for many years in Shakiso and Opal from layered rock profiles at Delanta area recently. The production practices at both locations rely on simple hand tools and traditional knowledge. Lack of scientific exploration and technological support is affecting both the mineral recovery rate and the ecosystem due to trial and error method of the mining operation that extensively disrupt the natural ecosystem.

The direct and indirect impact of ASM on the natural ecosystem is far-reaching. Deforestation, landslide, landscape change, soil erosion, siltation, tailing dumping, water pollution and the cumulative effect of those changes on greenhouse gas (GHG) emission are the major challenges.

ASM activities had a mixed impact on the health, social, culture and livelihood of the local people. There are important economic contributions of ASM to the national economy and local livelihoods. The economic contribution at the local level includes increased income of local government from royalty fee, employment generation for local people and large number of migrant workers. There is also remarkable investment and reinvestment of income generated from this economic sub-sector to other sustainable livelihoods and basic household assets.

Regardless of important contributions that the income generated from ASM has brought to the national and local economy it worth mentioning that the income distribution is uneven. Due to the labor based nature of the production activity and its remote locations it favors youth men over women, girls and elders. Moreover, due to the patriarchal culture of both communities the benefit sharing is also segregated by sex which favors men over women in the alleged reason of cultural values associated to type of job ascribed for men and women. Likewise, at the mineral value addition and transaction level those who have better skill, access to information and initial capital has grabbed the major share of the benefit.

With regard to health and social consequences, the negative consequences outweigh that of the positive contribution of the ASM on the local people's health and social wellbeing. High rate of HIV/AIDS prevalence that put both woredas in the 'high risk' list, STDs, unsafe sex, skin disease, communicable disease like TB are some of the health problems that ASM either cause or exacerbate in those areas. Social problems such as alcoholism, drug addiction, sexual harassment, crime, prostitution, child labor exploitation and high rate of school dropout and

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**Commented [DB2]:** In these three paragraphs you bounce back and forth between using the term 'artisanal miners' and ASM. And this happens throughout the whole report. I equally have fallen into this trap! But if we are talking about opal and gold mining in the SCIP pilot sites, then its artisanal. And if we talk about EIAs, then we have to make the distinction, as small-scale miners are mandated to undertake EIAs as per Proclamations, but artisanal miners are not.

absenteeism are the major challenge of the woredas. Most of the social problems are directly correlated with extravagancy and poor saving culture among youngsters.

In general, ASM has significant [potential](#) economic contribution to the rural households and other actors in the value chain if the culture of saving and reinvestment in sustainable business is developed. However there is a high likely of cumulative negative environmental, health and social impacts to outweigh the net positive contribution of the sector if the present disruptive practices are not addressed. Any form of extractive activities and forest degradation leads to CO<sub>2</sub> emissions which is incompatible with the CRGE strategy of the country. Hence, the negative health and social impact of ASM on the people has to be minimized and the negative impact of ASM on the ecosystem should be mitigated or prevented to positively contribute to the CRGE strategy of the country through coordinated effort of all concerned stakeholders.

## 1. INTRODUCTION

This Situational Analysis of the ASM in Delanta Woreda of Amhara and Shakiso Woreda of Oromiya Regional States was carried out by GMH International Business PLC based on the TOR and consultancy agreement entered into between GMH and Pact Ethiopia.

The situational assessment is part of the work that was designed to complement the project that Pact Ethiopia had partnered with the Ethiopian Ministry of Mines (MOM) to collaboratively implement a project named [Rehabilitating Abandoned ASM Sites and Improving Risk Mitigation Measures in Communities to Contribute to Wider CRGE Efforts in Ethiopia](#). The project is funded through the SCIP fund and aims to provide learning about environmental rehabilitation and risk management within the ASM sector that can complement wider CRGE efforts and be taken to scale.

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The project has two mutually reinforcing objectives. The first objective focuses on prevention and aims to build a menu of risk mitigation measures that will minimize and mitigate increased environmental degradation in different types of ASM mining sites. The second objective focuses on rehabilitation of previously abandoned sites. This rehabilitated/ re-established land will then serve as a valuable asset to the surrounding communities for eventual income generation and sustainable land use. Any community plans generated for these sites will need to be climate smart and link into wider CRGE efforts within Ethiopia.

The report is organized into nine parts where the first three parts focus on the introduction, background and methodology of the study. The fourth part [deals](#) with the ASM history, practice and the NRM in the study areas. The following two parts [discusses](#) the market value chain of gold and opal and stakeholders engaged in the ASM value chain. The final part of the report [analyzes](#) the impact of ASM on the people and ecosystem which finally draw conclusion and recommendation based on the analysis.

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## 2. BACKGROUND

### 2.1 Brief Historical Review of ASM in Ethiopia

Ethiopia is a nation endowed with various mineral resources due to vast geological diversity, although not explored and exploited to the maximum benefit of its people. The mineral resources are being mined by state owned corporations, private company and Artisanal and Small-Scale Miners. Artisanal Mining in Ethiopia has been the basic mineral and rocks production and processing sectors throughout the older civilization of the country from pre-Axumite kingdom to present time. The placer gold deposit has been mined traditionally by the artisanal miners for several thousand years back to biblical times. The presence of gold and precious stone (gemstone) in Ethiopia has long been known since Biblical time (1Kings 10: 1 - 13) referring to the Queen of Sheba's gift of gold and gemstones to the King Solomon of Israel. However, the Artisanal Mining operation has been given formal recognition and treated as a sector that contributes to the rural livelihoods and national income since recently. The history of labor based extraction of placer gold by local community and government in Shakiso area goes back to the Emperor Haileseilase regime although the Opal production in Delanta Woreda has started recently.

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### 2.2 ASM Policy, Proclamation and Procedures

Ethiopia has not previously had an official mineral policy but there is now a draft Mineral Policy under review. The draft policy framework recognizes the potential of the mineral sector to become a 'trigger of industrialization' and wider economic development. The policy framework clearly defines the role of the government as the facilitator, promoter and regulator of a mineral sector envision to be driven by private sector investment. The overall vision is that the mineral sector shall contribute to at least 10% of the GDP and that foreign currency earning shall increase 10-fold by 2020-2023, and this should be facilitated through measures aimed attracting private investment (World Bank, 2014)

The history of investment law in Ethiopia as incorporated in proper investment code dates back to the early 1960s. With a view to encourage investment of private capital, both from home and abroad, and with a desire to enact a special and comprehensive legislation, the Haileseilase regime came up with a Decree to Provide for the Encouragement of Capital Investment in Ethiopia in 1963.

The investment types subject to the code included mining, agricultural, industrial, transport and touristic investments. This piece of legislation had incorporated incentives such as exemptions from income tax and customs duty for mining and other investment activities. In 1971 Mining

Proclamation of the Empire of Ethiopia, No.282/1971 was issued. This was meant to formulate a separate mining legislation with a view to properly regulate mining investments.

With the coming to power of the Derge in 1974, the country adopted a policy which is fundamentally at odds with the idea of encouraging private investment to promote development. Accordingly, with the introduction of the Derge's socialist ideology, private properties were nationalized and there was little room for any form of private investment. The Socialist Government of Ethiopia Mining Industry Proclamation No.39/1975 was promulgated in 1975. The law has limited private sector's involvements in construction minerals like quarrying. The operation for metallic and industrial minerals was reserved for joint state and private investment whereas mining of precious metals, radioactive minerals, commercial scale salt production, and thermal power were exclusively reserved for the state (Bahir Dar University, 2012).

Following the downfall of the Derge, private investment in the mineral sector of Ethiopia was revived again in 1991 as a result of the political change in the country. Transitional Government of Ethiopia, Mining proclamation No.52/1993 was formulated in 1993. Artisanal mining got legal recognition for the first time under this proclamation. An amendment to this proclamation was made in 1996. These laws were repealed by a new law, Mining Operations Proclamation No. 678/ 2010 and further amended under Proclamation No. 816/ 2013.

The government with its obligation to deploy mineral resources for the benefit of the society acts as a custodian of such resources on behalf of the people. The federal government of Ethiopia is entrusted with formulating laws for utilization and conservation of mineral resources while regional states have the power to administer such resources in accordance with federal laws. Regional states have also the power to levy and collect income taxes, royalties and land rentals from small-scale and artisanal mining operations. The power to levy and collect income taxes and royalties from large-scale mining operations, on the other hand, is jointly exercised by both regional and federal governments.

Regional states have the power to issue artisanal mining license; reconnaissance, exploration and retention licenses with respect to construction and industrial minerals; and small scale mining licenses for industrial minerals and small and large scale mining licenses for construction minerals. The federal government has the power to issue reconnaissance, exploration, retention and mining licenses other than those to be issued by a state licensing authority.

During the previous regimes the potential of artisanal mining as a source of employment and alternative livelihoods for rural community was not considered as is seen by the existing government.

Due to criminalization of the ASM activities in the past the miners used to invade the area where gold is found in a large group at once and create an overwhelming destruction on the environment

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within few days. They did the mining activity in irresponsible manner and adopted harmful environmental practices, with little regard for their own safety and the environment. After they got legal recognition their operation is somehow guided by a recognized work program, given technical and financial assistance. Although the ASM activity is currently performed with due diligence to environment, the illegal producers are still causing environmental problems on active sites to some extent and on abandoned mining sites on large scale.

**Commented [DB6]:** I am not sure this is actually true! The legal opal cooperatives in Delanta are indiscriminately dumping tailings down the hillside into the river. Abandoned tunnels are not backfilled, and there is rampant erosion of slopes due to tailings but also uncontrolled livestock grazing and lack of bunds and terracing. In Shakisso woreda, legal gold cooperatives are diverting river, not backfilling, etc.

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Regarding the sale of minerals, during the previous regimes artisanal miners lack access to fair markets to sell mineral products as a result they smuggle the gold produced to neighboring countries through illegal routes. They also spend the money they got from the sale of mineral unwisely and did not show a change in their living condition. After legalizing and licensing they sell the gold to the National Bank of Ethiopia and able to contribute to foreign exchange earning of the country. They are now developing a saving habit through cooperatives and some of them already transforming their business into special small scale mining that give them opportunity to access better technologies. However, the previous poor saving habit is still observed and may continue to be a challenge at least in the short run. In general there is a promising improvement in the livelihood of people engaged in mining after legal recognition and contribution of the sector to the national revenue.

### 2.3 Socio-economic importance of ASM

It is widely recognized that ASM activities has been contributing to the employment opportunity and wealth creation to the rural poor and other actors in the value chain. It is estimated that around 1,000,000 people are directly engaged in the artisanal (± small scale) mining activities (Au, gemstones, Ta, Pt, etc) throughout the country; the number of people dependent (direct and indirect beneficiaries) on this mining sector can be more than five million people (Ethiopian Ministry of Mine, 2012). The same source asserted the fact that job seekers who are unskilled, low skilled women, disabled, etc from various parts of the country engaged in artisanal mining. As a result the number of people entering to this sector is significantly increasing; therefore, it has proved to be a source of job opportunity for a lot of people. Likewise, the sector has meaningful contribution to the reduction of rural poverty as it can be an important and major source of income for increasing the wealth of rural population and providing opportunities for alternative livelihoods. Furthermore, its potential contribution to the nation GDP and export earning potential is noteworthy. It was reported that in the fiscal year 2011/2012 the mining sector contributed 1.5 % to the GDP (Swedish Geological AB et al, April 14, 2014). In the same fiscal year, the sector accounted for USD 618 million (19%) of the country's exports, with gold making up close to 100% of the mining sector exports. In comparison, agriculture contributed 46.4%, industry 10.5% and manufacturing 3.6% to GDP and its largest export commodity, coffee, generated USD 833 million (26%) in export revenues. Hence, it can tacitly be judged that the sector has a very great potential in augmenting the national income through increasing the value of royalty payment , income tax collected from the

**Commented [DB7]:** Plus or minus? Is this estimate for artisanal miners or for the whole ASM sector in general?

**Commented [DB8]:** Need to spell these out for those who don't remember their school chemistry days!

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**Commented [DB9]:** Isn't that the criteria for working in the artisanal mining sector i.e. you have to be unemployed and unskilled? Are disabled involved in opal and gold artisanal mining?? In what capacity?

**Commented [DB10]:** Is this for the whole ASM sector, or the full mining sector (including large scale mining)?

sector and improving the foreign currency earning of the nation. ASM can be an important driver of local economic development and source of foreign currency if properly planned and implemented in environmental friendly [manner](#).

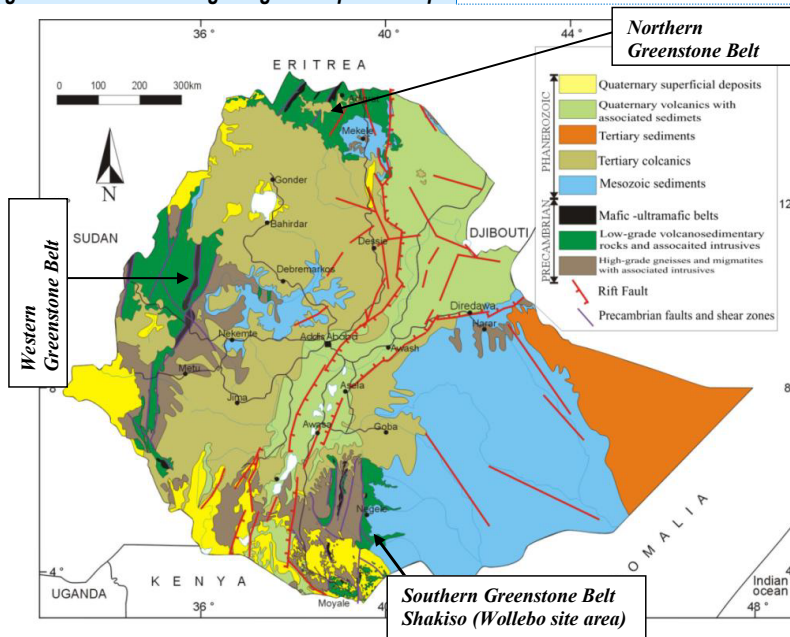
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## 2.4 Topography and Geologic Formation

Ethiopia is a nation endowed with various mineral resources due to vast geological diversity, although not explored and exploited to the maximum benefit of its people. The Ethiopia geologic formation is mainly consists of Precambrian Basement Rocks, Paleozoic to Mesozoic Sedimentary Rocks in some parts and Cenozoic Volcanic and Sediments in the rest parts of the country. The placer gold potentials are mainly confined and located within the Greenstone Belts of Precambrian Basement Rocks predominately in three different parts of the country (See Fig 01 below).

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Figure 01: Generalized geological map of Ethiopia



Commented [DB12]: Is it possible to show where gemstones are sourced presently on this map? This section is very biased towards gold, which is understandable given has a longer history. But would be good to beef up the opal sections as much as possible.

The topography and geologic formation of the study areas has a distinct feature that differentiates the landscape in the Delanta area from that of Odo Shakiso area. The Delanta topography is characterized by highly undulated, sharp cliffs and rugged mountains which is often inaccessible.

The area is highly degraded and devoid of natural forest apart from very few patch of bush and very scattered remnants of indigenous forest which indicates a trace of forest history in the area. Whereas the Shakiso area has some indigenous natural forest cover and the land features are slightly undulated with gentle slope in most areas.

The Shakiso area which is within the Adola geologic map is built up by Precambrian rocks, the older series of which is composed of gneisses, sericite-chlorite-amphibolitic and quartzites with emplacements of granites, massive amphibolites and even serpentinites. It is overlain by a younger series of meta-conglomerates and quartzites. These are remains of young flood basalts in the northern area capping the highest ridges and belonging to the young rift valley volcanic or even to the Trap series (Mohr, 1962).

The alluvial gold bearing placer is confined to depression representing mainly dry old riverbeds and streams. The absence of basalt rocks in gravel indicates the pre volcanic age of the fluvial cycle of erosion. Alluvial and deluvial placers originated probably during quaternary pluvial. The local movement of the floor has been caused by faulting of the refit system, which has continued to the present times.

The bulk of placer gold deposits are contained in horizontal or low-dipping sheets of fluvial alluvium laying directly over the bed rock. The placer gold deposit is composed of bedded gravel and sands of different size. They are covered by layers of loam and clayey silt. The vertical soil profile of the Walabo artisanal mining site has revealed layers of gravel and sand (see picture below).



Figure 02: Abandoned placer gold site at Wolabo Kebele

**Commented [DB13]:** I had provided a little info on the categorization of the ecosystems where the two SCIP sites are to Cristina Villegas recently for something else. Perhaps you can use (if you deem it accurate!) some of it here to flesh out this section:

The Delanta/Wadla Opal ASM sites are in the Dega Zone in the Amhara Region, in the central part of Ethiopia's highlands at an altitude of about 3200m. The area is characterized as Afromontane; once closed canopy forests with Podocarpus conifers and Juniper trees, the area is now heavily deforested and can be better categorized as dry evergreen scrubland vegetation, although there has been reforestation with eucalyptus. Relatively fertile hillsides means the area has attracted farming communities for centuries. The ASM sites are on very steep slopes/ravines, making access difficult, and slope destabilization a problem.

The Shakisso Gold ASM sites are in the southern part of Ethiopia's highlands in the Oromiya Region, at an altitude of about 1,400m. The site is in the general montane moist forest ecosystem, categorized by broadleaved tree species. The sites are heavily degraded, particularly along riverbanks and riparian vegetation, with close proximity to human habitation. Small subsistence agriculture occurs adjacent the sites taking advantage of the more forgiving topography and fertile soils.

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**Commented [DB15]:** The picture does not show the vertical soil profile of the site really. But it is a good depiction of the degradation wrought on a riverine system by artisanal gold mining!

The distribution of gold is very irregular. There are rich pay streaks alternating with poor or even barren zones. Gold tends to accumulate in the basis of the gravel bed, and it burrows also into the soft schistose bed rock. Gold grains are fine, flaky and smooth prevailingly. Bigger irregular nuggets are found as well. Fragments of quartz often adhere to the gold.

Gemstone exploration has recent history in Ethiopia. Limited explorations have been done by the Ministry of Mines and Energy and Geological Survey of Ethiopia so far. In Ethiopia precious Opal is found in Tertiary volcanics within rhyolitic ignimbrite or tuff as concretions that are covered by compacted acidic ash shell with different colored amorphous silica in center.

The Dessie map sheet which includes the Delanta area has Opal mineralization of economically important resources related to the Tertiary and Quaternary volcanics. The common and abundant gemstone in the Dessie map sheet is Opal associated with the layered Wegel Tena rhyolitic Ignimbrite. North of Wegel Tena town there is already mining activity by local people along the layered surface of 300-500 m thick Wegel Tena rhyolitic ignimbrite [along very steep slopes above steep canyons](#) (Fig.3).



**Figure 3: Deeply dissected and horizontally layered Opal bearing Wegel Tena rhyolitic ignimbrite**

Access to the area is limited by highly elevated and rough terrain. There are three Wegel Tena rhyolitic sequence, the first is the mentioned rhyolitic sequence found north of Wegel Tena town, where already Opal mining has been taking place. The others require systematic evaluation of the Opal mineralization. Ambassel-Gishen Mariam and Ajibar-Mekdela rhyolitic sequences are the two similar rhyolitic sequences in the area with no Opal mining activities. So that they could be other Opal bearing future potential zones demanding future systematic exploration work.

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## 2.5 ASM and Ecosystem

It is apparent that all kinds of mineral extraction activities could disturb the natural ecosystem. The type and magnitude of ecosystem disturbance could vary from site to site according to the technology used for extraction, environmental sensitivity level of the operators and ecologically fragile location of the mining sites. Deforestation, siltation, erosion, landscape change, chemical contamination, air and water pollution, greenhouse gas emission, loss of biodiversity and species extinctions could be some form of damage that mining could inflict on the ecosystem. The impact of artisanal mining on critical ecosystems mainly relate to biodiversity, forests, and water. The impact on biodiversity and forest degradation stems from direct forest clearance at the mining sites for the mining operation, land clearance for agriculture, tree felling for house construction and fuel wood. Forest degradation and dumping of tailings from excavation of trenches, and pits have direct impact on the biodiversity losses. Attraction of illegal settlements and migrant workers will further increase pressure on the biodiversity and forest resources. Artisanal mining will also affect water resources through diverting water away from the main river course for gold panning; blocking water flow which results in river bank erosion and increase turbidity level of the water, which affects the downstream users, flora and fauna.

When engaging in the extractive industry like mining there must be careful and systemic protection of the whole system of environment that assures sustainable use of the environmental resources in the ecosystem to make sure that our action will bring about either minimal or no destruction to the environment.

The mining legislation of Ethiopia, which came in to effect in 1993<sup>1</sup> has provision that requires as compulsory criteria to study, submit and get approval of Environmental Impact Assessment from the respective Authority in order to develop small and large scale mining projects. The Mining Operations Proclamation No. 678/ 2010 further stated the need for EIA and allocation of funds to cover the costs of rehabilitation by mining operators except for reconnaissance license, retention license or artisanal mining license. Given the nature and magnitude of the environmental damage caused by the artisanal mining operations it is unwise to exempt the operations from environmental impact assessment. Particularly the cumulate impact of artisanal mining operations over wider areas within a forest and along the river banks could have immense environmental impact on the biodiversity and physical landscape.

The same proclamation states that the owner of artisanal mining license will be obliged to undertake the mining operations in accordance with the environment, health and safety standards prescribed for artisanal mining in the relevant laws. However in practice, none of the environmental, health and safety standers are maintained by the artisanal mining operators.

The CRGE initiative strategy of Ethiopia focuses on four pillars that will support Ethiopia's developing green economy out of which one pillar clearly emphasis the importance of increasing

<sup>1</sup>Mining proclamation No.52/1993

**Commented [DB16]:** I would say that mining in the sites is definitely directly causing forest degradation, siltation, slope destabilization, bank erosion, impacting water quality, chemical contamination (i.e. from indiscriminate use of mercury) and degrading natural habitats. Indirectly, the sector as a whole is having landscape-wide effects, loss of climate resilience and GHG emission abatement through forest degradation. But generally, the sector is not a net emitter of GHG.

**Commented [DB17]:** Do we know this for a fact? Steep slopes in Delanta area might have some indigenous plant species, but probably negligible. Doesn't seem like a lot of wildlife in the site either other than glada baboons... I assume there is more in Shakisso forests, but I don't have any info on this. Can we get some reference to this to back up assertions?

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**Commented [DB18]:** I think the rationale behind not mandating EIAs for artisanal mining was the perceived relatively little effect on the environment. We have to show that this is by no means negligible but rather considerable, particularly the cumulative impact of the whole sector. But we need good evidence of this, and I think the focus should be less on biodiversity, species loss, wildlife, etc. but on landscape impacts, water quality, mercury contamination, etc. ALSO, just mandating artisanal miners to undertake EIAs will not solve the problem, as they do not have the technical and financial means to implement these. So we have to advocate for a realistic and appropriate requirement i.e. general permit or collective EIA methodology.

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**Commented [DB19]:** See comment above.

**Commented [DB20]:** Do we know what these are? Can we delve into these a little further here?

**Commented [DB21]:** Why the focus on this one pillar here? I would also say the environmental risk mitigation measures will reduce siltation of watercourses thereby reducing negative impacts on hydropower potential (another of the pillars). I would also say that the pull factor of ASM is putting huge strain on the forest resources of the country in terms of construction material. And so bringing about modern construction practices in the housing industry will be key (another of the pillars). But all this can be part of the 8.3 ASM Linkage with CRGE section...

the GHG sequestration in forestry, i.e., protecting and re-establishing forests for their economic and ecosystem services including as carbon stocks. Rehabilitation and restoration of the mined land will directly link to the CRGE strategic focus of the country though a lot has to be done.

### 3. METHODOLOGY

The Situational Analysis combined both qualitative and quantitative methods to generate required data. The assessments mainly rely on qualitative data gathering through key informant interview and focus group discussions. Household Survey [Questionnaires](#) were also administered to 46 respondents in Shakiso and 56 respondents at Delanta woreda to generate quantitative data that augment the qualitative information. Secondary data from government offices particularly on mining related policy, Proclamation and guidelines were reviewed. Other relevant literature reviews were also made to document historical accounts and study findings pertinent to issues under discussion including CRGE strategy.

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#### 3.1 Sampling

The sampling frame for the study was the two pre-determined active and abandon ASM Kebeles in Delanta and Odo-Shakiso Woredas. Within the purposively selected active and abandon sites simple random sampling was employed at Kebele level in which all units had an equal chance of being selected. To start off, the sampling frame was drawn by equal distribution of the sample size among the pre-selected kebele residents. Once the required number of samples per kebele was determined based on the population size the random sampling was applied to select assessment respondents within the ASM communities in the mining site based on residents and migrant miners' availability during the time of the data collection.

For the qualitative data collection the assessment intended to conduct three separate FGDs (government office representatives, ASM cooperatives and Women groups) in each of the two woredas. The number of discussants per group was limited to 6-10 on average. Focus group discussants were drawn from ASM community members with different roles and from government offices at the woreda level. Key informant interviews were conducted with government stakeholders in each of the two woredas. A total of 6 key informant interviews per woreda were carried out with key informant drawn from 4 Woreda Offices, and 1 kebele level administration and with one opinion leaders at kebele. Focus group discussant drawn from the government office includes: representatives from the woreda water energy and mine office, from Environmental protection and land administration office, from Cooperative Office, from forestry enterprise, and from women Children and youth affairs Offices.

### 3.2 Data collection

The assessment pursued focus group discussion and key informant interview technique for qualitative data collection. The focus group discussant and key informants were selected based on purposive sampling technique; the discussant were included in the assessment based on the knowledge that the assessment team have that these groups were engaging in ASM activities. At institutional level key government stakeholders were represented. Member of cooperatives and Kebele structure were also considered at grass root level. Both resident and migrant mining operators were interviewed in the key informant interview. Women alone focus group discussion was also conducted to encourage women freely air their concerns.

The Focus group discussion guide consists of issues like mining as source of livelihood, ASM practices, ASM impact on people and ecosystem, role of women in mining, composition and relations in ASM cooperatives, mineral transaction, and child labor and community perceptions of mining activities. The data collection tools were designed in English and interpreter was used during data collection. The tools were then field tested to ensure the language and questions were appropriate before being administered to respondents. Focus group discussion and key informant interview were facilitated by a team of experts comprising Agro-economist, Mineral Economist, Gender and Environmental Experts with more than two decades of experience in rural development. Checklists were developed based on the thematic focuses of the assessment to guide the discussion with different groups. In quantitative data collection, survey questionnaire was administered to the resident miners and migrants.

### 3.3 Data Analysis and Reporting

The qualitative data were summarized and grouped under different thematic areas based on the issues discussed for analysis. Then further analysis was made by correlating with empirical evidences generated from quantitative data. The Statistical package for social science (SPSS) was used to analysis the questioner survey data. Pre-coded data were inputted into data field to run descriptive statistics which generates quantitative data that augment the finding from key informant interview and group discussions. The report was produced under key thematic areas of the assessment including conclusion and recommendations.

**Commented [DB22]:** Where is this data presented? I see two graphs on livelihood distribution and another mention somewhere of some quantitative data but not much else. Can we present more of the data in graphical form or tables? Otherwise, it seems strange that there is more on the methodology of quantitative data than the actual quantitative data itself!

**Commented [DB23]:** Might be worth putting in an annex an example of the questionnaire used, and guiding questions for FGDs used as well.

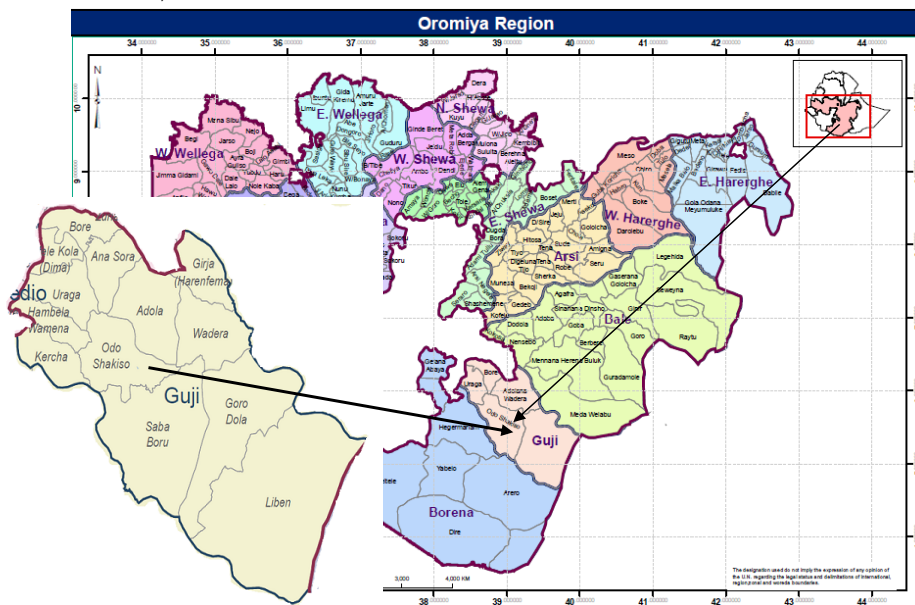
**Commented [DB24]:** ?? Not sure what this means. But again, where is all this generated quantitative data?

## 4. ASM HISTORY, PRACTICE AND NRM IN SHAKISO

## 4.1 Brief Background of Shakiso Woreda

### 4.1.1 Location, Topography and Climate

Odo Shakiso is one of the 13 woredas of Guji Zone in the Oromia Regional state. The Woreda is bordered on the south by Saba Boru the newly breakaway woreda from Shakiso, on the west by Kercha and Hambela Wamena, on the northeast by Adola, on the north by Ana Sora and Uruga, on the northeast by Adolana and Wadara, and on the east by Goro Dola. It is situated between 5045' north latitude and 38055' east longitude. The relative location of the woreda is 490 km to the south-east, from Addis Ababa.



**Figure 04: Location map of Shakiso Woreda**

Shakiso Woreda is divided into 21 rural and 2 urban kebeles. The area is sparsely populated in the east and moderately populated in the west. The agro-ecology of the Woreda is predominantly characterized by woina-dega and dega. The total annual rainfall ranges from 1000-1500mm. The woreda receives big rain in the Kremt (Hagaya) and small rain in the Belg (Bedhessa). Temperatures are humid and hot. The soil is fertile red-loam. Its overall production potential is high for both food and cash crops.

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#### **4.1.2 Demography and social services**

The Guji Oromo are the major ethnic group that occupies the Woreda while a mix of ethnic groups live in the woreda as a migrant mining workers or permanent residents. The majority of the inhabitants of the Woreda are agriculturalist whose livelihood mainly depends on crop production and cattle keeping. Coffee, maize and Enset are the major crops. Cattle, goat and donkey are some of the livestock kept by the rural community. Gold mining and coffee trade constitute significant part of the local communities' livelihood.

The human health services in the Woreda are not satisfactory. Poorly trained human resources, lack of facilities and vital health equipment to provide efficient services are the major factors that affected the quality of the health services. The school distribution within a woreda is fairly good but the school dropout rate is the highest in the zone which ranges between 23-28% over last three years compared to the zonal average of 14%. This is mainly blamed on the availability of traditional mining activities that attract school age children. Discussion with woreda education office [revealed](#) that most of the students regardless of age or sex engage in artisanal mining either after school or during vacation. The number of school dropout miner is also very high.

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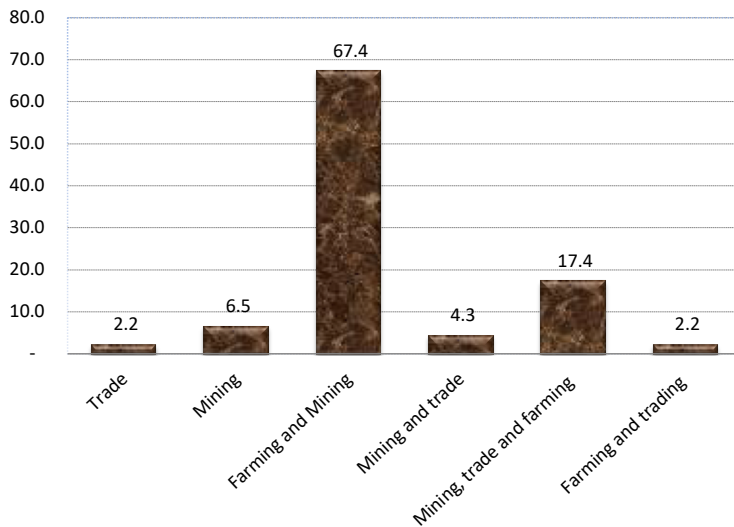
#### **4.1.3 Livelihoods**

Generally the woreda is a food self-sufficient agricultural zone known as coffee-enset livelihood zone. Enset and Maize are the major staple food while coffee serves as source of cash crop in most part of the woreda. Wheat and teff are also grown in some part of the worda though small in size. Cattle, goat and sheep are kept in most farming families.

Artisanal mining is considered as livelihood diversification option for some local residents while it is fulltime employment for migrant workers. Petty trading and coffee collection for licensed traders is another source of income during the coffee harvesting season. Working as a laborer in big coffee farms and well off farmers plot is a source of seasonal employment for some migrant workers.

It was found out that the major livelihood of the study site, Wolabo kebele, is also agriculture, ASM and petty trading activities in order of importance. Within the agricultural activities Maize, Enset, Teff and wheat were the major staple crops identified by the community. It was also disclosed that coffee is the first important cash crops followed by kat for Wolabo kebele too.

**Figure 05: Sources of livelihood in Wolabo Kebele**



Most of the study site community combine farming with mining\_(67.4%) followed by a mix of farming, mining and trade (17.4%) as a source of livelihood since mining will help them to get liquid cash that helped them fulfill household cash need on daily basis and procure agricultural inputs. In addition to easy access to cash they feel that gold mining will not compete with their labor requirement for the main agricultural activities. They also considered periodic engagement in mining activity as part of local culture. Besides, mining activity is positively perceived by the local community.

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#### 4.2 ASM History in Shakiso

According to the key informant interview and group discussions results as well as other secondary sources, ASM activities in Shakiso were commenced during the Italian occupation of the country. Later on in 1928, during the imperial period, artisanal gold extraction was started mainly using forced labor brought from different parts of the country. The laborers were provided only with food and shelter of poor quality. The imperial government declared that Adola area including the present Shakiso woredawas as protected Gold mining areas of the country. In the then period, the gold mined from that area used to contribute considerable share of the government revenue that the nearest town was named “ *Kibre-Mengist*” means the place that make the King to be highly respected.

During the transition from the imperial government to the Derge regime, a wide spread illegal invasion of the mining areas were occurred. An open access scenario due to brief power gap during the transition period created an opportunity for wasteful exploitation of the Gold throughout the providence by escaped bonded labor and local community who have some prior experience in artisanal mining. That short period was a period where large scale natural forest devastation and illegal exploitation of gold took place. Later on when the Derge regime consolidated its power, it did not give recognition to artisanal mining as a livelihood option though the practice continued in clandestine. As a result, vast area of forestland was devastated which drastically reduce the forest cover of the area and left open pits unfilled throughout the forest which put the life of people and wildlife at risk. Likewise illegal gold trading and smuggling was commenced and spread out which involved different people in the informal market value chain of Gold trade across the Kenya and Somalia borders.

Later on the Derge regime started formal exploration and exploration of Gold Ore and establishment of modern Gold mining industry of which Lega-Denbi is the major one. Though formally prohibited, the illegal miners stealthy follow the formal exploration trenches that the explorers opened up for gold exploration. The local community witnessed that they managed to recover good volume of gold along the exploration trench lines than traditional knowledge based tedious efforts. This state of affairs resulted in stronger sanction efforts by the Derge to halt the traditional exploitation that traditional miner also continued their "Hide and Seek" mining activities which further aggravated the natural resources degradation in the locality.

Immediately, following the downfall of the Derge regime, another large scale illegal invasion of the mining areas was began by the people who came from different corners of the country and from varied ethnic group in the country including the ex-combatants flee from war. The influx of migrant from various part of the country did not only illegally and unsustainably utilize the gold but also clear forest for settlement, agriculture, and firewood which significantly changed the forest cover of the woreda. In addition to large number of migrants flow to the woreda during the downfall of the Derge regime another wave of migrant from Hararge area came and settle in the forest during the drought of 2008. The relocation of the migrant from West Hararge area was initially facilitated by government to resettle some people from drought affected areas into less populated part of the region which later on followed by convoy of voluntary settlers incursion to the woreda due to the attraction of abundant resources. There are still around 480 households making up more than 3500 people who are illegally settled within the forest in Wolabo Kebele alone. Correspondingly, illegal settlers spread throughout the rest Kebeles of the Woreda.

The livelihoods of those illegal settlers are one way or another depends on artisanal mining and forest resource utilization. Due to the fact that their settlement pattern is haphazard and highly dispersed in the forest it was difficult to regulate forest clearing and illegal mining within the forest. As a result a lot of open pit were left uncovered in the forest which pose risk to human, wildlife and livestock. The extensive nature of this illegal activity did not only challenge the responsible

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government offices for regulation but it will make the mitigation and rehabilitation efforts costly and unbearable.

Realizing the significance of artisanal mining for local people's livelihood, employment generation and its contribution to national revenue, the current government attempted to give recognition to the traditional miners and prepared legal framework for entry and exit. Therefore, legal recognition has been given to ASM since 1991. Since then there are a lot of ASM cooperatives legally registered and supplying gold to the National Bank of Ethiopia.

### 4.3 ASM Practice in Walabo Kebel

The prevailing Artisanal mining practice types and methods are digging pits, and excavation of trenches and tunnel using rudimentary hand tools like pick-axes and shovels following the traditionally identified indicators of the gold deposit and gold panning along the river course. It was uncovered that ASM activities are being carried out without any technological support that reduce the workload of miners or enhance their recovery rate and without technical support in exploration from concerned line department to identify the potentially promising placer gold areas. The delineation of mining site for organized illegal miners is done wherever the traditional miners feel that the indicators of gold are present. This kind of trial and error delineation and extraction method will not only waste the time and effort of artisanal miners it will also bear significant impact on the disruption of the wider ecosystem as unsuccessful miners should move to other sites abandoning the less productive sites. During group interview at Wolabo Kebele with mining cooperatives they affirmed that their effort of mining in one of the site did not worth the labor and resource they invested in for the last few years and hence decided to abandon the site and request for replacement in other location. These types of guesstimate effort without proper exploration are not productive that they recover very little amount of gold after several hours or days of digging, washing and panning.

The present gold mining operations at the study site are organized in different forms and structure that embrace local residents, migrant workers, wage based laborers, cooperative/ group based producers, women, youths and child labor. It was found out that the relations involved in these activities pursue different forms of labor arrangements, and legal organizations.

**Cooperative based ASM Practices:** it is a legally recognized form of ASM practice in the area. A group of people with common social and economic goal will voluntarily come together and form a cooperative based on the predetermined rules and regulation depicted in the cooperative formation guideline. After the cooperatives are once constituted and requested for the mining area at certain location the Kebele Administration will assess the site to make sure that the land is free of individual or communal land owners' claim or whether it is the consent of the private plot owner. After once the kebele administration assess and confirm that the requested land is free of any

**Commented [DB28]:** I thought this was 1993? I think you refer to 1993 in another section of the report.

**Commented [DB29]:** Do we have statistics on this? i.e. number of cooperatives and amount of gold supplied to NBE per year?

I read somewhere that there were more than 575 cooperatives in Ethiopia's artisanal mining sub-sector (probably 90% of these in gold). And that in 2011/12 8,328 kg of gold was produced by the formal artisanal mining sector (<http://aigaforum.com/articles/economi-unit-on-mining-eth.php>). I am sure you can get more up to date figures from MoM there in Addis.

claim supporting letter will be written to woreda land administration and Woreda Mine, Energy and Water Office. Accordingly these two offices will make assessment of the proposed site to determine the technical feasibility of the site for proposed mining purpose and environmentally to conduct mining operation at proposed location. When the site is deemed feasible for mining operation based on visual assessment, the site will be demarcated and handover to the cooperative the woreda Water Energy and Mine office along with the production license which indicates the validity period. The duties and responsibilities of coops including rehabilitation of the sites after the extraction work is over or license expired.

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Once the cooperative receive legal license it will employs labors/diggers from both the members and non-members based on the locally accepted labor value for the activities and mutually agreed arrangement of benefit sharing. The diggers are wage laborer who are excavating, washing, hauling, picking and sorting waste. The coop will cover the daily expenses of the laborers such as food and drinks while they are in the mining works whether they are lucky or not in obtaining the gold. When the laborers recover certain amount of gold the coops will buy them at around 20-25% less than prevailing market price and also deduct the associated costs. Some of the coops have their own trade license therefore can directly supply to the National Bank at 5% higher price than prevailing current world market price. Some of the coops do not have their own trade license so will sale to license owners which in some case one of the well to do coop member who has license. In the case of Wolabo the mining operation was financed by one member of the coop who will also buy whatever produced. He will collect, sale to National Bank, retain his margin and payback the balance to the coop and again receive his dividend as a member of the cooperative. Such kind of membership and trade relation with rich and influential member of the cooperative could create power imbalance among the coop members and open room for unfair exploitation of a legal cooperative by a single individual.

**Illegal ASM Practice:** Since legal recognition is given to ASM as a source of livelihood, employment and formal business the illegal practices have gone down both at production and transaction level. However still there are some illegal extraction and trade activities going on as group discussion with government office and coop members indicated. The illegal ASM practices are being carried out on own farmland, in the remote areas at the foot-of the mountain, along the riverbank and deep inside the forest mainly by the settlers and indigenou people to the lesser extent. They also illegally excavate the abandoned mining sites making the rehabilitation program difficult and unsustainable in the long run. Illegal miners do everything in covert and hastily to extract whatever they get and change the site before the kebele officials or other concerned body traces their foot step. Therefore there is no time and patience for this group of actors to either reduce risk to the environment or to rehabilitate the exploited site.

**Commented [DB31]:** When we visited Shakisso, the illegal miners were working in the middle of the day, in front of the local kebele headman and the Office of Mines representative. Nothing covert or hasty about that!



**Figure 06: Tree [felling](#) by illegal miners**

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The worst of all is that the illegal practitioners do some extraction efforts at abandon sites which pose great challenge for rehabilitation. Unfortunately, illegal mining activities are not yet strongly regulated and discouraged by kebele administration.

Competition over resource between indigenous and the incoming [migrant](#) community has raised tension. There is also a deep rooted grievance among local community over irresponsible and destructive resource use by incoming group. The grievance is not only related to the mineral resource misuse but also encroachment to forestland which they looked after for several hundred years. This latent conflict could surface itself one day if proper resource governance will not be in place.

Sometimes the illegal miners' encroach on the legal mining operator's excavated tunnel and destabilize the underground structure left by operators for safety purpose besides stealing the gold bearing placer. This will often lead to sudden collapse of tunnels causing huge risk of death to the legal operators or the encroachers too.

**Children and ASM Practices:** It was found out that children of age 8 and above were participating at different stage of the ASM activities. They were being involved in washing the placer gold bearing soils, grinding the gold associated quartz, digging pit sunk and many other supporting activities.



**Figure 07: Child labor in the Gold Mining**

The children were brought to involve in the ASM activities due to peer pressures as well as their role in ASM activities were socially accepted by the community and their families were indifferent to their involvement and some families are even encourage them to involve in the activities. Such involvement of the children had brought about school drop-out and presence of out-of-age attendees in the school. It was revealed by the key informant from the woreda education office that most of the students in the high school were not in the right age categories for the grade. Most of them are more than 20 years of age. This emanated from the fact that most of school age teenagers frequently dropout and engaged in lucrative gold mining and risky motor bike rental services.

This state of affairs is very daunting for the future prospects of the woreda in general and the youth in particular since they are not acquiring knowledge and skill that prepare them for leadership in the country and pursue better livelihood options when the resource from extractive industry vanish. There is a tendency of discounting the future of knowledge acquisition by youth assuming that acquiring money is an end to all human effort. Sometimes the students will misbehave and showoff to disappoint the school community with the easy resource they get from gold extraction which negatively affect the motivation of teachers. The woreda education office discussant highly emphasized the serious impact this will have on the retention and motivation of teachers.

Early engagement on artisanal mining and access to easy cash from this activity will not only affect the education of youth it will also expose children and youth to multifaceted challenges. Youth delinquency, alcoholism, child labor exploitation, addiction to kat and drugs, early marriage and pregnancy out of marriage, and exposure to HIV/AIDS and other STDs are some of the problems affecting school age boys and girls in the area as stated by Woreda Women, Youth and Social Affairs Office.

**Commented [DB32]:** What about mercury use in artisanal gold mining? Not much mention of it here. Is that because it isn't being used or there is little evidence of it? Or mostly an issue with small scale mining?

## 4.5 Ecosystem and NRM in Shakiso

### 4.5.1 State of Ecosystem and Natural resources

Shakiso woreda is endowed with natural resources like forest, water and mineral. The forest cover was believed to be higher than 60% before the introduction of artisanal and small scale mining activities and land clearance for agriculture. Originally the area was settled by Guji Oromo and sparsely populated. The livelihood system of Guji Oromo was highly compatible with forest. They were mainly dependant on livestock rearing in the low laying grassland areas of the woreda and use the forest for non-timber forest products like honey and wild collection. They rarely move closer to forest area with their herds particularly when there is no sufficient water and grass for their livestock in the lowland areas due to lengthened drought period. According to key informants interview with Woreda Agricultural office and other elders the natural ecosystem was intact until the artisanal mining operation extensively started during the brief occupation of Italy and later on the extraction continues with varied level of intensity. Awata, Moremora and Kejowa Rivers are the major tributaries of Dawa River that drain the woreda. Bedakesa and Shanka streams are the two major streams that join Awata river crossing the Wolabo Keble.

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**Commented [DB35]:** Any information on hydropower potential on these rivers? I was told that the Bedakesa river (where the SCIP ASM sites are) is a tertiary tributary of a river that is either dammed or is soon to be dammed. Useful to note, as can better make the CRGE link vis-à-vis hydropower and siltation concerns.

The impact of artisanal mining on forest biodiversity is more pronounced compared to the water resources. The impact on biodiversity and forest degradation stems from direct forest clearance at the mining sites for the mining operation, tree felling for house construction and fuel wood. There are about 34 important tree species used to be plentiful in the Wolabo mining area but currently disappearing. The stump of big trees of more than 50cm diameter is an indicator for large scale deforestation on the site.



**Figure 08: Remnants of big tree stumps at abandon Wolabo coop ASM site**

Forest degradation and dumping of tailings from excavation of trenches, and pits have direct impact on the biodiversity losses. The loss of some grass species were observed along the river bank where several layers of leftover gravel, sands and debris were overlay to suppress the original grass cover. Secondary generation of alien species will take over the native species after alteration of the landscape.



**Figure 09: Biodiversity losses due to tailing dumping**

Encroachments into the forest for agriculture and timber extraction for various purposes also had impact on the forest biodiversity loss as observed at Diga block 2 abandon mining site of Chimiana Wolabo Cooperative. Artisanal mining will also affect water resources through diverting water away from the main watercourse to bring water to the pits; blocking water flow which leads to river bank erosion and washing soil, and changing turbidity levels of the water, which affects water flora and fauna as well as downstream users.

**4.5.2 Formal and informal NRM system**

**Customary Resource Management System:** Multi level Gada system based customary water; rangeland and forest management system was responsible for the overall natural resource protection, management and utilization in Guji community. The change in local government resource management system over long period of time has gradually weakened the customary

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- Commented [DB38]:** Is this the abandoned SCIP ASM site?
- Commented [DB39]:** ??
- Commented [DB40]:** Perhaps a little more here, as this is, in my view, THE MAIN impact of this type of artisanal mining. i.e. increased siltation, increased sediment loads downstream, distorting river regime, potential for flooding (and loss of life and property as a result, particularly with increased sediment loads), reduction in water quality both in terms of turbidity but also biological and chemical contamination (not just from mercury, of which there were trances in the water supply, but also DDT sprayed in abandoned pits).

resource management system. The change in the ethnic composition of the study area due to arrival of large number of new settlers who does not know and respect the customary resource management system further weakened the system. It was found out that the customary institution that governs resource utilization arrangement in the Wolabo Kebeleis on the verge of collapse. Hence, currently the formal government resource management system that extends from the Federal Ministry level down to kebele structure is recognized and used by local people in the study area.

**Commented [DB41]:** What is this customary institution? Why is it on the verge of collapse?

**Forest Management:** The formal institutional set up for the management and utilization of forest resources of the area is highly recognized than the traditional once. In this system of management the Oromia forest agencies along with its structure at the woreda level governs the forest resource management. It was found out that the Oromia Wild Life and Forestry Enterprise's Shakiso woreda office delineated 34,000 hectare of forestland and organized communities' residing in the forest areas into Participatory forest management groups to revitalize the forest management system through co-management arrangement with local community.

This kind of governance for the management of the forest wherein ASM activities are being practices within the delineated forest areas may create conflicts on resources utilization vis-a-vis the enterprise principles because there is already artisanal mining being practiced and promoted by government within the delineated areas. It was revealed that farm land expansion is the main factors for the forest depletion followed by mining and settlement respectively. Furthermore, it was disclosed that license provision for individual miners from 1983E.C to 1997E.C had greatly contributed for the devastation of the forest resource base of the areas since it did not provide for rehabilitation of abandon site or enforce mitigation measures

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**Mineral Management:** The officially mandated formal resource governance structures are Ministry of mine at the Federal level, Water Mine and Energy Bureau at Regional, zonal and Woreda level. Besides, there is a local level taskforce named "Kebele Mine council' pulled together from various local structures. Hence, the ASM activities are governed by the Woreda Water, Mining and Energy office. It was also revealed that Mining Council at kebele level also involved in the governance of the ASM activities. The Kebele Level Mining Council involved in ensuring the ASM site is free from individual or public claims and facilitates the speeding up of the license provision of organized cooperative for the ASM activities. They also involve in awareness creation among the community sustainable mining practices. It was learnt that illegal artisanal mining activities are serious challenge for the law enforcement and regulation of artisanal mining operation. The illegal operators are highly devastative of the natural resource bases as they do everything recklessly.

Controversial ideas were raised on the utilization of the abandoned land. It was pointed out that the ASM cooperative demonstrated their interest to further exploit the abandon mining site by going deeper if they get access to better technologies like bulldozer which reduce the arduous work of removing top soil and improve their gold recovery rate. However, artisanal miners are not allowed

to use any additional technology and go below 15 meter vertical depth according to the Mining Operations Proclamation No. 678/ 2010. However there is special small scale licensing initiative currently promoted by government as strategy to graduate capable ASM coops and other group of people would like to join the this new scheme that demand a minimum of 0.5 million startup capital. Hence, the paradox is on how to make sure the abandon sites will not be reallocated for special small scale or small scale mining exploitation. Investment on rehabilitation of abandon sites will only be worth when concerned government office as well as local community will guarantee that the abandoned site allocated for rehabilitation will remain intact.

**Water Management:** River, shallow wells and hand pumps in rural area and tap water in urban areas are the major sources of water for home consumption and livestock. There is a formal water supply and sewerage authority managed scheme in the town. The same authority will play management role including distribution, periodic quality check and maintenance.

In the rural areas rivers, streams hand dug wells and hand pumps are the source of water managed differently in different location. There is no formal or customary management system designed for river and streams. However there are commonly accepted rules and regulation wherein the local community abides by for the utilization of the hand pumps and shallow wells. There was water committee that manages the water well and hand pump use at Wolabo Kebele. The committee has chair persons, key holder for the fenced hand pump. This committee is established primarily for the management of the shallow well and hand pumps though at times deal with disagreement over other water uses in the community. In addition to this the formal kebele administrative structure is also involved in the management of conflicts in hand pump water uses. Hence it is recommended that any local resource management activities should engage these locally recognized resources management committees and the formal kebele administration structures in the design, implementation and management of water resources.

#### 4.5.3 Role of women in ASM and NRM

Both men and women have different but complimentary roles in natural resource management and utilization. Women often play vital role in managing key environmental resources like forest, water and mineral though less visible compared to the role played by men. This could be related to traditional role and responsibility ascribed to men and women by a given society. In the study area the women are part of water committee and also participating in the artisanal cooperative as a member and cooperative leadership. In addition to providing the workers with food and drinks women and girls take part in all mining activities apart from tunnel digging according to the discussants.

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Commented [DB42]: Is there evidence of this? Female heads of cooperatives?



**Figure 10: Women engagement in ASM activities**

Women are open to engage on other sources of livelihood that could augment family income in the study area. Likewise, there are organized women groups that are ready to engage in irrigated crop production and pottery at Wolabo kebele.

Regardless of significant role that women plays in various livelihood activities and resource management roles the notion of the community towards the women's equal contribution to the societies wellbeing is not strong. Apart from the dividend paid to the cooperative members which is equally divided among members regardless of sex, there is some bias towards men for labor payment in the pretext of men's engagement on arduous activities in mining. The role women played in cooking which is vital for labor productivity is not valued and rewarded in the artisanal mining sector. As a result women may not equally benefit from engagement on various natural resource management responsibilities and artisanal mining labor force unless sufficient awareness raising work is done among the wider community on the real value of women's contribution. Hence strong effort should be made to raise the gender awareness level of wider community as well as equip women with both technical skill and assertiveness training to enable them to demand for their rights and benefits.

## 5. ASM HISTORY, PRACTICE AND NRM IN DELANTA

### 5.1 Brief background of Delanta Woreda

#### 5.1.1 Location, Topography and Climate

Delanta woreda is one of the 22 woredas of South Wollo Administrative Zone of Amhara National Regional State. The administrative center of the woreda, Wogeltena town, is found at about 494 km to the Northeast of Addis Ababa. The Woreda is situated between 11°22'N latitude and 37°41'E longitude. The total area of the woreda has 99,846.49 hectares and it has mostly rugged topography and is less accessible. According to the current administrative division, the woreda encompasses 33 rural kebeles and one urban kebele. The altitude of the Woreda ranges from 1600 to 3500 M a.s.l. The landscape of the Woreda consists of 30% mountainous, 30.5% plain and 36.5% undulating hills and valley sides Valleys 3%.

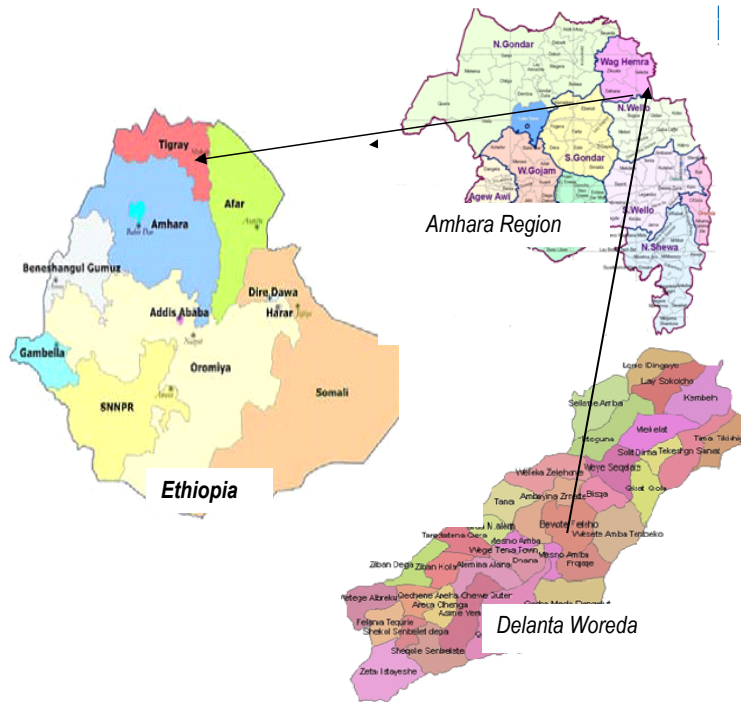


Figure 11: Location Map of the study area, Delanta woreda

Agro-climatically, Delanta is classified into Kolla 29.8%, Woina-Dega 43.8%, Dega 26.4%. In addition to this, the rainfall is bimodal nature with two rainy seasons (summer and spring). The summer rainy season (June, July and August) is the period of maximum rainfall. The other rainy season is spring (February, March and April). The area receives an average annual rain fall ranging from 1000 to 2000 mm and average daily temperature from 12-26°C.

#### **5.1.2 Demography and social services**

**Demography:** According to the CSA (2007) population census data, the total population size of Delanta woreda is 133,556 out of which 66,636 and 66,920 are male and female respectively. The annual growth rate from 1994 – 2007 is 2.6%. The rural population size constitutes 125,469 out of this 62,610 are male and 62,859 are female; the urban population size consists 8,087 of which 4,029 are male and 4,058 are female.

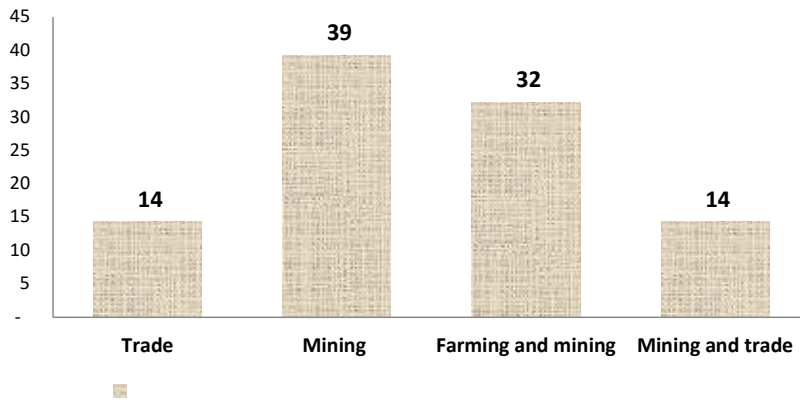
School and Health Services: it was found out that at both Tsehay Meucha and Gosh meda kebele there were elementary schools. Besides these there is one high school at Tsehay Mewucha Kebele. Furthermore, it was observed that there was no health service at the mining site except the health post which is located 10km away from the mining site. However, there is one health station at Wogel Tena town.

#### **5.1.3 Livelihoods**

The main livelihood source of the woreda is agriculture which is followed by OPAL mining recently. The major crops grown in the woreda includes barley, lentil, Teff, wheat, bean and sorghum. The farming system of the study area is dominantly subsistence based on mixed crop – livestock production system. Since the discovery of Opal in recent years, in 28 out of the 34 rural kebeles of the woreda the livelihood option of the rural community as well as the urban has been diversified. The large proportion of respondents (39%) depends on Opal mining at the study site followed by 32% of the respondents who combine both farming and mining as a source of livelihood. About 14% of the respondents pursue trade and same size of the respondents combine trade and mining activities.

The reason for shifting from dependence on agriculture alone to mining or combination of mining and agriculture was the complementary nature of the two livelihoods in terms of maximizing income and labor productivity during off season by engaging in mining. Large majority of the youth however depend purely on mining because of lack of farmland. The scenario of exclusive dependence on extractive resource could lead to a disastrous impact when the mining resource will eventually depleted unless proper saving and investment on other sustainable livelihood is sought in advance.

**Commented [DB43]:** Is this the case? It seemed as if there was quite a lot of farmland in the general vicinity...on the plateau of course!



**Figure 12: Proportion of respondents' by livelihood sources at Tsehaymewucha**

Following the expansion of mining activities in the area there has been a lot of newly emerging livelihood option in the areas such as Opal brokering, lapidary, snacks shop, shoe polish, food and catering activities both at the mining sites and semi-urban town.

Agriculture used to be the major sources of livelihood in the area but presently Opal production is significantly contributing to the improvement in income and livelihood of large number of people in the kebeles particularly youth and their family members. It was observed that majority of the community members recognize that mining activity is more lucrative and bring significant change in the household economy and bring wealth much better than any other livelihood option in their surroundings. On the other hand, the discussant also revealed that there were no alternative livelihood options that they could compare it with mining. For some segment of the community particularly women catering and petty trading is becoming attractive following the development of urban settlement in their kebele. Similarly in rural settings, dairy cow and apiculture development were also indicated as alternative livelihood in addition to crop production in the agricultural sector.

## **5.2 ASM history in Delanta**

Artisanal mining is recent phenomena in Delanta woreda compared to the ASM practices in Odo Shakiso woreda. There is no detail geological exploration work carried out in the area especially for Opal mineral. Hence Opal is found in the Delanta area by chance through the introduction of the artisanal Opal mining experience from the North Shewa zone. ASM activity has been started in 1991, by the women called "Wudinesh" who came from North Shewa with a Sample of OPAL Rock to explore OPAL presence in the woreda. The mining was started at kebele 23 of the woreda initially. The youth from different kebeles of the woreda used to participate in the mine activity at kebele 23. As times goes on, they used their experience in identifying Opalso spread the mine

activities to other kebeles of the woreda. In such ways the mine activity spread to 28 kebele out of the 34 kebeles of the woreda. Initially, the woreda residents were not beneficiaries of the mine activities. It was people who were outside of the woreda and those who engaged in transaction were highly benefitted from the mine as well as those who had the knowledge of the world Market price took the greatest benefits. However, gradually, when the benefits were recognized by the local residents, the woreda youth started engaging in extensive Opal production and transaction. As a result a lot of people currently acquiring wealth and changing their living standard. There are youths who already acquired asset like buses, Motor Bike, Hotel by engaging in mine production and transactions.

### 5.3 ASM Practice in Tsehaymewucha and Goshmeda Kebeles

ASM practice at Tsehaymewucha and Goshmeda Kebeles is focused on production Opal based on traditional exploration and excavation using traditional hand tools such as pickaxe and shovels. The production was initially begun in disorganized manner and illegally on individual basis. But latter on the Artisanal miners were organized by the district Administration and were licensed to operate legally. It was revealed that, although ASM was started very recently, it had been creating some negative impact on the ecosystem of the mining area. The miners dug between 50 to 100m deep openings into the cliffside with a height of about 70-100cm creating a chain of tunnels along the geological seam. This will destruct the already fragile ecosystem. The sand, gravel and sub-soil removed from the tunnel will be exposed for erosion and cover the top soil of the farmland at the bottom of the mountain which makes cultivation impossible. It will also silt up the river and pollute the downstream water sources. The mining operators will not try to restore the area as it were before the intervention. Consequently, the woreda was bound to delineate around 5.5 ha of land for rehabilitation at kebele 019 or locally called “Gosh Meda”

In addition it was reported that ASM resulted in wild life Disturbances, the few remnant natural forests and afforested tree devastation for different purpose mainly for cooking and temporary shelter. It had also disturbed the walk way used by the residents in and round the mining areas as observed during the site visit.

**Cooperative Based Production:** the legal Opal production in both Tsehay Memucha and Goshu meda was being carried out by groups organized into cooperatives by the Woreda Cooperative Promotion Office after the approval was given by the woreda Water Mining and Energy Office. In accordance with this processes there are 28 cooperative comprising 3800 members in the woreda of which only 132 are women. Most of these women did not have decision making roles in both production and management of the Opal. It was discovered that the roles of women is mainly on food and drink catering for those men Opal diggers and sale soft drinks to miners and collecting Hajara the leftover of Opal bearing soil for resorting.

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**Commented [DB44]:** In the ongoing site in Delanta there are no farms 'at the bottom of the mountain'. This might have been the case in the abandoned site however, although no evidence of that per se.

**Commented [DB45]:** Why is this? Important to understand the barrier here; the incentive structure, or lack thereof.

We asked some of the miners this and it wasn't necessarily to do with lack of technical knowledge (as they have been involved in bund/terracing construction and tree planting under Work for Food programs in the past) but rather motivation, lack of regulation/enforcement and financial ability.

**Commented [DB46]:** When was this?

**Commented [DB47]:** Repetitive. (see Women in ASM section)

**Production and benefit sharing:** each cooperative member has 70 production teams which has ten members each. Then each ten members has to be allocated specific mine site. The Opal recovery is based on chance since there is no proper exploration that guides producers. One group could get more Opal than the other by chance.

**Women and ASM:** It was found out that women member of the cooperative were not involved in the Opal production for the cultural belief that women are not physically fit for such arduous work. As a result the benefit obtained from Opal by women members of the cooperative was very minimal. This was owing to the fact that the benefit from Opal production is based on the amount of Opal that a miner produces and sells to the cooperative. However, the discussion conducted with the women group disclosed that young age women could do the mining as their male counter parts but they were not allowed to do so by the men members of the cooperative and the society at large. Consequently, the women role was restricted to food preparation, soft drink and food selling to the minors, pick left over of OPAL which are very small size and less rewarding in value. Realizing the discriminatory situation in Opal production and benefit sharing structure the worda office start encouraging women as affirmative action to engage in Lapidary to add value and sell to exporters or middle men.

At Tsehay Mewucha Kebele, there were two cooperatives named “Addis Hiyiwot” and “Weraye Ye Maedin Kufarona Shach” cooperatives. The ‘Weraye Ye Maedin Kufarona Shach’ cooperative has 731 members out of which 44 members are women. These members are organized into 61 mining team. The member of each team comprised 10-11 people. The cooperative has executive committee comprising 16 members of whom: seven executive bodies, three controls committee, three awareness raising team and the other 3 dealing with local development mobilization. Likewise, at Gosh Meda, Kebele 19, there was a cooperative called “Yibeletal” organized in 2005 E.C. to undertake Opal production on 5.5 Ha of land delineated for mining purpose which is currently abandon and set aside for rehabilitation.

The internal structure of the cooperative was meant to ensure that the Opal production system is environmental friendly and contribute to local development. It was pointed out by the executive committee that the local development mobilizing team is responsible for ensuring that terraces are constructed to stabilize the structure, prevent downstream water pollution, soil erosion and tailings dumping on the farmland. The same team is responsible for discouraging the engagement of school age children in Opal production so as to address the issue of dropout and absentees.

**Children and ASM:** it was found out that children below working age of at least 14 according to national labor law were being involved in Opal production at different level as there is strong push from parent and peer pressure. It is apparent that the quick cash generated from Opal production and transaction has created an attitude of discounting the future of education by advocating that the ultimate goal of learning is for acquiring money. This change in attitude among children and youths triggered wide spread drop-out and absenteeism in both the primary school and high

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Commented [DB49]: Is THIS one of the SCIP ASM abandoned sites?

Commented [DB50]: In what way? Do they have bylaws in place? It was 'meant to ensure system was environmentally friendly.' Why are they not effective? Lack of incentives? Money? No set bylaws/ guiding principles? This would be VERY IMPORTANT to know in order to design/develop measures to change this i.e. training, bylaw generation, etc.

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school. Such shifts in attitude was further pronounced by the large amount of benefits acquired from Opal business by youth less than age of twenty who showoff to attract other school youth.

The woreda education office described that out of three high schools in the woreda, the high school at kebele 023( Tsehay Mewucha kebele) was the school with high absenteeism among students as many of the students were engaging in OPAL production. Moreover there is a tendency of despising teachers who try to advise them to quit the Opal business and focus on their study. Hence the school dropout and absenteeism is common in the area where Opal production is active. This will not only affect the secondary and high school students but also the primary school children since they are widely engaged in Hajara purifying and selling. To curb the school drop-out and the negative attitude in school children, the woreda declared that children below age of 18 are not legally allowed to engage fulltime in Opal production and transaction. Responsibility was given to the woreda, kebele administration and school administrations to follow up the students' practices in each kebeles.

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## 5.4 Ecosystem and NRM in Delanta

### 5.4.1 State of Ecosystem and Natural resources

Due to the rugged and steeply slope feature of the Delanta Woreda and the study site the top soil is highly eroded and gigantic rocks are exposed in mountainous areas. In relatively flat areas the local community practices farming from time immemorial without any conservation measure that consequently cause a widespread removal of topsoil through erosion and over exploitation of natural resources. Unsustainable agricultural practices cause soil erosion, loss of soil fertility, loss of biodiversity and ecosystem services. The over exploitation of land has been found to exhaust the capability of the ecosystem to support the growing demands of more and more people, all requiring more intensive use of resources. The natural forests are fully cleared apart from very few indigenous trees left around inaccessible part of the steeply cliffs, and around churches that protect tree groves. Some part of the area seems difficult for biological conservation but rather left intact for sometimes to give chance for natural regeneration. The ongoing artisanal mining practice is further destabilizing the already fragile ecosystem. A combination of both physical and biological conservation measures could contribute to the restoration of the regenerative capacity of the ecosystem.

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Commented [DB52]: Wasn't there some Work for Food programs in the area? I had seen some bunds and terracing in the agriculture areas. In fact, I had even seen some bunds installed along the lower parts of the slope just downstream from the opal mines....

Commented [DB53]: What are these unsustainable ag practices? Removal of crop stubble for biomass burning (for fuel) rather than tilling back into soil, thereby breaking nutrient cycles? No terracing or bunds? I thought Work for Food program had tried to tackle these unsustainable practices?

Commented [DB54]: What ecosystem services in particular? Crop pollination? Water infiltration vs runoff?

Commented [DB55]: ?? Do you mean allow natural regeneration to occur by closing area off ?

Commented [DB56]: What are these? There is no mention of terracing, bunds, tree planting, use of vetiver grass to bind soil, support beams for mine pits to minimize tunnel collapses and slope destabilization, area closure to reduce livestock grazing and encourage natural rehabilitation, etc.

### 5.4.2 Formal and informal NRM system

The natural resource management system is highly dependent on the formal government structures which embrace the kebele administration (the smallest formal administrative units in Ethiopia). There is an Environmental protection and Land Administration Office at the woreda level and similar structure at regional and zone level which is directly responsible for forest resource and land resource management. Correspondingly there are a grass root level team of 5 households (five-in-one) which are organized to deal with communal issues at very local level. Furthermore, it

was found out that the role of church in preventing deforestation was highly recognized in the study area. The church micro-ecology is the area where some nearly disappearing species got refuge.

#### **5.4.3 Role of Women in NRM**

Women are the custodian of ingenious knowledge of local herbs and medicinal plants. Their knowledge of forest trees are as good as their men counterparts. Men and women often use different part of woody plants. For instance when men cut a tree for construction and farm implements women use the leftover twigs for firewood. The degradation of forest resource will affect both men and women and wider community from resulting climate change. Availability of water resources is one-way or another linked to the status of forest cover in the wider ecosystem.

Regardless of the rich unaccounted knowledge women have in natural resources and the significance of natural resource in their day to day life, their public management role is not so visible. However, in every management role that men play the invisible hand of women is always there. In the study are due to the heavy hand of the formal structure on the natural resource governance the role of women and other traditional institution is very limited. It was only the local churches that have some say next to the formal structure.

The magnitude of the natural resource degradation at ecosystem level would call for wider stakeholder engagements that involve women, youth, and traditional institution in co-management structure. The participatory resource management practiced elsewhere could be adapted to the context of the study are to halt the alarming rate of resource degradation and design inclusive resource management and rehabilitation system.

## **6. MARKET VALUE CHAIN**

Market value chain analysis and mapping shows the way the product flows from raw material to end markets along the value chain, identify constraints and possible solutions, and also identify key actors in the value chain as well as connection between actors. It is a dynamic process that involves mapping of geographical flow of products from one point to another along the value chain and formal and informal players in the chain. The analysis of relationship between the actors will go deeper into the nature of relationship itself including fairness and inclusiveness of the benefit retention at different level. The flow of market information up and down along the chain is as important as goods and services. Information distortion at certain level of the market segment will put some part of the value chain actors at disadvantageous position. This would mean exploitative relationship will arise in the value chain that disproportionately affects actors with limited or inaccurate market information. Most of the time, the lack of transparency and fairness in the value chain will affect the producer as access of information is often limited. In the long run dissatisfaction at producer/supplier level will affect the motivation for production of good quality product and services which will eventually affect the end user. Hence there must be a fair and

**Commented [DB57]:** Wonder if this information can't be broken up and added to the respective sections i.e. opal and gold, in previous sections.

equitable share of benefit as well as transparent relationship among actors at all level to make the value chain vibrant and sustainable.

### 6.1 Gold Value Chain

The actors involved in the gold value chain at production level are basically the legally organized cooperatives and illegal producer individual or groups. Under the legally organized cooperatives there are employed laborers and some coop members who engage directly on the labor work. Parallel to the legally registered coops there are a number of illegal miners operating out of sight in small group or individually. The illegal practices are mainly carried out in the remote part of the forest, along the river banks and sometimes on own farm and homestead.

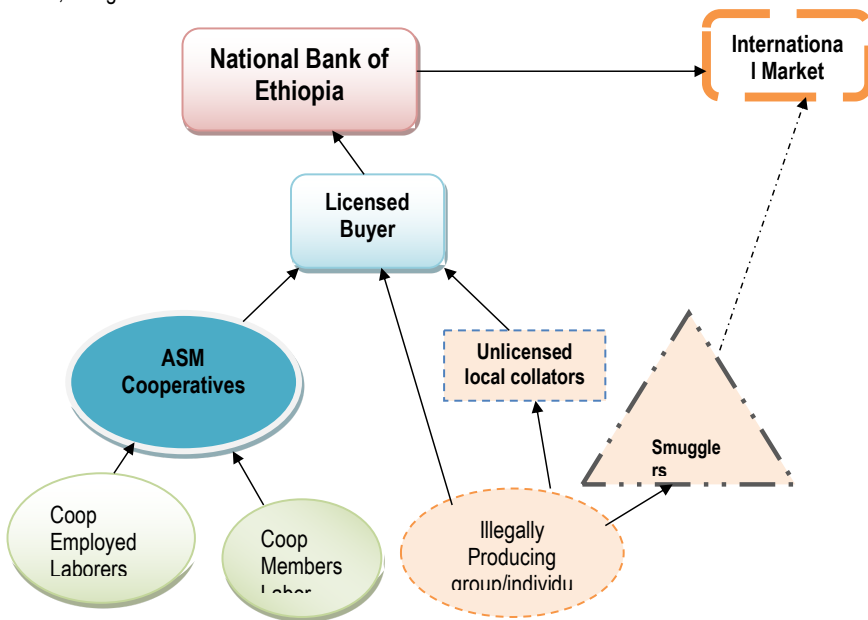


Figure 13: Gold Value Chain

With regard to gold transaction both coop employed laborers and coop members engaged on gold production will sale whatever volume of gold they recovered to the ASM cooperative commonly about 25% less than the national gold price. Then the ASM cooperative will again sell to license owner buyer that supply to the national bank adding their margin to cover the labor, admin cost and some benefit. The cooperatives were used to sale their products directly to the National Bank but since recently owing to the change in the regulation of the sectors that require separation of the sellers and producers of Gold they are obliged to sale it to licensed buyer. In the case of Wolabo cooperative the transaction was done by a well-to-do member of the cooperative who has legal

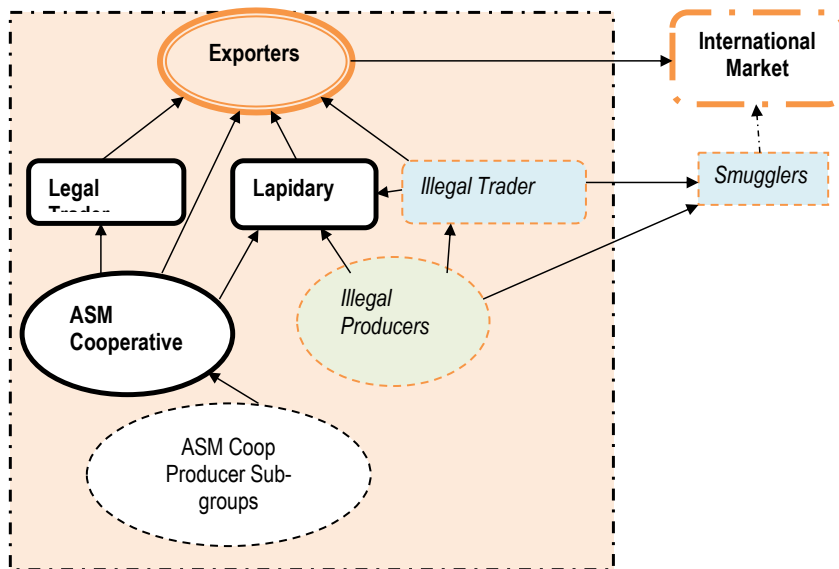
license to buy and sale gold to the National Bank. He often pre-finance the production when the cooperative could not afford to pay laborers and then buy all gold collected by the cooperative, sale it to National Bank, retain his margin and again receive dividend as a member of cooperative. This kind of relationship might need further examination to learn the value an individual add to the effort of the coop in bridging the transitory finance gap and the level of pressure exerted on the coop so as to strike the balance.

Illegal producers are free riders who usually sale to unlicensed local collectors and sometimes to the licensed buyer depending on their access and volume of gold. They are even at times sale to smugglers who smuggle gold across the national border though the likelihood is sliming after formalization of the artisanal mining business in the country. Unlicensed local collectors are individuals who may not have sufficient capital but get advance from licensed buyers, go to remote areas to reach out illegal producers and buy gold at some amount lower than what licensed buyers could pay. Hence they will sell to the licensed buyer retaining their margin. Key informant interview revealed that the profit margin earned by the local collectors is more than double of the legal ASM cooperatives. This is partly explained by the risk of robbery by going to the remote areas for collection and market information distortion by collectors.

In the formal line, the bargaining power of employed laborers by ASM cooperative used to be very weak and the relationship was exploitative. As access to market information increase particularly through TV and radio news on national gold market their bargaining power is increasing. The cooperatives also want to retain the diggers since the level of gold recovery dependant on how well the cooperatives manage to motivate and retain the laborers. Hence it is a mutual benefit for both the cooperatives and the laborers.

## **6.2 Opal Value Chain**

The actors involved in the Opal value chain are legally organized producers, illegal producers, middle men/OPAL traders, Lapidary and exporters. In this chain the legally organized cooperative groups will produces OPAL and sell it to their cooperative and /or legal OPAL traders; and the legal traders will sell it to the exporters. The following figure depicts the simplified values chain of OPAL.



**Figure 14: Opal Value Chain**

The kebele level discussion revealed the Opal traders are those who have got license of mine trading from the federal government and people who are residing in the regional state and within the community. Furthermore it was asserted that there were illegal and legal marketing of OPAL going side by side at the kebele level. These days, illegal trading is pervasive both at the kebele level and the woreda town market that significantly reduced the amount of royalty that the local government supposed to collect. It was attested by local people that the illegal buyers are paying quite high price for the same volume and quality of Opal compared to the licensed buyers. Hence both legal and illegal producers tend to sell to illegal traders.

The value of Opal generally depends on four elements: the beauty of the stone itself, play of internal color its rarity, hardness and toughness, and the skill with which it has been cut and polished. Due to high variability in the quality of Opal based on color, hardness and other parameters which is sometimes subject to personal judgment the price also vary accordingly. Moreover the absence of market information based on the quality differentiation there is high possibility for exploitative relationship between producers and traders.

## 7. STAKEHOLDERS IDENTIFICATION AND ANALYSIS

Stakeholders in ASM are all the people who stand to gain or lose something as a result of the ASM practices. Typically, they include individuals, cooperatives, corporation and regulatory institutions with a stake in the mineral and surrounding natural resources. They are therefore likely to affect or be affected in some way by the ASM practice either during the course of production or later from the negative impact inflicted by the practice. The stakeholder analysis was made to identify actors in the ASM production, processing and marketing as well as regulatory body. The assessment was also tried to identify their mandate and interest regarding ASM and associated natural resources, and the way they actively engage in the future development, mitigation and rehabilitation efforts. Accordingly the following stakeholders were identified from federal ministries up to local level actors in the formal structure as well as informal actors.

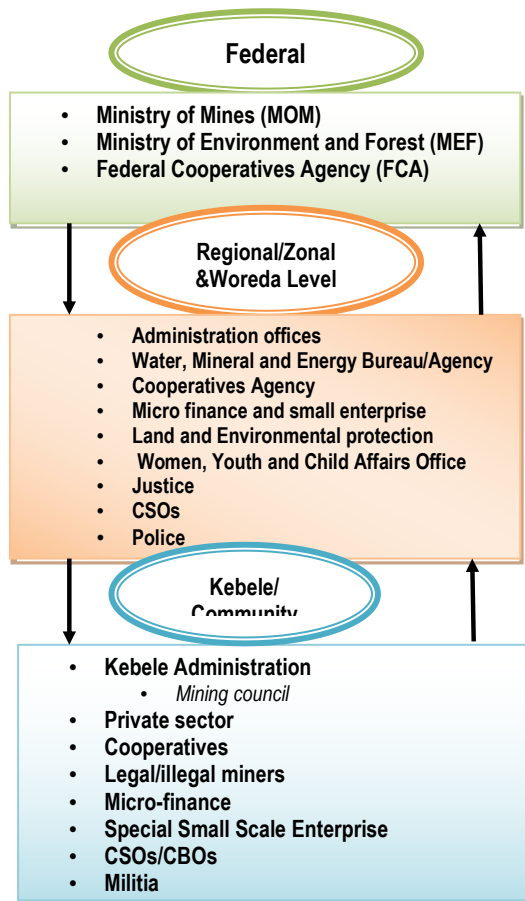
**Table 01: Role of ASM stakeholders**

<b>Roles of Stakeholder's</b>	
<b>Federal level</b>	
<b>Ministry of Mines (MOM):</b>	is a federal government executive body responsible for the promotion and regulation of the mineral resources in the country. MOM has been delegated by MEF to regulate the environmental impact caused by the developers of the sector as per the Environmental Impact Assessment Proclamation No. 299/2002. This delegation is made by the Decision of the Council of Ministers and as per article 6/24 Proclamation No. 295/2002
<b>Ministry of Environment and forest (MEF):</b>	MEF used to be responsible for the EIA process but has seconded environmental supervision and control of the mineral sector to the MoM. Manages & regulates environmental & social issues related with the mining sector through MoM.
<b>Ministry of Finance and Economic development (MoFED)</b>	MoFED has interest in the sector related to its control of the budget process and planning process, its interest in and administration of revenues, taxes, royalties and foreign exchange earnings from the sector, and its control of the financial aspects of development programs support by development partners.
<b>The National Bank of Ethiopia (NBE)</b>	NBE is involved through purchase of gold produced by artisanal and small-scale miners
<b>Ministry of Revenue:</b>	Collect mining income tax at federal level.
<b>Cooperatives Agency:</b>	Assist regional governments in organizing artisanal miners into cooperatives.
<b>Regional (region, zone and woreda) level</b>	
<b>Administration offices:</b>	Coordinate stakeholders and give direction and assistance to attain the required result

<b>Water, Mineral and Energy Bureau/Agency:</b>	Is responsible for the promotion, licensing and regulation of the mineral resources in the region/zone/Woreda.
<b>Cooperatives Agency:</b>	Organize voluntary persons into an autonomous association who voluntarily cooperate for their mutual economic benefit and are legally recognized body that are engaged in mineral extraction, value addition and selling of minerals.
<b>Micro finance and small enterprise:</b>	Make financial support in the form of low interest loan and is easily accessible to the miners.
<b>Land and Environmental protection:</b>	Manage & regulate environmental & social issues related with the mining sector.
<b>Revenue authority:</b>	Collect mining royalty and income tax at different level of regional governments
<b>Police office:</b>	Cooperate with concerned organ in crime prevention at ASM operational areas.
<b>Justice office:</b>	Take measured on those identified offenders who violet the law in the ASM operation areas and transaction process.
<b>Kebele/Community level</b>	
<b>Kebele Administration</b>	The kebele level stakeholders perform advisory roles and collaborate with the government on the control and regulation of ASM activities. Kebele level ASM council is a pool of actors from Kebele structures including representatives of women and youth are directly responsible for awareness raising and monitoring of the ASM activities in their respective Kebeles.
<b>Private sector</b>	Private sector actors engaged in mineral processing/lapidary and transaction at different level
<b>Legal/illegal miners</b>	Individual or group of individuals legally/illegally engaged in the mining operation
<b>CSOs</b>	Create awareness and provide capacity development supports

Management Functions of ASM Stakeholders include enforcement of government policies on ASM activities and organization of miners into cooperative groups. These functions are meant to ensure miners' compliance with government policies and to prevent their involvement in illegal ASM activities. The functions of the regional government at different level include the administration and management of operational activities of the people on the site. The kebele ASM council also performs advisory roles and collaborates with the government on the control and regulation of ASM activities. The key stakeholders were depicted in the chart below.

Figure 15: Key ASM Stakeholders at all levels



Stakeholders involved in Organizing ASM groups and legalizing the groups are: the kebele Administration, Environmental Protection and Land use office of the woreda, Water, mine and Energy Office of the Woreda, Cooperative Office of the woreda, and recently Small and Micro enterprise Agency offices. The kebele level Administration office will identify members organized into ASM groups are residents of the kebele and write letter for the woreda Environmental Protection and Land use office. The woreda Environmental Protection and Land use office ensure whether EIA was carried out by independent consultant as well as the socioeconomic studies. Based on this, the office will send it to the Woreda Water, Mine and Energy Offices. The WMEO will ensure whether there is indication of the presence of OPAL/Gold in the areas where the groups

**Commented [DB58]:** So independent consultant is contracted by small-scale mining companies to undertake EIA?

want to carry out ASM activities. Finally the group will get organized into Cooperative organization and license of Gold or OPAL production will be given to the cooperative by the WME office.

Capacity of Local Government Offices: it was revealed that the Water , Mine and energy offices of the woreda does not have adequate staff skilled enough to provide technical information and potential of OPAL or Gold in mine site to ASM cooperatives. There was no scientific exploration based support to the ASM cooperatives in regard to the potential indicators of mineral deposit on the site. Correspondingly, the other key woreda level stakeholder were also constrained by skills and resources to provide training to the traditional miners on environmental and sustainability issues as well as on the proper managements of the benefits that youth acquired from the mine activities.

It was also pointed out that there are unresolved issues in Ministry of mine in regard to the practices of OPAL transaction and pricing that there is significant number of illegal OPAL traders and trading practices. Due to the fact that the mineral transaction license is issued by the federal ministry, the region or woreda do not have information of the licensed Opal traders which made difficult to identify and control the illegal traders. This gap has aggravated the participation of illegal Opal traders. Understanding the problem the woreda is initiating to establish checking point at selected transfer points. Mining taskforce pulled from key stakeholders was organized to collaboratively address this issue. However, the discussants disclosed that the task force had not taken any meaningful action beyond hearing reports from some tasks force members as it was facing coordination failure. The gap in the coordination and synergy exist not only at the woreda level but also between stakeholders at federal and regional levels. Although the collaboration among all stakeholders are important there must be a close coordination and synergy between key stakeholders at all level to address the negative impact of ASM on the Ecosystem and the people while enhancing the positive impacts.

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**Commented [DB60]:** I asked this question to Enat in MoM and she said there just is no technical capacity for such extension services to artisanal miners...

## 8. THE IMPACT OF ASM ON THE ECOSYSTEM AND THE PEOPLE

### 8.1 ASM impact on the People

The situation analysis made at Shakiso Woreda of Oromia Regional State and Delanta Woreda of Amhara Regional State has revealed that the ASM activities had a mixed impact on the health, social, culture and livelihood of the local people. The positive economic impact of ASM goes beyond the local economy to that of contributing to the national GDP. The economic impact at the local level includes increased income of local government from royalty, employment generation for local people at both woredas and for large number of migrant workers particularly in Shakiso Woreda. The economic activities of ASM engage people from both sexes, different age groups, religious and ethnic background. The employment generation role of the ASM activities particularly for semi-skilled, unskilled and economically less advantaged segment of the community is noteworthy. Several non-local actors in the value chain have amassed considerable amount of wealth from Opal and Gold transaction. There is a remarkable investment and reinvestment of income generated from this economic sub-sector to other sustainable livelihoods and basic household assets. Investment in commercial coffee production in Shakiso area, household asset building, purchase of vehicles and motorbikes for business and reinvestment in local economy that includes petty trade, shops and other services in both Woredas. Creation of new livelihood types and diversification to other livelihoods was evident in Delanta Woreda after discovery of Opal. There are visible impacts on the livelihood of some local community in terms of better housing, access to health, fulfillment of basic household needs. Close to 40% of Delanta respondents are fully dependent on Opal mining compared to that of 7% in Shakiso area (dependent on gold) which is mainly due to limited access to farmland in Delanta area. Large proportion of respondents (73.4%) from Tsehaimewucha and Goshmeda were landless whereas only 20% of the Wolabo Kebele are reported landless.

Regardless of important contributions that the income generated from ASM has brought to the national and local economy it worth mentioning that the income distribution is inequitable. Due to the labor based nature of the production activity and its remote locations it favors youth men over women, girls and elders. Moreover, due to the patriarchal culture of both communities the benefit sharing is also segregated by sex which favors men over women in the alleged reason of cultural values associated to type of job ascribed for men and women. Likewise, at the mineral value addition and transaction level those who have better skill, access to information and initial capital have grabbed the major share of the benefit which means excluding poor, unskilled and those who have less access to market information particularly rural women.

Although the economic access to health service as a result of income generated from ASM could be considered as a positive impact, the negative consequences outweigh that of the positive contribution of the ASM on the local people's health. High rate of HIV/AIDS prevalence that put

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both woredas in the 'high risk' list, STDs, unsafe sex, skin disease, communicable disease like TB are some of the health problems that ASM either cause or exacerbate in those areas. Some of the health and life risks of tunnel collapse and death from unsafe working condition are not only on the local people but also affect the life of migrant mining workers and the local miners too.

Social problems such as alcoholism, drug addiction, sexual harassment, crime, prostitution, child labor exploitation and high rate of school dropout and absenteeism are the major challenge of the woredas. Most of the social problems are directly correlated with extravagancy and poor saving culture among youngsters. Above all, the attitude of equating the goal of education simply with getting money which discounts the transformative value of education will hugely impact the future of the generation in general and the woredas in particular. There is a tension over resource use and ownership between local residents and migrant community that came for mining and illegally settled in the forest which could grow to violence if the current latent conflict is not properly addressed.

## 8.2 ASM impact on the Ecosystem

The direct and indirect impact of ASM on the natural ecosystem is alarming in both assessment Woredas. Some of the impacts are localized while the others are at landscape level and far-reaching in terms of its magnitude of destruction. Deforestation, landslide, landscape change, soil erosion, siltation, tailings dumping, water pollution and the cumulative effect of those changes on greenhouse gas (GHG) emission are the major problems.

Forest clearance and tree felling for direct mining operation, tree cutting for temporary shelter construction and firewood are widely practiced at both study sites as localized source of deforestation. The natural forest at Tsehimewcha kebele of Delanta woreda has reached to critical level owing to the historic watershed level forest degradation for agricultural land expansion. The mining operation in this fragile ecosystem is further aggravating the problem to the extent of making some biodiversity loss irreversible. In some of the sites the magnitude of degradation surpassed the natural regenerative capacity of the land, hence requiring special approaches that start with physical conservation measures and then gradually follow up with biological conservation measures after structural stabilization work is done.

In Shakiso area in addition to those direct mining related deforestation practices there is a landscape and watershed level destruction of natural forest by illegal settlers who came to the Woreda for mining and spread all over the forest pursuing agriculture and mining as livelihood. Unrestricted illegal settlement within forest areas by migrant mining workers is not only destroying the natural forest but also disrupting the customary natural resource governance practice of the local people since the incoming people are not respecting the local culture. Hence, the respect for nature and forest compatible livelihood system of indigenous Guji community is gradually eroded

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Commented [DB61]: Again, as before, not sure what all the 'cumulative effects on GHG emissions' are....

Commented [DB62]: Again, need to qualify this comment. Do we have evidence of species extinctions and irreversible biodiversity loss?

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Commented [DB63]: Again, as before, need more detail.

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which will have a lasting impact on the fate of few remaining forest resources. The widespread encroachment on the natural forest has also disrupted the wildlife habitat which led to wildlife migration. The ongoing localized and large scale deforestation due to direct and indirect impact of ASM is not only affects the local ecosystem but also contribute to GHG emission and climate change which is against the CRGE strategy of the country.

**Commented [DB64]:** I would categorize it more as forest degradation.

**Commented [DB65]:** Not necessarily contributing to emissions, but rather reducing carbon sink and carbon dioxide abatement.

The tunnel excavation, pit digging and trench excavation practice for placer gold mining in Wolabo site of Shakiso woreda had a visible effect on the landscape change. At times, the destabilized structure of the soil during tunnel and pit excavation will collapse which often lead to death of miners. Landslide and soil erosion have silt up the river and increased the turbidity of the river which affects the downstream water users as well as the fauna and flora in the river system. The excavation of Opal mineralized in steep cliffs in Delanta area has defragmented the already fragile structure of the rugged and rocky mountainous landscape. The excavated sand and gravel will flow downstream and cover farmland and grazing areas. This will convert the scarce farmland and grazing land into dumping site. At some location the tunnel excavation for Opal has damaged the previously started physical and biological soil conservation measures. There are a lot of reforested eucalyptus tree cut down by the mining operators for firewood. Air pollution from mining operation dusts and use of mercury for separation of gold also has some effects though the magnitude is not that significant.

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**Commented [DB66]:** Seemed quite uninhabited immediately downstream from the mines. Any sand and gravel would be deposited on the floodplain...

**Commented [DB67]:** NO mention of the affects this air pollution will have on the miners themselves i.e. silicosis.

**Commented [DB68]:** Need to qualify this. Because a little bit of mercury can go a long way!

In general, ASM has significant economic contribution to the rural households and other actors in the value chain if the culture of saving and reinvestment in sustainable business is developed. However there is a high likely of cumulative negative environmental health and social impacts to outweigh the net positive contribution of the sector if the present disruptive practices are not addressed. Any form of land conversion and forest degradation leads to CO<sub>2</sub> emissions which is incompatible with the CRGE strategy of the country. Hence, the negative impact of ASM on the people and the ecosystem has to be mitigated through coordinated effort of all concerned stakeholders.

**Commented [DB69]:** It might be good to also focus on the POSITIVE impact the ASM sector can contribute towards a green economy and the CRGE.

### 8.3 ASM linkage with CRGE

**Commented [DB70]:** The ASM sector is one that essentially needs 'greening' to be part of the 'Green Economy.' Because at the moment causing localized environmental degradation as well as potential landscape level concerns i.e. siltation of rivers, reducing hydropower potential, forest degradation, etc.

The Ethiopian Government has started the Climate-Resilient Green Economy (CRGE) initiative in 2011 under the leadership of the Prime Minister's Office, the Environmental Protection Authority, and the Ethiopian Development Research Institute to protect the country from the adverse effects of climate change and to build a green economy that will help realize its ambition of reaching middle income status before 2025. The objective is to identify green economy opportunities that could help Ethiopia reach its ambitious growth targets while keeping greenhouse gas emissions low. The green economy plan is based on four pillars:

IT would be good to make the link across all four pillars. In this section the focus is primarily on Forestry. But can make the link with the Power pillar, in that an environmentally-diligent ASM sector will not negatively impact watercourses, and will not affect the hydropower potential of downstream rivers.

1. Agriculture: Improving crop and livestock production practices for higher food security and farmer income while reducing emissions

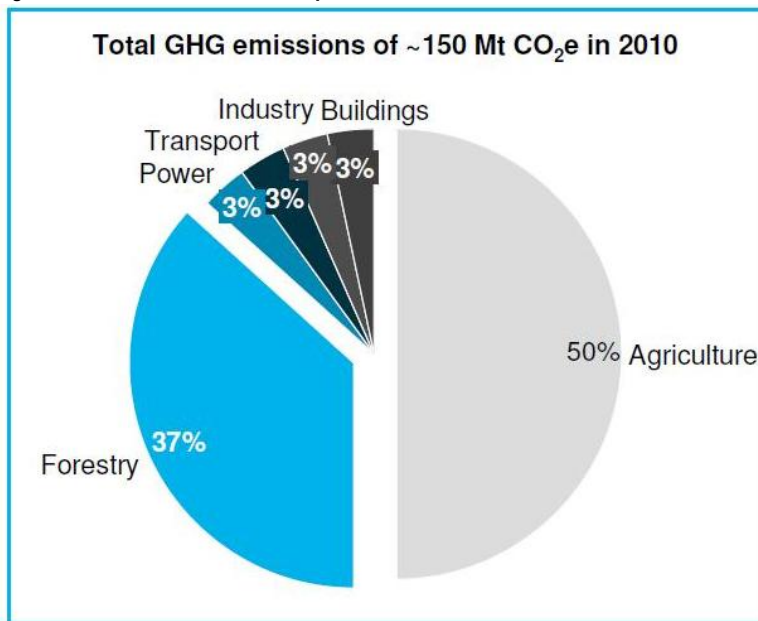
Can also make the link to agriculture, in that the ASM sector is another form of economic diversification providing a semblance of climate resilience, and so to a certain extent, reducing the pressure on agricultural land.

The pull factor of the ASM sector has put great pressure on forest resources. Leapfrogging to modern housing will reduce the pressure on forest resources for wood from the ASM community.

2. Forestry: Protecting and re-establishing forests for their economic and ecosystem services, including as carbon stocks
3. Power: Expanding electricity generation from renewable sources of energy for domestic and regional markets
4. Industry, Building, and Transport: Leapfrogging to modern and energy-efficient technologies in transport, industrial sectors, and buildings.

Ethiopia's overall contribution to GHG emissions (represent less than 0.3% of global emissions) is very low on a global scale. However if the current practices prevail, GHG emissions in Ethiopia will reach more than double from 150 Mt CO<sub>2</sub>e in 2010 to 400 Mt CO<sub>2</sub>e in 2030. Of the 150 Mt CO<sub>2</sub>e in 2010, more than 85% of GHG emissions came from the agricultural and forestry sectors. They are followed by power, transport, industry and buildings, which contributed 3% each (Figure 00).

**Figure 16: Share of GHE Emission per sector in 2010**



Source: CRGE, 2011

According to CRGE, (2011), Forestry emissions are driven by deforestation for agricultural land (50%) and forest degradation due to fuelwood consumption (46%) as well as formal and informal logging (4%). Protection and re-establishing forests for their economic and ecosystem services, including as carbon stocks is planned as a mitigation and prevention strategy. More specifically, afforestation on 2 million ha, reforestation on 1 million ha, and forest management on 2 million ha

of forests and 2 million ha of woodlands was suggested to sequester more than 40 Mt CO<sub>2</sub>e to mitigate emissions from the forestry sector.

The CRGE also stated that all industrial GHG emissions accounts for only 3% of GHG emissions of this cement (66%) is the single largest industrial source of emissions, followed by mining (32%), and the textile and leather (17%) industry. For the mining sector, gold mining and processing, tantalum, potash, and coal were considered. Taken together, emissions are projected to grow from nearly 1.5 Mt CO<sub>2</sub>e in 2010 to almost 4 Mt CO<sub>2</sub>e in 2030.

**Commented [DB71]:** Which ones exactly? The mining sector? But I assume this is mostly from large (and to a lesser extent small) scale mining, not artisanal mining. Worth noting.

The strategy did not seem to properly account for the direct localized impact of mining on the forest as well as the indirect impacts on the forest by land clearance for agriculture by migrant as a result of pull factor of the ASM business into intact forest areas. Moreover the mitigation and abatement measures were not spelt out for the 32% of recognized mining CO<sub>2</sub> contribution.

**Commented [DB72]:** Well, this is partly what we are demonstrating under this SCIP project i.e. the gains that can be made regarding climate adaptation and climate mitigation in the sector.

## 9. CONCLUSION AND RECOMMENDATION

### 9.1 Conclusion

Artisanal and Small Scale Mining can be an important driver of local economic development, while simultaneously contributing to a complex array of positive and negative socio-economic and environmental impacts. It has a mixed impact on the health, social, culture and livelihood of the local people.

**Commented [DB73]:** Needs some beefing up in my opinion. These are quite general conclusions. Might be worth making them more specific to the woredas in question.

There is an important economic contribution of ASM to the national economy and remarkable investment and reinvestment of income generated from this economic sub-sector to other sustainable livelihoods and basic household assets. Regardless of important contributions that the income generated from ASM has brought to the national and local economy it worth mentioning that the income distribution is uneven. It favors youth men over women, girls and elders. The upper level of the mineral value chain benefit more those who have better skill, access to information and initial capital.

The negative consequences outweigh that of the positive contribution of the ASM on the local people's health and social wellbeing. High rate of HIV/AIDS prevalence that put both woredas in the 'high risk' list, STDs, unsafe sex, skin disease, communicable disease like TB are some of the health problems that ASM either cause or exacerbate in those areas. Social problems such as alcoholism, drug addiction, sexual harassment, crime, prostitution, child labor exploitation and high rate of school dropout and absenteeism are the major challenge of the woredas. Most of the social problems are directly correlated with lack of awareness, extravagancy and poor saving culture among youngsters.

With regards to environment deforestation, landslide, landscape change, soil erosion, siltation, waste dumping, water pollution and the cumulative effect of those changes on greenhouse gas (GHG) emission are the major challenges posed by ASM on the ecosystem. Any form of land conversion and forest degradation leads to CO<sub>2</sub> emissions which is incompatible with the CRGE strategy of the country.

**Commented [DB74]:** This is at least the third time I have read this sentence in the report! A little repetitive.

In general, ASM has a significant economic contribution to national economy, the livelihoods of rural households, and other actors in the value chain if the culture of saving and reinvestment in sustainable business is developed. However there is a high likely of cumulative negative environmental, health and social impacts to outweigh the net positive contribution of the sector if the present disruptive practices are not addressed. Hence, the negative impact of ASM on the people and the ecosystem should be mitigated and the positive impact is enhanced through coordinated effort of all concerned stakeholders.

## 9.2 Recommendation

### 9.2.1 Mitigation measures on the ongoing sites

- There should be a comprehensive environmental impact assessment before any mining site is allocated for ASM operation. The EIA should clearly indicate the socio-cultural and environmental issues along with clearly spelt out mitigation measure so that the cooperatives could easily understand and implement.
- Create awareness on the long term environmental impact (on forest, wildlife, biodiversity, water, and soil) of inappropriate ASM practices to prevent further environmental degradation.
- Inculcate culture of saving and provide entrepreneur skill development training so as to assist ASM actors particularly youth and women to invest in environmental friendly and sustainable business.
- Provide women with requisite skill and financial resource to enable them engage on mineral value addition, lapidary, and transaction. This requires affirmative action to compensate the discrimination women are facing at the production level from societal cultural values.
- Train and encourage school age children to envisage the transformative power of education while assisting those who cannot economically afford
- Establish the natural resources (forest, water and rangeland) co-management system to prevent the illegal settlement in the forest and uncontrolled illegal mining and forest clearing for agriculture. Land certification could also help in Delanta area to avoid open access in some communal lands.

**Commented [DB75]:** Worth putting in one bullet point with actual physical and biological mitigation measures?

**Commented [DB76]:** As mentioned before in other comments in the report, there are certain barriers to effective EIA implementation for artisanal mining sector i.e. technical, financial and regulatory. We are looking at encouraging MoM to implement a 'general permit' methodology for the short-term, with a view to putting in place a 'collective EIA' type system whereby cooperatives come together to produce ONE EIA, so they can pool resources, streamline the process and make regulatory oversight of the EIA process much simpler.

**Commented [DB77]:** Some already exist correct? i.e. burial committees, water committees, etc. Can we build on these existing structures rather than create new parallel ones that might essentially 'compete' with the others for resources (time and funding), and create a power struggle of sorts?

### 9.2.2 Rehabilitation measures on the abandoned sites

- In the abandon sites with good potential for natural regeneration like Shakiso area reforest with a mix of selected indigenous tree, fast growing commercial exotic trees and fruit trees. This could serve as sources of livelihood for coop members or other member of the society while contributing to CRGE goal of the country as a carbon sink.
- In Delanta area where the ecosystem is highly degraded the rehabilitation should start with area enclosure, physical soil and water conservation measures and follow up with biological conservations.
- Assist cooperatives in backfilling open pits, trenches and general wasteland reclamation since some of the mining sites have long history of ecological disturbance that involved different actors and probably beyond the rehabilitation capacity of the cooperatives.
- Provide technical support and professional guidance on the selection of appropriate physical and biological conservation measures. This will include assistance on selection of appropriate species for ecological and economic purposes as well as training and guidance on the application of physical conservation measures that require engineering skills particularly in Delanta area.
- Encourage women to participate and benefit from environmental and economic gain resulted from the rehabilitation of abandoned sites.

**Commented [DB78]:** Commercial for what purpose? For harvesting for construction i.e. eucalyptus? Non-consumptive tree species might be best, keeping a consistent canopy cover i.e. fruiting trees. Agroforestry might be the best option, as provides a dual purpose.

**Commented [DB79]:** Socially acceptable? Opportunity cost vs livestock grazing, etc.

**Commented [DB80]:** What are these measures? Haven't really spelt these out in the whole report, but central to the issue at hand.

**Commented [DB81]:** Who would provide this assistance? Under Proclamation there is an article that speaks to the responsibility of the State to finance the rehabilitation where the past licensee is not around/deceased or able to do so. So a precedence here. But realistically, where is the money to come from? Some in Mongolia have implemented 'frugal rehabilitation' which is basically the cheapest and lowest tech form of rehab with spades and pick axes and using local labor. Worth mentioning as a potential here.

**Commented [DB82]:** But who would be responsible for these engineering interventions? With what funds?

**Commented [DB83]:** In what way? i.e. lapidaries, auxiliary support to miners, etc.

### 9.2.3 The Role of Key Stakeholders in Mitigation and Rehabilitation

- There is a general need for coordinated effort among key stakeholders in the mitigation and rehabilitation planning and implementation. Under the leadership of MoM with close collaboration with Administration bureau/offices, all identified key stakeholders should prepare harmonized mitigation and rehabilitation plan that can be jointly implemented and monitored. Each stakeholder could play specific role in rolling out the harmonized plan. For instance:
  - **Water, Mineral and Energy Bureau/Agency:** Stakeholders coordination and make sure that the EIA is done; providing scientific exploration support to cooperatives. Design environmental education and awareness programs in collaboration with Land and Environment Bureau targeting the local community and gold/Opal miners.
  - **Land and Environmental Protection Bureau/office:** Check the appropriateness of the EIA and endorse, follow up and monitor the implementation of mitigation measures stated in the EIA in the course of ASM operation.
  - **Cooperatives Agency:** Organize ASM cooperatives, inculcate saving culture, build their entrepreneur skills and encourage them to reinvest benefit gained from ASM operation in ecological friendly and sustainable business.
  - **Micro finance and small enterprise:** Closely work with cooperatives to fill the financial resource gap for those who diversify their business or reinvest in sustainable business.
  - **Women, Youth and Child Affairs Office:** Closely work with Education and health bureau/offices and coordinate efforts in awareness raising related to occupational safety, personal hygiene, HIV/AIDS etc and transformative value of education.
  - **CSOs:** Civil Society Organizations will catalyze the collaborative effort of key stakeholders at all levels and provide awareness raising, technical and financial support.

**Commented [DB84]:** In speaking to MoM it seemed that there is a lack of expertise in Ethiopia in this regard.

**Commented [DB85]:** So MoM responsible for EIAs but Land & Env Protection Bureau responsible for follow up and monitoring of mitigation measures per environmental management plan? And this should be noted to be for small and large scale mining, not artisanal.

- **Kebele Administration:** Mobilize community participation in awareness raising, mitigation and rehabilitation efforts. Kebele Administration should also closely monitor the rehabilitated abandoned to prevent the illegal miners operation.

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