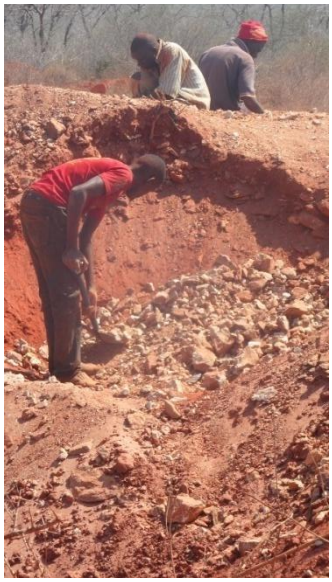
Economic and Job Creation Potential of Artisanal and Small-Scale Mining In Taita Taveta County



Dr. Bernard Kipsang Rop (Consultant)

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1 Executive Summary

Artisanal and small-scale mining (ASM) directly and indirectly employs a number of people in Taita Taveta County (TTC) on temporary basis, while other mining operations are ongoing in the county constituencies where minerals are being exploited. This income generating activity by the ASM plays a very important role by providing vocational jobs that sustain the livelihood of the community living in the mining environs. The economic impact on the county community and the national economy at large may be profound with a significant proportion of national mining production coming from ASM sources. It is difficult to obtain accurate information on exact ASM numbers in the county, given that it is considered informal or illegal in nature. ASM population has temporarily and geographically formed an increasingly growing phenomenon in the county. Artisanal mining typically uses rudimentary tools, employs basic recovery techniques and manual labour is largely involved.

Conflicts over land endowed with minerals have been reported in the gemstone areas of TTC. The potential areas for gemstone mining are usually grabbed by prospectors who are large-scale miners (LSMs) to the detriment of the ASMs. The broad aim of the study was to get an overview of mining and minerals in TTC as well as the accompanying problems and prospects.

The study also documented the challenges involved and made recommendations based on the research findings on how the mining, mineral potential and trade could be utilized for sustainable development of the area. TTC has lately been an important area because of its mineral potential, particularly gemstones. However, most of the previous research work done in TTC has not been documented nor published, with exception of few, old geological reports. Consequently, little has been published about the political, economic, social and environmental impacts of mining in the County.

This necessitated a preliminary study to be conducted from the political, economic, social and environmental perspectives. Critical here was the need to include the relationship between the community affected by mining, the environment and the mineral resources. Thus the UNDP contracted a consultant, Dr. Bernard Kipsang Rop (PhD), to carry out a study entitled: "*Economic and Job Creation Potential of Artisanal and Small-Scale Mining in Taita-Taveta County*". The consultant worked directly under the supervision of the Taita Taveta County Executive Committee (CEC) Member in-charge of the Ministry of Mining, Environment, Wildlife and Natural Resources between September, 2014 and October, 2014.

According to the terms of reference, the consultant was mandated to assess the risks, challenges, opportunities for enhancing sustainable livelihoods from small scale gemstone mining with a particular focus on youth and women of the artisanal and small-scale mining sector in Taita Taveta County. He was also required to assess the impact of ASM on women, youth and men. Value chain and supply chain of the minerals mined in the county were other areas of interest that had to be factored in the report. Overall, the consultant was expected to recommend solutions for the challenges experienced in the ASM sector in TTC as well as offer guidelines for the implementation of the stated recommendations. In line with the study, the empirical materials developed consisted of Rapid Rural Appraisal (RRA) and in-depth interviews, unstructured interviews, questionnaires, literature review of existing information, reports, journals, field observations and desk references as well as review of relevant Kenyan laws on mining.

However, challenges were encountered during this study but did not fundamentally affect the outcome of this exercise. Some of the limitations encountered during the study were, among others, the critical shortage or lack of information regarding the extractive industry in this county. It was not possible to establish for instance the number of people involved in the gemstone mining and how much is made from mining per annum. Even the basic information indicating the location of the mining activities and the type of minerals extracted is unavailable. There is no sufficient information available from the national or the county government indicating the amount of gemstones exported and to which country they are destined and how much they fetch out in the market. As another challenge, gemstone mining is shrouded in secrecy and so it is not possible to establish the exact amount of income generated to households from the activity. The inability of most ASMs to keep books of accounts further complicates the attempts to give monetary value to the ASMs. Lastly, the time set aside for the field work was too short for the number of issues competing for attention. The magnitude of the problems facing the extractive industry in this county calls for more dedicated time and resources to even start scratching the surface.

The data was thus collected and analyzed with the understanding and consideration of a myriad of factors regarding the ASM sector in Taita Taveta County. The study has given vital recommendations for policy and legislative action that would ensure that equitable distribution of artisanal mining operations benefit the men, women and youth. Most ASM activities take place in remote areas where infrastructure is lacking or in poor states. Such areas make it difficult for the Mining authorities to access thereby contributing to the illegal nature of mining operations.

Co-operative structures have had limited success within ASM in this county as profit-sharing is not popular in the extraction of precious metals and stones, however where associations are established for legal compliance and to improve access to other resources, they may have greater impact. Interventions which improve product valuation skills and knowledge, marketing skills and access to new markets through technology, ASM bourses, auctions, etc can also improve ASM as a livelihood.

Trading relationships in ASM can be complex. Often a purchaser also fulfils the role of creditor and may have a degree of control over the workers through remoteness, indebtedness or threat. Alternatively, the purchaser may be the preferred trader based on loyalty and a value-adding relationship. Some interventions seek to remove the middle-men and traders from the ASM supply chain in order to improve the return to the miners; however caution is required as supply chains such as these have evolved to operate within their context and attempting to change them may have unintended negative consequences; may be resisted; or the change may by unsustainable. A weakness in ASM is the lack of organization within the sector. Formalization of ASM could improve representation to government and the market; strengthen price bargaining; allow pooling of resources for credit and development; and help to achieve economies of scale.

The gemstones mined by ASMs from TTC are exported to Asia with Hong-Kong, India and Thailand acting as the major export markets (Ministry of Mining, 2014). The mineral export data indicates that gemstones from Taita Taveta County significantly contribute to Kenya's foreign income (25%). However, it was not possible to establish how much of the foreign income earned directly reaches TTC.

The major challenges affecting ASMs include: lack of equipment and accessories, lack of food and water, health and occupational safety facilities, insecurity and inadequate geological skills and knowledge. Some solutions have also been fronted in the report, including the need to establish properly structured cooperative management system to monitor revenue from sale, distribution and control of resource. The consultant also advocates for the setting up of a commission or taskforce that will review and address land issues affecting ASMs and therefore develop sustainable solutions to the land issue.

Mining legislation and regulations in Kenya have for long time focused on large-scale mining (LSM) rather than on the needs and potential of ASM. ASM is a critical sector that contributes significantly to the local economy and that of the county in general. The government therefore, has a pivotal role to play in

defining the policy and legal framework, incentives, and the necessary support processes which can lead to integration of ASM into the mainstream economy.

2 ACRONYMS

AP	Administration Police
ASM	Artisanal and Small-Scale Mining
ASMs	Artisanal and Small-Scale Miners
CBO	Community-Based Organization
CDF	Constituency Development Fund
CFC	Common Fund for Commodities
CEC	County Executive Committee
CSO	Civil Society Organization
DC	District Commissioner
EAC	East African Community
EMCA	Environmental Management and Co-ordination Act
EIA	Environmental Impact Assessment
EI	Extractive Industries
EMP	Environmental Management Plan
EPL	Exclusive Prospecting License
ERI	Extractive Resources Industry
GDP	Gross Domestic Product
ICA	International Coloured gemstones Association
IGI	International Gemological Institute
IGI	International Gemological Institute
ILO	International Labour Organisation
IMF	International Monetary Fund
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KCM	Kenya Chamber of Mines
KIHBS	Kenya Integrated Household Budget Survey
KNBS	Kenya National Bureau of Statistics
Ksh.	Kenya shilling

KWS	Kenya Wildlife Service
LSK	Law Society of Kenya
LSM	Large-Scale Mining
LSMs	Large-Scale Miners
NEMA	National Environmental Management Authority
NGO	Non-governmental Organization
PC	Provincial Commissioner
PR	Prospecting Rights
PU	Pwani University
RRA	Rapid Rural Appraisal
SL	Special License
SME	Small and Micro Enterprise
SMEs	Small and Micro Enterprises
SLA	Sustainable Livelihoods Approach
SML	Special Mining Lease
SSM	Small-Scale Mining
SSMs	Small-Scale Miners
SWAP	Strengths, Weaknesses, Aims and Problems
SWOT	Strengths, Weaknesses, Opportunities and Threats
Sq. Km	Square Kilometers
TTC	Taita Taveta County
TTUC	Taita Taveta University College
TUM	Technical University of Mombasa
UNDP	United Nations Development Program
UoN	University of Nairobi
USA	United States of America
WHO	World Health Organization
WMMF	World Mines Ministries Forum

3 CONCEPTS AND DEFINITIONS

Geology: This refers to the science that deals with the earth's physical structure and substance, its dynamics and history, the rocks of which it is composed and the physical, chemical and biological changes that the earth has undergone and continues to undergo.

Gemology: Refers to the combined art and science of studying, cutting, valuing, buying and selling of precious stones or gemstones.

Mine: An excavation or opening made in the ground for the purpose extracting minerals or valuable material.

Ore body: A mineral or an aggregate of minerals from which a valuable constituent can be profitably extracted or mined.

Mineral deposit: A mass of naturally occurring mineral material of sufficient size and grade that might under favorable circumstances be considered to have economic potential.

Gemstone: A naturally occurring precious or semi-precious stone or mineral that can be cut, polished and used in a piece of jewellery.

Artisanal and Small scale mining (ASM): This is a type of mining, mostly informal, that depends on the most basic of tools (hammers, picks, shovels, buckets, wheelbarrows, etc) and manual labour for excavation and extraction of minerals.

Small-scale mining *(SSM)* differs in various regions with countries taking different approaches. However this may be defined as mining that utilizes some mechanization but this is to facilitate, not necessarily to replace manual labour. It usually involves only a few people working in small or medium-sized mines and some operations may have resources for mine planning, development and management. In this study the definition adopted (Gueye, 2001) refers to SSM as operations of individuals or organized groups (four to eight individuals) the abbreviation ASM will be used to denote Artisanal and Small-Scale miners

Ruby: This is a type of gemstone that is pink to blood-red in colour. The red colour is mainly caused by the presence of the element chromium. Ruby is a red variety of the mineral corundum (Aluminium oxide), one of the hardest minerals on Earth, of which sapphire is also a variety. For thousands of years, ruby has been considered one of the most valuable gemstones on Earth. It has everything a precious stone should have: magnificent colour,

excellent hardness and outstanding brilliance. In addition to that, it is an extremely rare gemstone, especially in its finer qualities. It is the colouring element chrome which is responsible for this scarcity. In really fine colours and good clarity, this gemstone occurs only very rarely around the world. Ruby is found in several mines in Taita-Taveta County.

Tsavorite: Also known as green grossular garnet, Tsavorite is a green gemstone, a variety of the garnet group species grossular, a calcium-aluminium garnet. Trace amounts of vanadium or chromium provide the green colour. It was first discovered in Kenya by geologist Campbell Bridges in 1971 within the Tsavo national park. This gemstone has a vivid radiant green which makes it so desirable and its colour ranges from a spring-like light green to an intense blue-green to a deep forest green. The gemstone is also valuable on account of its great brilliance and unlike any other gemstone, tsavorite is neither burnt or oiled and does not need any treatment. It is a common gemstone in Taita-Taveta County.

Tanzanite: This is a blue/purple variety of the mineral zoisite (Calcium aluminium hydroxyl Sorosilicate) belonging to the epidote group. It is an extraordinary gemstone found only in Tanzania and named after its country of origin and has rapidly developed into one of the most coveted gemstones in the world.

Amethyst: This is a semi-precious gemstone, one of the several forms of quartz and violet in color often used in jewelry.

Sapphire: Refers to a gem quality variety of the mineral corundum (Aluminium oxide) that comes in a variety of colors, the most valuable being blue sapphire. It is valuable for its beauty, its

magnificent colours, its transparency and also its durability and constancy. Thanks to their hardness, sapphires are easy to look after, requiring no more than the usual care on part of the wearer.
Tourmaline: Tourmaline is a semi-precious stone that comes in a variety of colors. It is a crystalline boron silicate mineral compounded with elements such as aluminum, iron, magnesium, sodium, lithium, or potassium. Green tourmaline is the main variety mined in Taita-Taveta.

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Artisanal Miners at Mkuki Mine

4 Introduction

4.1 Background of the Study

The management of extractive industries is one of the most critical challenges facing many resource-dependent developing countries today. Rather than stimulating broad-based economic development, reliance on resource extraction has tended to concentrate wealth and power in the hands of a few. It also exacerbates corruption and inequalities leading to environmental degradation and pollution, while doing little to reduce poverty, economic disparities and generate employment.

The recent discovery of oil, gas and other minerals has propelled Kenya as a new player in the global market for hydrocarbons and valued minerals. The International Monetary Fund (IMF) projects that oil production in Kenya is expected to start in six to seven years from now, giving the country time to prepare to manage its endowment to achieve its development goals as stipulated in Vision 2030. In addition to oil, Kenya is also rich in gas, rare earth metals, coal, iron ore, gold, limestone, gypsum, soda ash, gemstones, manganese ore, fluorspar, diatomite, titanium, zircon, chromite, niobium and silica sand. Most recently, Cortec Mining Kenya Limited has announced that Mrima Hills in Kwale County has one of the largest rare earth mineral deposits in the world with a potential in-ground value of up to $62.4 billion.

According to government estimates, extractives currently contribute just 1% to Kenya's GDP and in terms of total export revenues it is less than 2%. This contribution is set to grow significantly (current estimates suggest the sector may grow to 10% of GDP) and the opportunity to use the sector to catalyze transformational national development and economic growth requires careful planning at this critical and early stage(Adam Smith International 2013).

Kenya is well known for gemstone mining; however, the small-scale (artisanal) miners dominate the industry. Artisanal mining accounts for over 60% of annual gemstone production in Kenya; women and youth play a major role in artisanal mining. In 2002 Kenya had an estimated production of 10.9 tones of Ruby corundum (5.86 tones in 2001) and 61.4 tones of gemstones compared to 73.3 tons in 2001(Kenya Chamber of Mines). There has been a decline in Kenya's gemstone mining industry recently; with the same traditional players continuing to dominate the sector. It is this critical role played by the sector that necessitates a

deeper understanding, analysis and appreciation of its socio-economic impacts in Taita Taveta County.

4.2 Nature of Artisanal Miners (Formal and Informal)

All artisanal miners worldwide have one thing in common – artisanal mining represents an opportunity. To some, participation is driven by the allure of riches; however, for many women, artisanal mining signifies an opportunity to relieve the strains of poverty. Çagatay (2001) has described poverty as a term that refers to "human poverty", which includes lack of assets, dignity, autonomy and time in addition to income poverty.

Artisanal mining is used to denote all small-scale as well as medium and large-scale mining that may be illegal or legal, formal or informal. Artisanal mining may be better characterized by a lack of long-term mine planning and use of rudimentary techniques (Hinton et al., 2003). These artisanal miners employ rudimentary techniques for mineral extraction and often operate under hazardous, labour-intensive, highly disorganized and illegal conditions. Despite these factors, artisanal mining is an essential activity in many developing countries, particularly in regions where economic alternatives are critically limited.The International Labor Organization (1999) estimates that the number of artisanal miners is currently around 13 million in 55 countries, which is roughly equivalent to the global workforce of large-scale mining. From this, it has been extrapolated that 80 to 100 million people worldwide are directly and indirectly dependent on this activity for their livelihood.

Approximately 30% of the world's artisanal miners are women and youth who occupy a number of roles ranging from labour-intensive mining methods to the processing aspect of artisanal mining. In many cases, the roles of women and youth in artisanal mining communities differ significantly from those of men, and extend well beyond direct participation in mining activities that are often overlooked by initiatives and development programmes directed at catalyzing the transformation of artisanal mining. Due to their critical role, not only in mineral production, but also in the development of sustainable communities, combined with their susceptibility to poverty, enhancing the role of women in artisanal mining may be a means to "bridge the gap" between the well-conceived technical and socio-economic changes often prescribed for artisanal mining, and the actual facilitation of positive transformation of the artisanal mining sector. This may be accomplished in a number of ways, such as Gender-sensitive technology assistance initiatives – *Gender* (Butler, 1990) refers to the

behaviours, attitudes, values, beliefs, etc. that a particular socio-cultural group considers appropriate for males and females.

4.3 Study Area

This scoping research entitled '*Economic and Job Creation Potential of Artisanal and Small-Scale Miningin Taita-Taveta County*' was carried out between August and October 2014 by a team of consultants led by Dr. Bernard Rop(PhD, Msc, Bsc – Geology)

Taita-Taveta County lies in the south-western part Kenya's coast. It is bounded between longitudes 37^0 30' 00" and 39^0 30'00" East and latitudes 2^0 30'00" and 4^0 30'00" South. It is approximately 200 km northwest of Mombasa and 360 km southeast of Nairobi. It borders Makueni, Kitui and Tana River Counties to the North; Kilifi and Kwale counties to the east; Kajado County to the Northwest and the Republic of Tanzania to the Southwest

The county has an undulating and raged terrain with an altitude ranging from 500 m to almost 2,300m above sea level with Vuria peak being the highest.The rainfall varies according to the terrain with the lower zones receiving an average 440 mm of rain per annum and the highland areas receiving up to 1900 mm of rain

The population of the county 30 years ago was approximately 45,000 persons but this has shot up to well over 284,657persons (2009 census) with population densities ranging from 3 persons per km^2 to more than 800 persons per km^2

The county covers an area of 17,083.9 km^2 (6,596.1 sq mi) of which a bulk 62% or 11,100 km^2 is within Tsavo East and Tsavo West National Parks. The remaining 5,876 km^2 is occupied by ranches, sisal estates, water bodies such as Lakes Chala and Jipe in Taveta and Mzima springs, and the Hilltop forests which occupy less than 100 km^2 or approximately 10 km^2 out of 587.5 km^2.

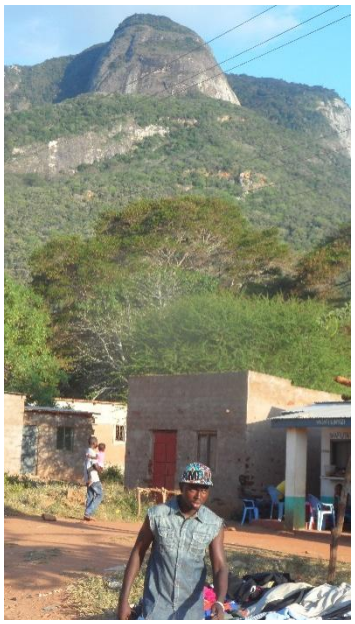
The lowland areas of the county that do not belong to national parks are divided to ranches, estates and wild life sanctuaries. The county has approximately 25 ranches. The main land use in ranches is cattle grazing. The three operating sisal estates of the district are the Teita Sisal Estate, Voi Sisal Estate and Taveta Sisal Estate. The ranches are also used for wildlife conservation and tourism. The famous Taita Hills and Saltlick Lodges sanctuary are located in the county.

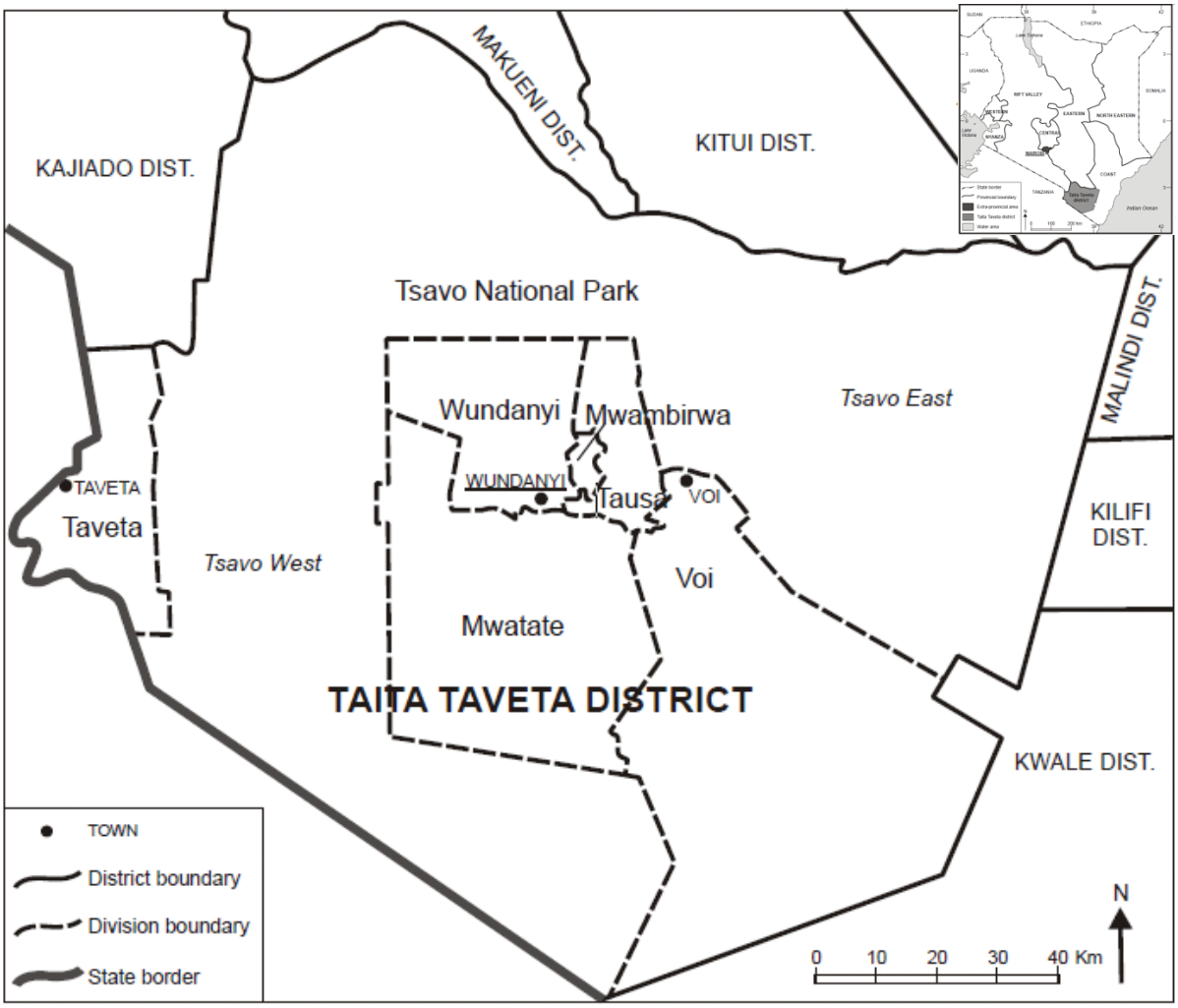
Research team with the Taita Taveta County Governor H.E Mr. Murutu

The economic activities practiced in TTC by the local communities are livestock keeping, small-and large-scale mining, small-scale subsistence farming and small- and micro-enterprises and/or businesses. Some of the people are employed in various public and private institutions in the County.

There are about 48 forests which have survived on hill tops in the county of which 28 are gazetted and are under government protection and management. They range in size from small 500 square meters with a few remnant trees to modestly vast 2 square kilometers indigenous and exotic forest mountains. These forests are part of a unique Eastern Arch range of forests which are found mostly in Eastern Tanzania with the Taita Hills forming the only Kenyan Eastern Arc forest type in East Africa

In 2007, the Taita-Taveta District was split into two districts: the Taita District and the Taveta District. The two were subsequently merged to form Taita-Taveta County. This consists of four constituencies namely, Voi, Mwatate, Wundanyi and Taveta. There are 20 county wards which include Mwanda/Mgange, Werugha, Wumingu/Kishushe, Wundanyi,Mwatate, Bura, Chawia, Wusi/Kishamba, Sagala, Kaloleni, Kasigau, Ngolia, Mahoo, Bomani, Mboghoni, Ronge, Mbololo, Marungu, Chala, and Mata.





Location map of formerly Taita Taveta District (Taita Taveta County)

4.4 Geology of Taita Taveta area (Bear, 1952)

The Taita Taveta area is situated within the Mozambique Belt, a majorstructural/metamorphic unit which extends along the African east coast from Mozambique and Malagasy into the Sudan and possibly as far north as Egypt and Arabia; it represents one of the fundamental geological features of Africa (Holmes 1951, Clifford 1970, Kröner 1977 and 1979). The belt consists typically of high-grade metamorphic rocks, characterized by K/Ar-ages of 400-600 m.y. (Cahen 1951). Three major units were recognized in southern Kenya (Pohl & Niedermayr 1979):

Relics of older-metamorphic basement occur as wedges and slices of charnockites and granulites, tectonically emplaced within meta-sediments. Variegatedmio – geosynclinals meta-sediments, consisting of marbles, quartzites, graphite and kyanite (-sillimanite) gneisses and schists,biotite (-hornblende)

gneisses and amphibolites which were deposited as a sedimentary cover with volcanic intercalations upon the basement. Saggerson (1962) described this suite as the "Kurase Series".
Eu–geosynclinals meta - sediments are considered to be represented by a thick suite of monotonous meta-greywackes (quartz-feldspar-biotitehornblende gneisses) with bands of ortho-amphibolites, described by Saggerson (1962) as "Kasigau Series" immediately to the east of the Taita area. This unit probably was deposited on a continental margin.

Facies transitions between the two series suggest approximate time equivalence. The present contact between the two groups is apparently concordant. It is marked by lenses of meta-dunites, peridodites and –basalts possibly representing dismembered ophiolites along a regional thrust.

4.4.1 Economic Geology

Geological reports of surveys carried out at different times in this region show the presence of mineral deposits in the County and the neighboring areas. A report by Horkel (1980) shows that parts of Taita Taveta County has high and middle value gemstones including: Tsavorite (green garnets), red garnets, ruby, change colour, blue sapphire, pink sapphire, green tourmalines, yellow tourmalines, rhodolites and kyanites. The main gemstone mining area in Kenya is in the Tsavo region, which derived its name from tsavorite (Bridges, 1974, 2007). Many small mining operations are located along a fault system extending from the Taita Hills of Kenya to the Umba Valley in northern Tanzania, passing through the Tsavo, Kasigau and Kuraze areas. This is where Campbell Bridges discovered tsavorite in 1971 and where his company continues to carry out mining. Taita Taveta County is currently the main source of Tsavorite in the world.

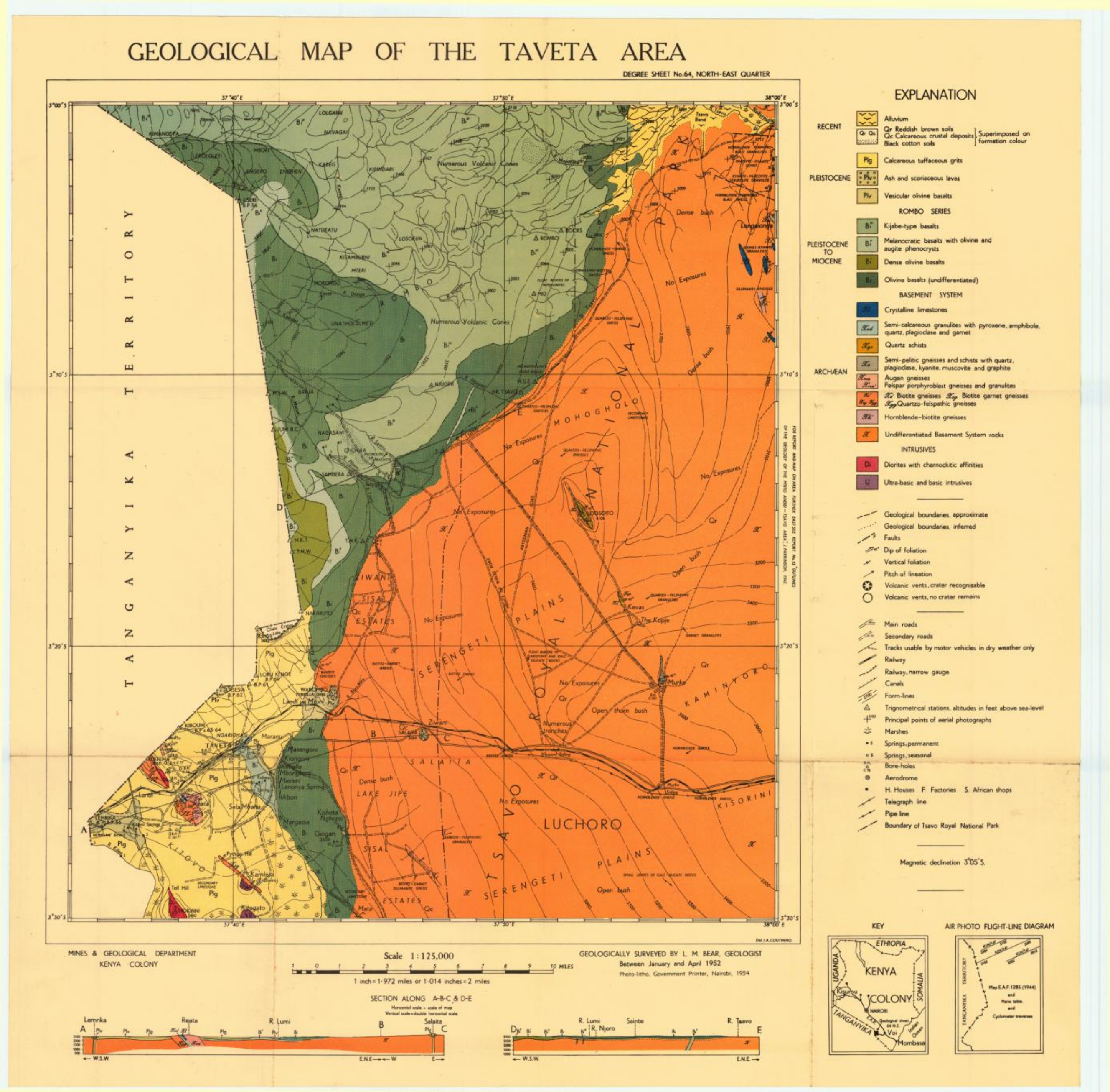
Rubies are associated with ultramafic rocks while *greengrossularites ("Tsavorite") is*strata-bound. Other gemstones include *blue zoisite ("Tanzanite"), andradite, Red spinel,turquoise, and Amethyst.* The production of graphite, particularly from the Chawia deposit may also prove economically feasible. Less promising mineralization, mainly with a potential for domestic markets, are magnesite and asbestos occurrences in ultramafic bodies or kaolin and magnetite deposits. The development of bulk commodities such as marble and structural stone depends mainly on an adequate local market potential.

Marble is available for quarrying east of Mwatate on a small scale. Owing to a high Mg (Magnesium) content, the rock is not suited for the manufacturing of

cement, but merely for burning to produce lime, and as dimension stone or aggregate. Small quarries for basalt, gneiss and lapilli supply the local requirements for road metal and aggregate. Ample resources of these low-value bulk commodities are readily available for development if required by increased local demand. Building stones (tuffs) are currently being quarried near Taveta town and there is a potential for further expansion if more resources are invested and the demand is right. There is sufficient supply of sand to satisfy the needs of the area and even surplus to sell to the neighboring counties.

Taita Taveta County is therefore endowed with one of the richest minerals deposits in Kenya and the Eastern Africa region (Keller, 1992 Central Bank, 1991). These include both industrial minerals and gemstones, which have the potential of generating considerable wealth to various mining prospectors and investors (Bancraft, 1984). But this wealth does not trickle down to the local people. This wealth continues to benefit middlemen, brokers and other players along the supply chain while poverty in the county continues to spread unabated (Mwandawiro, 2009). Furthermore, the mining is often carried out without clear government regulations and control(Taita - Taveta Professionals Forum, 2008)

Tsavolite Mining Co.Ltd site at Kasigau ranch


GEOLOGICAL MAP OF THE TAVETA AREA
DEGREE SHEET No.64, NORTH-EAST QUARTER
TANGANYIKA TERRITORY
SERENGETI PLAINS
TSAVO ROYAL NATIONAL PARK
LUCHORO
MOHOGHOLO
KAMINYORO
KISORINI
LAKE JIPE
SALAITA
TAVETA
Numerous Volcanic Cones
No Exposures
Dense bush
Open bush
Open thorn bush
SISAL ESTATES
EXPLANATION
RECENT
Alluvium
Qr Reddish brown soils
Qc Calcareous crustal deposits
Black cotton soils
Superimposed on formation colour
PLEISTOCENE
Calcareous tuffaceous grits
Ash and scoriaceous lavas
Vesicular olivine basalts
ROMBO SERIES
PLEISTOCENE TO MIOCENE
Kijabe-type basalts
Melanocratic basalts with olivine and augite phenocrysts
Dense olivine basalts
Olivine basalts (undifferentiated)
BASEMENT SYSTEM
ARCHÆAN
Crystalline limestones
Semi-calcareous granulites with pyroxene, amphibole, quartz, plagioclase and garnet
Quartz schists
Semi-pelitic gneisses and schists with quartz, plagioclase, kyanite, muscovite and graphite
Augen gneisses
Felspar porphyroblast gneisses and granulites
Biotite gneisses Biotite garnet gneisses
Quartzo-felspathic gneisses
Hornblende-biotite gneisses
Undifferentiated Basement System rocks
INTRUSIVES
Diorites with charnockitic affinities
Ultra-basic and basic intrusives
Geological boundaries, approximate
Geological boundaries, inferred
Faults
Dip of foliation
Vertical foliation
Pitch of lineation
Volcanic vents, crater recognisable
Volcanic vents, no crater remains
Main roads
Secondary roads
Tracks usable by motor vehicles in dry weather only
Railway
Railway, narrow gauge
Canals
Form-lines
Trignometrical stations, altitudes in feet above sea-level
Principal points of aerial photographs
Marshes
Springs, permanent
Springs, seasonal
Bore-holes
Aerodrome
H. Houses F. Factories S. African shops
Telegraph line
Pipe line
Boundary of Tsavo Royal National Park
Magnetic declination 3°05'S.
KEY
ETHIOPIA
UGANDA
KENYA COLONY
SOMALIA
TANGANYIKA
NAIROBI
Voi
Mombasa
AIR PHOTO FLIGHT-LINE DIAGRAM
MINES & GEOLOGICAL DEPARTMENT
KENYA COLONY
Scale 1:125,000
1 inch = 1·972 miles or 1·014 inches = 2 miles
GEOLOGICALLY SURVEYED BY L. M. BEAR, GEOLOGIST
Between January and April 1952
Photo-litho, Government Printer, Nairobi, 1954
Del. J.A. COUTINHO.
SECTION ALONG A-B-C & D-E
Horizontal scale = scale of map
Vertical scale = double horizontal scale
Lemrika
Reata
R. Lumi
Salaita
R. Njoro
Sainte
R. Tsavo
W.S.W.
E.N.E.

4.5 AIM AND OBJECTIVES OF THE STUDY

The broad aim of the study was to get an overview of mining and minerals in Taita-Taveta County (TTC), as well as the problems and prospects. The study also aimed at documenting the challenges involved and making recommendations based on the research findings of how the mining, mineral potential and trade could be utilized to contribute to sustainable development of the area. The specific objectives of the study included the following:

a) Documenting the known kinds of minerals in the TTC and where they are located.
b) Documenting the main dealers involved in the prospecting and mining in the TTC.
c) Documenting the nature of mining and the trade in the minerals, its problems and prospects.
d) Understanding the importance of the mining industry and trade to the economy and development of Taita-Taveta County and Kenya at large.
e) Highlighting the potential of mining in Taita-Taveta County for the development of the area.
f) Documenting and analyzing the challenges involving mining and trade in minerals in the area.
g) Formulate interventions to mitigate the challenges experienced in the sector
h) Making relevant recommendations.
i) Publishing the study findings.

The main objective of the study is to assess and identify the risks, challenges and opportunities of men, women and youth in Artisanal and Small-Scale Mining, particularly for youth and women in Taita Taveta County.

4.6 THE RELEVANCE OF THE STUDY

Due to its importance as a location of minerals, particularly gemstones (Central Bank, 2008), considerable information exists about mining in Taita-Taveta County. However, most of the research and publications address the natural science and geological issues, since they are driven by prospector, investor and trade interests. Consequently, little has been published about the political, economic, social and environmental impacts of mining in the County.

This calls for further research from the political, economic, social and environmental perspectives. Critical here is the need to include the relationship between the people of the mining areas affected, the environment and the mineral resources. Such research would also need to explore more cogently why local people continue to be losers in the exploitation of the mineral resources in their ancestral lands, and what should be done to correct this in order to promote sustainable development. Given that Taita-Taveta County is endowed with abundant minerals it was important to find out whether the local people were aware of this. Their

indigenous knowledge will continue to be invaluable to future prospectingexploitation and utilization of mineral resources.

It is also important to determine the benefits accruing from an industry that is reputed to make billions of shillings in profits annually, and whether the current policy, regulatory & legislative framework in the Extractive Resources Industry (ERI) adequately address the issues of royalties and benefit sharing between the investors, communities and government, as compared to best-practices from other countries with natural resources. So there is need to determine why the industry and trade in minerals has not brought about the development of local communities around mining areas. In this regard, it is important to investigate why the local people continue to be perceived as mere participants and losers in the mineral trade and industry found in their locality, and the possible ways of changing this in their favour.

The hypothesis of the study was to have sustainable peace, a necessary precondition for sustainable development; this requires policies and measures that ensure communities fully participate in conserving the deriving benefits from their local natural resources. To expect people to remain peaceful when they are alienated from their natural resources by outsiders is to ignore logic; the country would have to contend with this, sooner or later (Mwandawiro, 2008). Hence the need to examine mining in the TaitaTaveta County and further determine how it contributes to the development of the communities in the area.

One of the most important aspects of the newly-enacted Constitution of Kenya – promulgated on August 27th 2010 (Government Printer, 2010) – is the devolution of political, social and economic governance. The constitution divides the country into 47 devolved Counties. A total of 15% of the national income is to be shared among the counties. The aim is to devolve resources to the grassroots to trigger sustainable development. Of even more significance is the fact that the counties not only have more powers to decide their affairs, they also have more responsibilities in conserving and managing their natural resources.

Accordingly, this study report is an important source to both the national government and the government of Taita Taveta County. Elected leaders and professionals, meeting in Nairobi on 23rd October 2010 under the umbrella of Taita-Taveta Professional Forum Trust, (www.taitataveta.co.ke) identified minerals as one of the most important resources in the county. They also lamented that exploitation of the minerals has hitherto not benefited the people of the county. Thus the study would also help increase the knowledge of the people of Taita-Taveta about their mineral resources and the need to ensure that they are utilized sustainably to improve the community's welfare.

Based on the study findings, recommendations have been made on ways of maximizing the potential of mining in Taita Taveta for local and national development. It is posited that the benefits accruing from the abundant minerals of Taita Taveta should be shared equitably with the local communities. The current scenario in which only outsiders benefit at the expense of the local people and the government is untenable. The county and central government should continue promoting a benefit-sharing mechanism.Minerals that remain unexploited cannot contribute to development. There is need to take cognizance of the fact that the skills and financial investment by foreign and local investors are necessary for the development of Taita Taveta County.

Ownership of resources alone is not enough; the most important thing for development is how the resources could be harnessed and utilized to add value to the economy and development of the area, the county and the nation. Thus the study report recommends cooperation in

sustainable exploitation of the minerals by both the large and small investors and the government.

4.7 HYPOTHESIS: THE NEED FOR SUSTAINABLE UTILIZATION OF NATURAL RESOURCES

The people of Taita Taveta County have, for a long time, been alienated from their land and land resources. Their struggles for land rights and tenure are well-known in Kenya. Many of them have either too little land or live as squatters. They are also alienated from the minerals, wildlife and forest resources in their local area. This state of affairs impedes the development of these communities. It is therefore necessary to document these realities and suggest solutions to ensure that the rich mineral resources contribute to local development.

4.7.1 Profiling the ASMs

Most artisanal mining in Taita Taveta is rudimentary in nature; the miners mainly use easily available explosives to break down the rocks in search of gemstones and precious metals. The health and environmental risks are enormous. Besides these issues, the markets for gemstones are not well established – a few dealers and brokers still control the entire process; the small-scale artisanal miners in Taita Taveta have limited market powers. It has been reported (but not confirmed) that there is a big black market selling of gemstones. The miners also lack the technical knowhow, capacity, to correctly value the gemstones.

The artisanal miners are predominantly men with little or no education. They have little or no income but big expectations. Almost all interviewed artisanal miners expressed very high optimism that they will one day strike it rich. They have undivided attention to their work and would never consider abandoning it. They have an obsession for their work that keeps them going even under very hostile conditions. This is almost like a religious addiction.

Artisanal mining typically uses manual labour, simple tools, and basic recovery and processing techniques. Small-scale mining is also labour-intensive but also employs a higher level of mechanization and more sophisticated processes.ASM is fraught with dangerous practices with little regard for health and safety.

ASM is frequently migratory as miners move from site to site in search of minerals. The rate at which they move, and the area within which they travel, are functions of a combination of practical, economic and social factors including the life of the mine; the lure of high value mineral strikes in other areas which create a 'rush' to that site; relocation by traders; pressure from conflicts; exclusion from a site by new restrictions such as the arrival of a large-scale mining company; rain and the availability of water; environmental shocks; and the agricultural seasons.

A number of them do not have land of their own so they often carry out mining 'illegally' in ranches and other privately owned land or in the neighbouring Tsavo national park. They are commonly referred to as "*Zururas*" meaning marauding miners or 'miners without borders'. However a significant number of them have now formed associations or cooperatives and have staked claim on some ranches. They however lack the necessary land ownership documentation such as title deeds, and this has been the main source of the mining conflicts in the area.

Due to lack of financial capital, most artisanal miners, work under some 'land lord' who supplies them with the much needed food, water and shelter and whatever mineral they recover is shared out with the land lord taking the lion's share. The desperate circumstances they work under expose their vulnerabilities making them easy target for exploitation by predatory middlemen or brokers. From the field interviews it would appear that it takes so long to get gemstones of economic value. A number of them cannot recall recovering any valuable gem

in the last six months to one year. However it is said that when they get good quality gemstones and make significant amounts of money, they indulge in excessive leisure, drinking, taking foreign trips abroad and purchasing lavish cars and would only return when the money is exhausted – then the cycle repeats itself again.

The trade is fraught with dangerous and illegal practices, and, it can have serious implications for security. It can create localized and far-reaching social risks, and typically exploits highly vulnerable individuals and groups.

There are few small-scale miners who have made good money from the industry and established themselves well. These often have land of their own with title deeds and practice mechanized mining with a good network of clients locally and internationally. They have invested their income elsewhere especially in real estate in major or nearby towns like Voi and Mwatate and they often act as landlords or brokers to the artisanal miners. With their enhanced capital base coupled with their understanding of the area, this category of small-scale miners, standout to be the greatest beneficiaries of the mining industry in this area.

There is however a different category of artisanal miners in the area; those involved in building stone quarrying and sand harvesting. The former group is found near Taveta town and the later at Ongoni area along the Voi River (and other rivers in the area). Unlike gemstone miners these ones operate from their homes and are less optimistic about the future and are less secretive in their dealings. They also assist the county government in collecting cess from Lorries that come to collect building stones. Fewer conflicts have been reported from this type of miners compared with those from gemstones though they have less income. These often use mining as a supplementary source income apart from farming, which also promotes seasonal work patterns.

Small-scale mineral producers form the majority of mineral dealers in Taita-Taveta. These small-scale miners can be categorized according to the size of mining area, number of people employed or involved and volume of production and profits they make. They use simpler, fewer and less sophisticated tools and machines. Most of them are self-employed and work in groups of four - eight, comprising relatives or neighbours. For example, in a group of ten small-scale miners, only three hire labourers. Most small-scale mineral producers depend on their own labour. They sell their minerals locally. Traders travel to buy gemstones from small-scale miners at Mkuki, Kasigau, Kamtonga, Chungaunga, Bura, Kishushe and Wanjala. However, a few small-scale mineral producers sell their gemstones as far away as Mombasa, Nairobi and Arusha while a few have access to market outside the country.

The small-scale miners rarely access loans to invest in mining as most of them do not meet the legal requirements for mining. Whenever they discover the minerals, they are often dispossessed of the claims by the large scale-miners who employ or chase them away. They are also often exploited by brokers and the large-scale miners as they rarely know the value of their gemstones and have little access to the gemstone markets controlled by large-scale dealers.

There is some symbiotic relationship between the large- and small-scale miners. Some large-scale mineral producers support small-scale miners with water, transport, food, security, and other requirements. In return, small-scale producers sell their gemstones to large-scale miners as well as provide them with relevant information on minerals potential of the area.

4.7.2 'Zururas'

Some producers and sellers of gemstones do not fit in the various categories of small-scale miners. They are simply known locally as zururas; a nickname for mines and mineral dealers with no legal mining rights. They are mainly poor

people from all over Kenya and the neighbouring countries who operate in the plains of Taita Taveta County and depend on gemstones for survival. They live and struggle to earn livelihoods where the rich and powerful have privatized nearly all the land that is rich in minerals.

The zururas come from virtually all the ethnic groups of Kenya – especially Kikuyu, Embu, Meru, Tharaka, Maasai, Somali, Kamba, Taita, Luo, Luhya, Giriama. Some from outside Kenya belong to the Chagga and Pare tribes of Tanzania. They roam the mining areas in Taita, scavenging for gemstones which they sell for a living. Many of them are vagabonds, being criminals who have escaped from prisons or justice systems to seek refuge in the wilderness of Taita-Taveta County. They hide in the mining areas and hardly leave the place, except for a short time at Mwatate and Voi to sell their gemstones. Some zururas are former employees of the mines who decided to continue living around the mining areas to scavenge for gemstones (Mwandawiro, 2008).

4.8 Other producers and dealers of gemstones

Many other people in Taita are involved in the production of minerals and gemstones in some way. These include herders who discover gemstones, collect them and sell them to dealers. Teachers, policemen and other business persons in Wundanyi, Mwatate, Voi, Bura, Maungu, Kasigau and other places of Taita Taveta County are also involved. But their involvement in the industry is mainly illegal. They work in mining activities to supplement their incomes. In fact, many civil servants, including district commissioners and district officer engage in gemstones production and trade whenever they are posted to work in Taita Taveta County. Some even become small-scale miners. This happens despite fact that the law forbids it.

Some are brokers (middlemen) of minerals of all sorts at Voi, Mwatate, Kamtonga, Kasigau and in mining areas, as well as Nairobi, Mombasa and

Arusha. They sponsor small-scale mineral producers or 'zururas' with food, water and tools on condition that the gemstones produced are only sold to them, yet some are peasants who own land which has gemstones and who lease their land to people with prospecting rights (PRs). Others are large land owners who have minerals deposits in their land. They include hotels, sisal estates and private farms. They secretly produce gemstones in their large properties.

4.9 Infrastructure and public services

4.10 Road network

The road network is poorly developed in the county. There are plans by the county government to improve the network and open up areas currently inaccessible. The Mombasa-Nairobi road passes through the county with Voi being the main town on the highway which provides the much needed connection to the rest of the country. This road is the only paved class A109. However from Voi there is a class A23 road paved up to Mwatate; plans are at an advanced stage to soon start paving the remaining parts of the road to Taveta and ultimately to the neighboring country, Tanzania . A class C103 unpaved road connects the county to Kajiado branching from the Mombasa-Nairobi highway at Tsavo Gate. Similarly an unpaved C 103J1 class road connects the county to Kitui to the east branching off from the main highway at Manyani gate.

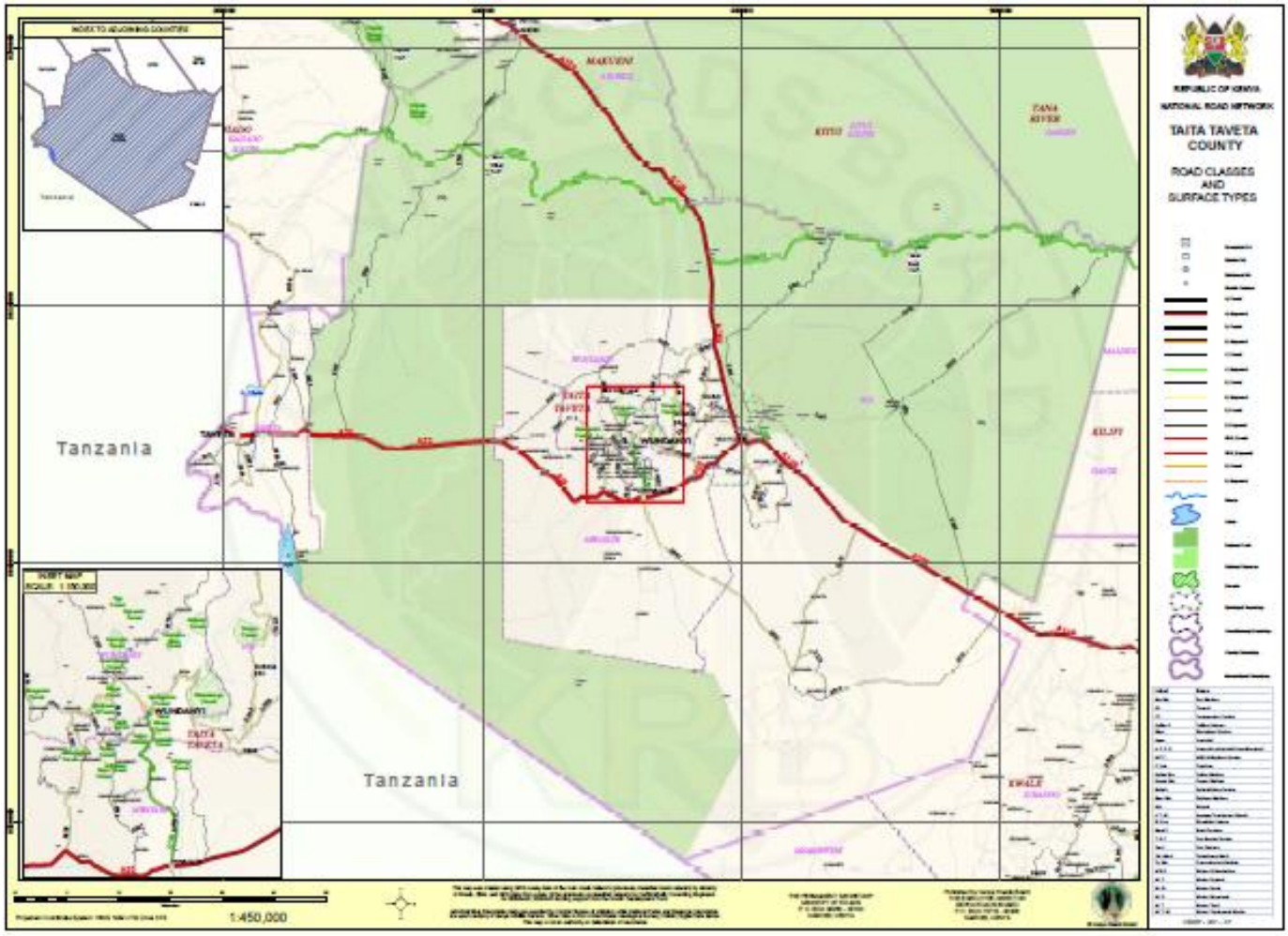
A paved class C 104 road connects Mwatate town to Wundanyi and from these key town centers several class D roads radiate out connecting to a number of other smaller market centers (see map bellow). The rest of the county is interconnected with a network of class D unpaved roads, several SPR and U classes of unpaved roads, trucks and footpaths.

It is important to note that the roads, paths or trucks leading to the mining sites are by and large unmapped. This communication network is a new development

that has not been captured in the old topographic maps. Their absence in maps presents a major problem in providing services to the mines. In a number of occasions government officers have been unable to find their way to the mines as they get lost in the wilderness even with the help of guides. Hence it is critical that mapping of these roads be done to assist in service provision to the mines.

4.11 Electric Power connectivity

Rural electric power connectivity is very low in the county and this has attracted the attention of the county government which has allocated a substantial amount of money in the current budget to increase connectivity. Currently only the main town centers and market centers are connected and key institutions. However domestic units are yet to be connected to the main grid.



Map showing roads and railway lines

Access road to Mkuki Mine in Mwatate

4.12 Study Terms of Reference – TTC ASM

Kenya has an abundance of largely untapped natural resource wealth which, to date, has attracted considerable investor attention. The benefits accruing from the extractive industry are enormous and estimated to run into billions of shillings; however there is no clear policy, regulatory & legislative framework to adequately address the issues of royalties and benefit sharing between the investors, communities, the county and national governments. There is need to mark Kenya out as an attractive investment destination, align regulation and governance of the sector with the devolved arrangements of the constitution (adopted in 2010), and institute mechanisms designed to make sure that the country derives value from the activities of its extractives industry

It is against this backdrop that the UNDP in collaboration with the Taita Taveta County government conceived, instituted and funded this study. The study seeks to collate and analyzes some of the critical issues facing local communities and small scale miners in Taita-Taveta County.

The broad aim of the study was to get an overview of mining and minerals in Taita-Taveta, as well as the problems and prospects. The study also aimed at documenting the challenges involved and making recommendations based on the study findings on how the mining, mineral potential and trade could be utilized to contribute to sustainable development of the area. It would examine the legal and policy environment and recommend ways of mainstreaming the industry to maximize the benefits and ensure sustainable development for the local communities and Kenya as a whole.

To achieve these objectives UNDP hired a consultant, working directly under the supervision of the Taita Taveta County Executive Committee (CEC) Member in-charge of the Ministry of Mining, Environment, Wildlife and Natural Resources, the incumbent was guided by the following terms of reference, to:

- Define the assessment criteria
- Assess current contribution of artisanal mining to household income within the communities in Taita Taveta County.
- Provide gender specific socio-economic data and analyses, based on gender disaggregated statistics / data, to determine the current contribution to household incomes, economic opportunities and job creation potential for both men and women and youth within the artisanal and small-scale mining sector in Taita Taveta.
- Carry out a supply chain analysis of gemstones trade in Kenya with a special focus on Taita Taveta County; providing details in terms of prices, quantities, quality and processes used at various links in the value chain.

- Identify challenges faced at various links in the value chain, with particular focus on small-scale mineral producers / miners (upstream), covering the following issues:
    a. Inputs and equipment
    b. Finance
    c. Environmental sustainability
    d. Social problems such as conflicts, gender-based violence, etc.
    e. Alternative livelihood opportunities available (this is relevant only to small-scale mineral producers/ miners)
    f. Laws and regulations (or the lack thereof)
    g. Access to information, including geological information
    h. Existence and functioning of institutions such as associations and business development agencies
- Highlight policy, economic, social, and political factors hindering growth in the supply of gemstones and the development of effective value chains that integrate the poor with a gender specific focus of the artisanal and small-scale mining sector in Taita Taveta County
- Define causes of low royalty returns to the national government
- Recommend gender sensitive approaches on how to mitigate these challenges and enhance the equitable and sustainable artisanal and small scale mining
- Develop and share guidelines implementing the recommendations
- Based on stakeholder consultation workshop(s), provide recommendation for policy and legislative action that will ensure equitable distribution of artisanal mining operations benefits to men, women and youth.

4.13 Output

The key output from this assignment will be a report on the "**Economic and Job Creation Potential of Artisanal and Small-Scale Mining, in Taita Taveta County".**

The report would include the following:

- An assessment of risks, challenges, opportunities for enhancing sustainable livelihoods from small scale gemstone mining with a particular focus on youth and women of the artisanal and small-scale mining sector in Taita Taveta County
- An assessment of the impact of small scale gemstone mining for women, men and youth
- A description (with gender specific examples) of the factors hindering growth of the artisanal and small-scale mining sector in Taita Taveta County.

- A value chain analysis by gender of artisanal mining
- Recommendations on gender sensitive approaches on how to mitigate these challenges
- Guidelines implementing the recommendations.
- Provide recommendation for policy and legislative action that will ensure equitable distribution of artisanal mining operations benefits to men, women and youth.

Miners quarrying the gemstones

4.14 Study methodology

The study materials and data were gathered between September-October 2014, during an eight-day field period in the county. The empirical materials consisted of RPA (Rapid Rural Appraisal) and in-depth interviews, unstructured interviews, questionnaires and desk references, literature review of existing information, reports, journals and field observations as well as review of relevant Kenyan laws on mining. The field studies began by an excursion as part of the RRA. The interviews were carried out by the team of professionals. The study mainly focused on the areas where mining is taking place. These included Chawia area, Mwatate, Kasigau, Alia, Kishushe, Mkuki, Buguta, Ongoni (Voi River), Bura, Taveta and Wundanyi.

The RRA is based on the idea that data is bound to the time and place and that, therefore, no intentions are made to generalize it. Rapid refers to rapid data collection; getting results does not require time-consuming inputs and analysis of questionnaire data since the data is gathered through more informal and small-scale discussions (Laitinen, 2002). This method emphasizes the importance of genuine participation of the local people, not only for the benefit of researchers but also for the benefit of the locals themselves who were given the opportunity to control, analyze and use the information to determine their destiny. The RRA method is highly recommended by many researchers especially in development cooperation (Laitinen, 2002). Information derived from this study was gathered by expert interviews, more unofficial unstructured interviews(representing RRA-approach) and questionnaires, of which the target groups were the administrative officers of Taita Taveta County, established miners and mining companies as well as the local civil society and whistle blowers.

In addition to these interviews, the team held several informal discussions, or unstructured theme interviews of which the most valuable took place with the Taita Taveta County governor H.E Mr Mruttu, some members of the county assembly, mining committee especially the chairman Mr. Mwangola, experienced and long serving miners, brokers and opinion leaders. The Principal of TTUC Prof Boga and Chairman of Mining and Mineral Processing Engineering department TTUC Mr. Ndegwa added value to the study since the institution has been involved in providing solutions to the mining industry. The current government regional geologist, Mr. Omito, provided critical information and guided the research team in field excursions. The team also worked closely with the acting County Executive Committee (CEC) Member in-charge of the Ministry of Mining, Environment, Wildlife and Natural Resources, Ms. Pamela whose input and information regarding the industry was invaluable. The questions were open-ended to elicit broad insights from the respondents on the extractive industry in the county, the activities of their organizations, the challenges faced and their recommendations. The questionnaire used is annexed to this report.

In total, over 150 artisanal miners were interviewed, 20 local brokers and 10 key small scale miners namely; Musa G. Njagi, Gabriel Mcharo, Miceni Musa, Edith

Lewela, Joseph Mtwandei, Major Mtongolo, Jared Nzano, David to mention just a few, were also interviewed in-depth.

4.14.1 Target Population

A population can be described as any set of persons or objects that possesses at least one common characteristic (Barton, 2001). The target population in the study was the small-scale and artisanal miners, brokers, opinion leaders,experienced and long serving miners and the national and county government administration.

4.14.2 Sampling Technique

According to Cohen, Manion, Morrison and Morrison (2007), the sampling method used for research should ensure that the selected subset is representative of the population in order to increase reliability and validity. This studyattempted to use both probability sampling and non-probability sampling during selection of the artisanal and small-scale miners as well as brokers and other stakeholders.

Mining pits on site in Mkuki ranch

The study involved both quantitative and qualitative methods. However, more emphasis was put on qualitative field data collection. The aim was to generate living data on mining in Taita-Taveta by interviewing the stakeholders in the mining industry in the area.

The past media coverage of the mining activities in Taita Taveta County and the associated political dynamics were also examined to highlight the socio-political nature of the industry and the ensuing conflicts.

Research tools designed based on thematic Issues/Institution

No.	Research Tool	Key issues addressed
1	Artisanal Miner Questionnaire	• Age and gender • Marital Status and no. of children • Education Level • Mining experience(years) • Other sources of income • Mining contribution to household income • Capacity of the miners & Training needs • Gemstone clients • Mining challenges and mitigation measures • Land ownership • Environment, safety and health • Infrastructure and access • Conflict issues • Equipment and requirements
2	Established Small-Scale miners Questionnaire(mine & land owners)	• Outlook of the gemstone and jewellery business in Kenya • Analysis of the sector in the past 5 years • Challenges encountered as a small scale miner • Conflicts – Mining rights • How can SSM & artisanal miners work together • Human rights violation cases and the role of the mine owner • The state of security in the mining area
3	Government and institutional officials Questionnaire	• Strategic plan for the extractive industry • Expected support from donor community • Common challenges and issues from ASM • Income from ASM • Critical areas of concern to assist ASM • Number of ASMs and registered miners
4	Gemstone brokers Questionnaire	• Gemstone clients • Pricing of gemstones • External markets • Government by-laws and their effects on

		their operations • Role of county government • Legislative issues regarding ASMs
5	Field observation checklist	• Nature of ASM in the county ✓ Formal or informal ✓ Organized or disorganized ✓ Seasonal or permanent • Method of mining and level of technology employed • Environmental aspects of ASM • The socio-economic impacts as a result of ASM • Areas of value promotion along the value chain

4.15 Sampling Method

This study used a two-tier sampling method including the random sampling and simple random sampling. Simple Random sampling essentially gives equal chance of selection to all items or persons in a population (Bertini&Santucci, 2006). This method is fair and gives all sampling units an equal opportunity of being selected. Additionally, a simple random sampling method allows researchers to draw inferences and generalize the findings of the study.

4.15.1 Analysis of the data and materials

The collected information from the questionnaires and interviews as well as the documents received from the key stakeholders were analyzed using standard statistical methods with the aim of presenting an accurate and unbiased assessment of the issues affecting the sampled population.

Critical to this study was also the assessment of the current mining laws, policies and practices and how they impact on the ASM and the extractive industry in general. These were analyzed through SWAP and SWOT. These methods are used to draw conclusions of the study. The SWAP analysis examines the

strengths, weaknesses, aims and problems of the content and practice of the mining by-laws and policies used in Kenya and Taita Taveta County in particular.

SWOT-analysis again examines the strengths, weaknesses, opportunities and threats of the procedures, applications and practice of the mining laws and policies. This is to analyze the county's ability to perform and realize the mining policy aims and objectives for now and for the future.

4.15.2 Quantitative research

Quantitative research was done to gather information about existing minerals, their types, the people involved, and value. It involved data collection through interviews and literature review of existing information. The literature review focused on:

a) What has been published about mining in Taita-Taveta by scholars, researchers, the media and government institutions in the county; and
b) Review of relevant Kenyan laws on mining in, particular, and natural resources, in general.

4.15.3 Qualitative research

Qualitative research sought to collect and collate the perspectives of the mining stakeholders, particularly the local communities. It involved visiting the affected areas – especially those involved in active mining. It also involved making observations, interacting and discussing with the local people and conducting interviews with individuals and groups. The interviews targeted the artisanal and small-scale miners, ideally those involved in the mining industry – the investors, producers, national and county government officials, civil society workers, brokers, prospectors, among others. The main objective was to:

a) Identify various case studies of mining areas and solicit for detailed information.
b) Document issues identified by the people of the case study areas regarding mineral prospecting and mining; and
c) Document the views and concerns of various stakeholders, like the large- and small-scale miners and local communities.

4.16 Stakeholder workshop

After the completion and compilation of this report a stakeholders' workshop was held to disseminate the study findings and receive feedback from the participants. The mining communities were represented by different groups and/or individuals involved in the study.

Challenges and limitations encountered during the study

There were a number of challenges encountered during this study. However they did not fundamentally affect the outcome of this exercise. Some of the limitations encountered are worth mentioning:

1. There is a critical shortage or lack of information regarding the extractive industry in this county. It was not possible to establish for instance the number of people involved in the gemstone mining and how much is made from mining per annum. Even the basic information indicating the location of the mining activities and the type of minerals extracted is unavailable. There is no sufficient information available from the national or the county government indicating the amount of gemstones exported and to which country they are destined how much they fetch out in the market.
2. The gemstone mining activities are shrouded in secrecy so it is not possible to establish the exact amount of income generated to households from the activity. The inability of most ASMs to keep books of accounts further complicates the attempts to give monetary value to the ASMs.
3. The time set aside for the field work was too short for the number of issues competing for attention. The magnitude of the problems facing the extractive industry in this county calls for more dedicated time and resources to even start scratching the surface.

4.17 Numbers of ASM workers & dependents

It is notoriously difficult to collect accurate information on this sector given its informal and unregulated nature, seasonality, migration, use of ASM as a supplementary or back-up income source, etc. However, it is generally agreed that ASM is growing and this is an invisible income generating activity.

According to the national government's records there are 512 recognized mining allocations most of which are licensed and two operating on government leases namely Bridges Exploration Ltd and Rockland (K) Ltd. Of the 512 licensed

miners a number of them are out of operation due to various reasons ranging from attrition, financial problems, conflicts and other personal problems.

Apart from government records we were able to get lists of members of a number of mining associations and self-help groups (see table below). The estimated the number of dependants can be computed by using the 2009 population and household census which gave an average of 6 persons per household. Assuming each member of the associations identified below represents one household and that each has children, then the number of dependants can be estimated by multiplying the number of members by six.

No.	Name of Association/Co.	Est. No. of Members	Est. No. of dependants(times 6)
1	Mkuki Mine	140	840
2	Taita Taveta Women Mining Group-Alia	300	1,800
3	Muungano Gwaloli Mining Group-Buguta	150	900
4	Timbo Mlimani	400	2,400
5	Timbo Kubwa	150	900
6	Lukundo Mine	100	600
7	Alia Mining C.G	234	1,404
8	Licensed miners	512	2046
9	Rockland (K) Ltd	41	246
10	Bridges Exploration	6	36
11	Tsavolite Mine	41	246
12	Ongoni area-Voi River(sand)	50	300
13	Wanjala Mining-Kishushe	600	3,600
14	Mama Mercy Miners	200	1,200
15	Others	300	1,800
	Total	2,684	19, 344

This is a very rough estimation which excludes miners that do not belong to any association and operates on many assumptions. But even going by this alone, one can get an impression of the sheer size of people who directly or indirectly

depend on this industry. This is considered an underestimation and therefore a much larger number of people are supported by the extractive industry in this area.

4.18 Social impacts of ASM

ASM can have significant negative social impacts as an influx of miners to an area can cause overcrowding, contamination, and consumption of the area's water and other resources, as well as introducing or escalating alcohol abuse and sex-trading. ASM can change an area's economic profile dramatically bringing new revenue sources, stimulating trade, and creating access to new goods and services, but often at the expense of traditional income sources and with associated inflation.

Key mining town centers such as Mwatate and Kasigau have experienced major transformations in the last two or so years as the number of artisanal miners keeps increasing. Changes in the moral fabric of the towns have been witnessed with an evident increase in alcoholism and sex-trade. Business owners however are happy with the increased sales and money circulation in the local economy fueled by the new guests. Real estate owners have also hiked their rents and more people are investing in house construction which also comes with economic ripple effects.

Conflicts over land and mineral resources are commonplace in Kasigau, Chungaunga, Kamtonga, Mwachabo, Alia, Kishushe and other parts of Taita - especially in the lower zones where mining is a major economic activity. Wealthy and politically-connected individuals, mainly from outside of the county, have a stranglehold on the industry; they acquire the right to prospect for minerals in the area from the administrative centers of Nairobi, Mombasa and the area district headquarters at Wundanyi often without the participation of the local communities (Mwandawiro, 2011).

Conflicts between small-scale gemstone miners and large-scale gemstone miners arise because most of the land in the lower zones of Taita-Taveta County is not demarcated; the general feeling is that the locals have been robbed of their land and resources (Mwandawiro, 2011).

4.19 Political impacts of ASM

Mining being one of the main income generating activities in Taita Taveta County, is bound to attract a fair share of political attention. While political intervention is inevitable and could positively impact the extractive industry by focusing attention on the plight of the artisanal miners, most of it has been negative, divisive and to some extent selfish. Exploiting the dire and deplorable state of the artisanal miners for political expedience is common and may not be unique to this area. Targeting non-locals for blame as contributors to the poor state of the local community can be appealing to the voters and may offer temporary politically mileage but it cannot provide a lasting solution to alleviate poverty among the electorate. What it may succeed to do however is to create a feeling of distaste for non-locals and generate conflict.

This is currently developing in the area and people generally feel that the poor small-scale miners labor for many months and years to prospect for the minerals; but they are often violently evicted from the mines by powerful and well connected large-scale prospectors, miners and traders who claim legal ownership of the land as soon as the locals discover mineral deposits. Residents around mining areas complain of human rights violations by the police and the rich and powerful miners. Their complaints include cases of arbitrary arrests, torture, imprisonment, and even murder. These have been reported mainly in Kishushe, Mwachabo, Chungaunga, Kamtonga, Kasigau and throughout the other mining areas.

4.20 Issues Appearing in the Kenyan Print Media regarding ASM in Taita Taveta County

To help put the issue of ASMs in Taita Taveta in context, it was thought necessary to review the relevant matters appearing in the local print media. A number of past news papers were reviewed and emerging concerns were summarized.

- Mining in Taita Taveta County started in 1970 and so far 483 industrial minerals and 197 semi-precious minerals have been discovered.
- The most common issue appearing in the media since the year 2002 is the conflict between miners regarding land and minerals. It is reported in a number of occasions that some large-scale Miners (LSM) carry out mining without seeking consent from locals. Conflicts have been reported at Mkuki mines where at one time (2006) two groups clashed over ownership. In the year 2009, a private miner at Mkuki, Lukas Kitumbi (Chawia Garnet) had his daughter killed and wife injured by thugs and gemstones worthy millions of shillings were stolen. In May 2006 a confrontation erupted at Mngama hills between squatters seeking to encroach on private land of about 28,000 acres. LSM, illegally, being issued with exclusive prospecting license and excluding locals from the vast idle mining fields.
- The other frequent issue that has been appearing on print media is the politics of minerals and mining. Sometime around 2004 the then Voi Member of Parliament led three thousand demonstrators to protest against poor management of ASM and mining issues in general. They wanted the District Commissioner (DC) transferred for failure to address the problems of wealthy investors in the mining industry oppressing locals. Days later, 45 out of 70 ASMs from Chungaunga were arrested while trying to invade Davis Mining and were released without being charged.
- Then around 2008 the former Voi MP Basil Mwakiringo lamented that the government was registering behind doors companies belonging to Kamlesh Pattni and Gideon Moi to mine in Tsavo National Park. He wondered why the government had allowed some companies to prospect and mine in the National Park while denying others.

- In 2009, Mwatate MP Calsit Mwatela blamed the provincial administration and geological department for taking sides and suggested that mine owners issue their workers with budges to help screen out criminals and the government to increase police posts in the mining areas.
- Around 2002 the then Mwatate MP Hon. Madoka wanted to know what the government was doing to regulate prospecting and mining. He felt that Kshs 250M received as royalties from mining activities in 5 years was too little and wanted better monitoring of the industry. Chamber of commerce and industry chairman, Kimuzi Mjomba recommended that a mines office be set up in the area.
- The issue of brutal killings also attracted media attention. In 2009 three gemstone miners were killed and 10 injured. The same year there were more reports of killings some of which were ritual – some miners are reported to rape mentally handicapped women in the hope of getting good luck when they go mining. August 2009 the Chairman of Kenya Chamber of mines – Campbell Bridges was murdered.
- The fact that the area has great wealth but the local people are poor has been a matter of concern to all, the media included. The gemstones form Taita Taveta are the second largest income earner in the county – Kshs.500M earned from the industry for the last 6 years. Gemstone exports accounted for Kshs5B (out of 11billion nationally) compared to gold (Kshs 3.5B) and Kshs7.5B from soda ash. In 2003 the country earned Kshs 8B from the gemstone industry and ASMs contributed about 80% of this. In 2003, 6g of cut and polished gemstone could fetch Kshs. 270,000 while the raw gem would fetch Kshs 15,000. However roads leading to these multi-million mining sites are in a deplorable state and there is lack of clean water. Locals always complain about poor facilities in the area despite the area having vast resources and miners claim that they are being exploited by mine owners. Nine people died due mine related accidents, two buried alive at Mwatate – 1 stepped on an explosive at Kasigau.
- Some local leaders have been calling for sobriety in the area: Edith Lewela (TT SSM cooperative secretary) said the area would lose investors if illegal mining by gangs is not stopped. Some sources claimed that investors from Thailand had shelved plans to invest in the area due to illegal mining.

4.21 Environmental impacts of ASM

Due to the nature of exploration for new mineral resources as mines are exhausted, ASM in Taita Taveta is frequently migratory. It provides labor opportunities for large numbers of men who live in camps associated with the mines. Over time, these camps disappear or may transform into more permanent settlements, depending on the scale of the resource and the duration of mining activity. This pattern of migratory movement compounded with the unstructured and *ad-hoc* mining techniques, commonly used by ASMs, and the large number of artisans involved, have profound impacts on the environment. The following environmental impacts were observed in most of the mining sites visited in the county:

1. Tree cutting and bush clearing: A number of indigenous trees and shrubs are cleared to pave way for the mining sites, building residential shelters as well as damping mine tailings. Such species as the acacia, baobab, etc which take so long to mature are cleared without being replanted. If this trend is not arrested a number of plant species, some of which are rare or endangered, may be lost forever from this ecosystems. Mkuki, Alia and other mines are good examples.
2. Removal of top soil and soil erosion: Any extractive method opens the ground and results in the removal of top soil. In most cases, with artisanal miners, this soil is not returned nor stored for re-use. The trenches dug out, the tunnels and clearing of vegetation, initiate soil erosion. During rainy seasons water runs through these openings washing away the valuable soil nutrients. This may also increase the siltation in rivers nearby. This was observed at Mkuki (Mwatate), Timbo-Mlimani(Taveta), Timbo Kubwa (Taveta)and sand mining along Voi river etc
3. Abandoned pits, tunnels and trenches: Quite often when pits and tunnels are no longer productive or exhausted they are abandoned and never reclaimed nor covered. This poses great danger to both animals and humans. Besides, these openings may create hidings caveats for dangerous animals or criminals. Rain water may also collect in them creating pools of water for mosquitobreeding as well encouraging invasive species to the ecosystem. Surface water may also find its way through these openings and easily penetrate to reach the underground water table thus introducing toxic chemicals and other pollutants. Abandoned pits were observed at Wanjiru Baraka Mining One, at Kichungi mines, Gemkit Mining, Kasigau Mining, among others
4. Health implications due to poor hygiene and lack of sanitation: The large number of artisans that normally invade potential or existing mining sites comes along with the basic human consumption habits and waste disposal problems. The need for sanitary services such as toilets, waste dumping

sites and general litter has an evident impact on the natural environment. Normally there are no toilet facilities hence bushes and thickets are used instead.

5. Hunting for game meat to provide food for mining camps, sometimes comes with very serious impacts on biodiversity as these mines are in close proximity to Tsavo national parks. This is highly likely due to the lack of food in most mining sites as indicated by interviews and observation.
6. Physical disruption of the landscape and creation of physical hazards. The change of landscape affects the natural aesthetics of the area.

Obviously, if ASM is not effectively regulated, then its impact on environment will be unpleasant.

4.22 ASM and Government

It is certain that artisanal mining contributes extensively to the economy of a country. As a source of wealth creation, ASM has led to job creation, abating poverty and in some instances complementing other economic activities such as farming. This ensures that a family has multiple sources of income that when combined are able to sustain their livelihoods.

As discussed earlier, ASM is informal and the activity is termed "illegal" as most of the individuals or groups do not have the necessary permits or licenses which allow them to conduct mining operations. The activity involves the use of rudimentary tools or if mechanized, only to a small degree translating to low production that cannot be equated to the energy input. This then culminates into subsistence commercial gains that only add a small value in the lives of the miners.

In many countries, including Kenya, ASM has not been accorded its due share of seriousness as a result of its informal nature. It is therefore not integrated and thus not among the country's major economic activities. ASM may be marginalized economically compared to the formal mining sector but it is by no means marginal in human and environmental terms (A MINING POLICY FRAMEWORK; Mining and Sustainable Development. 2010). A wide range of challenges can be attributed to ASM, key among them, is the negative impacts of ASM. Environmental degradation, effect on biodiversity, uneconomical mining practices as well as health and safety concerns are some of the issues that paint a bad picture to ASM. Other challenges experienced in ASM are that of legislative, organizational and social nature.

Artisanal mining is less environmentally sustainable when compared to other formal forms of mining. The reason for this is that inadequate economic profits are not generated to compensate for environmental degradation and the depletion of the mineral resources (Artisanal Mining: An Economic Stepping Stone for Women. Beatrice Labonne. 1996)
The government has lost a considerable amount of revenue associated with ASM due to the existence of a black market. This is as a result of government's inability to properly regulate the sector, complicated procedures required in marketing and sales arrangements and high tax rates imposed on the mining activities. This makes the black market the only available alternative. Presence of a black market indicates that a particular country's government is not in control and therefore investors (mostly foreign) are discouraged from investing in such a country. This hinders economic development on a macro level as it only benefits a few players whose agenda is limited in the perspective of public interest.

Sub-economical mining which means extraction is limited to the equipment available, manages to extract the minerals that are accessible leaving those at specific depth, a consequence of artisanal mining. Proper mining practice dictates mining both the low grade and high grade to achieve the cut-off grade as demanded by the prevailing market conditions. This is however not the objective in the mining plan of ASM as the better grade you mine the higher the economic returns. The government's involvement in ASM, through financing, can aid in the acquisition of proper equipment to boost or lobby for economic mining.

Unregulated artisanal mining has led to failure in observing high health and safety standards. Although artisanal miners understand that their activities can affect their health, they still don't know to what degree. Many have developed health complications after being exposed to toxic substances or due to inhaling materials considered harmful to their respiratory system. Accidental injuries are common in ASM and in extreme cases deaths have been reported. Most of the mines are not properly ventilated and stability of the mines is usually in question as the roof supports are usually not adequate. Instability in mines (roof caving) and poor or lack of proper ventilation may lead to deaths in artisanal gemstone mining areas in Taita Taveta County.

Sustainable livelihood can only be achieved if the natural resources at our disposal are effectively managed. It should be clear that mineral resources are non-renewable and therefore once depleted it cannot regenerate. Robust governance is the keystone for sound management of natural resource (Patti et al, 2011). The government should thus be active in ASM activities through support and regulation to ensure that the mineral resources are exploited responsibly.

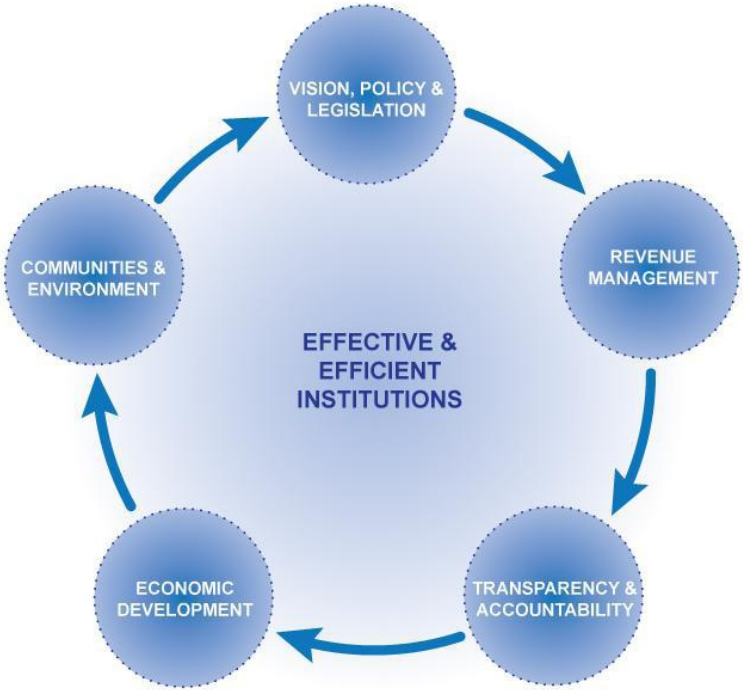
In light of the challenges that face ASM, there is a strong need for the formalization of this mining sector that many, especially the poor depend on to eke their living. Although most governments have been reluctant to act on ASM issues due to other competing priorities, the illegal nature of ASMs or budgetary constraints, this can no longer be ignored.

As a contributor to economic development, the awareness of ASM is on the rise worldwide for when addressed accordingly, artisanal mining has been realized as one of the agents for sustainable development. The following are some of the major international forums that have highlighted the significance of artisanal and small scale mining:

i. Inter-Regional Seminar on the Development of Small-and Medium-Scale Mining held by the United Nations in Harare, Zimbabwe in 1993.
ii. International Round Table on Artisanal Mining organized by World Bank in Washington, 1995.
iii. Global Conference on Small/Medium scale Mining held by National Institute of Small Mines of Calcutta in 1996.

Kenya having enlisted as a member of Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) in 2010 shows that as a government, it is committed to addressing the needs which would enhance the potential contribution of mining to sustainable development.

In order for development in ASM to be realized, the legal and regulatory frameworks not only have to exist, but they also have to take notice of ASM. Among the key governance principles that must consider for effective and efficient ASM management include: revenue management, transparency and accountability, economic development communities and environment, vision, policy and legislation.



Adam Smith International: 5 Principles of Good Governance in the Extractive Industry

5 The Legislative framework on mining in Kenya

The Department of Mines and Geology, under the Ministry of Mining is responsible for exploration and mining of minerals in Kenya. The Department was started on 1st January, 1933 through the Mining Ordinance of 1933 to replace the Tanganyika Territory Code of 1931. The current Mining Act (chapter 306 of the Laws of Kenya) was instituted on 1st October 1940. It was revised in 1972 and 1987. At the helm of the Department was the Commissioner of Mines and Geology whose responsibility is overseeing mining research, policy and implementation of the Mining Act. It had two divisions, the Mining and Geology divisions[5].

According to the Act, all unextracted minerals are the property of the Kenyan government.

Kenya has variety of minerals which are known and most of them are mapped. However, there is great potential for undiscovered deposits which may prove essential to the development of the country. Most of the gold being mined in the country is mostly by artisanal miners in western Kenya. The discovery of significant coal deposits in Mui Basin has attracted huge interest from foreign companies. Rare Earth Oxides (REOs) discovery in the Mrima Hill in Kwale is of

paramount importance as its maiden deposit is the third largest in the world, after Brazil and Canada. The in-ground value of the deposit was placed at US $62.4 Billion. This will be Kenya's largest mineral valuation on project basis. Demand for titanium in the world is soaring due to innovation in the aerospace industry as well as the industrial markets. Kenya through the mineral sands project is expected to account for 14% of the global production of titanium dioxide. The country also holds proven deposits of soda ash, fluorspar, diatomite, gemstones, manganese ore, and iron oxide among others. Currently, mining constitutes 1% of GDP and around 3% of export revenues. An aero-magnetic geophysical survey to determine the country's mineral wealth will be completed in June of 2015. This may pave way for further discoveries of significance that will enhance Kenya's image as a country for mining investment. Kenya can amass great economic gains from its extractive industry and ensure equitable distribution of its wealth for sustainable development.

However, Kenya's minerals remain largely unexploited as the needed development in the mining industry is slow. According to Rop (2010), the Kenyan government recognizes mining as an engine for economic development but there exist policy challenges that need to be addressed to streamline the mining sector.

The mining Act which has been in existence since 1940s has only been revised twice. It is outdated and therefore cannot be applied optimally especially with the current changes in mining exhibited by changing technology and[1] mining techniques. It has for a long time been referred to as a stumbling block to the progression of mining in the country. The industry is thirsty for a law that is clear and straight forward unlike the Mining Act of 1940 which is clouded with ambiguity.

The inappropriateness of the Mining Act of 1940 has caused the country to lose out on potential investment, with investors preferring other countries such as Tanzania or Uganda whose laws are conducive for investors. In Kenya, complicated procedures in acquiring an exploration or a mining right is one of the issues that can be attributed to the Mining Act. Policies on compensation and resettlement of communities under mineral land are not clear. Lack of cohesive policies relating to land reclamation is also a downside of the Mining Act of 1940.

[5]Policy Gaps in Mining and Mineral Sector in Kenya. Pg.3. Brian Mutie, September 27, 2012.

5.1 REFORMS ON THE MINING LAW

It can be noted that with the recent discovery of commercially viable minerals in Kenya, there was need to institute changes in the Mining Act to make it effective by today's standards. As a tool for regulation, the Mining Act must be able to touch on all the aspects of the mining industry and to a sufficient level erase ambiguity. As a guideline, the Mining Act will be responsible for fostering growth not previously possible.

In 2012, the Geology Minerals and Mining Bill Draft was published through the Ministry of Environment and Mineral Resources. The Mining Bill which aims at re-energizing the mining sector advocates for transparent and efficient management. It also aims at providing greater security of tenure and minimizes discretionary powers to the licensing authorities. It intensifies environmental protection by mining entities as represented in the Environmental Management and Coordination Act No.8 of 1999(EMCA). Other features include focus on value addition on the minerals, the changes on royalty rates, reclassification of certain mining rights, sharing of benefits among stakeholders and dispute resolution through the Mining Disputes Resolution Tribunal.

Kenya is also in the process of formulating a National Minerals and Mining Policy. This draft policy aims to provide for a written declaration of the framework of principles and policies that will guide the reform of the mining sector (Promotion of Extractive and Mineral Processing Industries in the EAC – Kenya Status)

The New Mining Bill is at an advanced stage and if passed, will make most of the mining in the country at par with international standards. The Bill, as a tool for development will provide the mode of engagement with the various stakeholders in the mining industry. To encourage accountability and responsibility, a mature modern legislative regime needs to be in place. The mining Bill as a regime item will contribute to good governance of the mineral sector. The development and implementation of the appropriate legal framework lays the groundwork for a booming yet dynamic mineral industry.

The Mining Bill (2014) has been approved by parliament and is currently awaiting presidential assent. Once enacted, the Bill will transform the mineral sector in Kenya into an engine for economic growth as envisioned in Vision 2030. The Bill is consistent with requirements of the Constitution of Kenya 2010.

The new law will provide that the Cabinet Secretary has overall responsibility for the management of Kenya's mineral resources, with day-to-day administration by the Ministry of Mining.

- The new law will provide that in carrying out statutory powers, the Director of Mines will be required to follow advice given by a National Mining Corporation, which would be established under the Bill.
- The new law will require regular reporting by the Director of Mines to the Cabinet Secretary and the Cabinet Secretary to Parliament concerning the implementation of the new law.
- Fixed rules on processing, reviewing and granting mining applications by the National Mining Corporation.
- Full array of powers to enforce provisions of the legislation and conditions of licenses on a transparent and non-discriminatory manner.

The new law will be harmonized with other applicable legislation, particularly the Environmental Coordination and Management Act (1999).

Laws and policies governing mining activities in the country should be neutral. The laws are made for all the participants in the sector and should thus be empowering. Since the laws are meant to govern and regulate both large-scale and ASM, a good Mining Policy should advocate for the stratification of the regulatory regimes that support all the players. ASM being a crucial area must be regulated through formalization.

5.1.1 Mining Permits in the Mining Act Of 1940

Before any mining operation is carried out, the applicable permits or licenses are first and foremost obtained from the Ministry of Mining, through the Mines and Geology Department. Below are the types of rights issued;

1. Mineral exploration

    i. Prospecting Right: any person may apply for a prospecting right which will provide the holder the right to carry out exploration activities in any land.

    ii. Exclusive Prospecting License ("EPL"): persons who hold a prospecting right may apply for an EPL which provides the holder with the exclusive right to prospect in a designated land. An EPL is initially issued for one year and may be renewed at the discretion of the Commissioner of Mines (CS for Mining - in the new Bill). An EPL is not transferable without the consent of the Commissioner.

    EPLs normally relate to prospecting in a large area of land. Alternatively "Mining Locations Licenses" may be obtained for mineral

exploration in a smaller area of land (up to four square kilometres).

2. Mineral exploitation

   i. Mining Lease: a mining lease is issued to a holder of any prospecting right and provides the lessee the right to extract deposits within the land area of the mining lease, including the right to remove and dispose of the minerals as specified in the lease. A mining lease may be granted for a term of five to twenty-one years, and will set out the applicable terms and conditions for such mining.

   ii. Special Mining Lease ("SML"): where the Commissioner is satisfied that there are special costs or other reasons applicable to a particular deposit, the Commissioner may grant a SML to any person. A SML may be grated and be renewed for such a term, and upon such conditions as the Commissioner may think fit.

*5.1.2 Procedures for obtaining a Mining Lease**

A mining lease is a legal entity that bestows the bearer of the lease, the right to mine a particular mineral in a given location for a specific duration of time. It is wise to note that Leases must be registered with the commissioner and transfer is only possible through the Commissioner's written consent.

The steps are as summarized below:

1. Carrying out a mining feasibility study and an approved cadastral survey of the deposit.

2. Preparation of an Environmental Impact Assessment Study ("EIA") in accordance with the requirement of the Environmental Management and Co-ordination Act No. 8 of 1999. This must be approved by the National Environmental Management Authority.
3. The EIA is subject to public comments before such approval;
4. Submitting a formal application for a mining lease (which will include information included in (1) and (2) above, and any compensation agreements payable to landowners) must be published in the Kenyan Gazette and a local newspaper inviting any objections.
5. Registration of the mining lease under the Mining Act and the Registration of Documents Act, and the applicable stamp fees must be paid.
6. Constitution of Kenya states that the Parliament must ratify any right or concession for the exploitation of any natural resource.

The above process typically takes over a year to complete.

5.1.2.1 Taxes

Resident and non-resident corporations in Kenya are liable to pay corporation tax on all income generated within Kenya. Corporation tax rate is currently at 30% (a branch of a foreign company is taxed at 37.5%). A reduced rate of tax applies if a company has been recently listed on the Kenyan Stock Exchange. Capital gains are generally not taxable in Kenya. However, following the Finance Act 2012, the Government introduced a withholding tax on transfer of shares or property in the mining sector. A sale of a mining company will now attract a withholding tax of up to 20% (locals involved in such a transaction will be required to pay a reduced rate of 10%).

5.1.2.2 Royalties

The law provides that royalties are paid for all minerals. The rates of royalties are negotiable within the commonwealth countries' rates. The proposed legislation will specify rates for different classes of minerals.

5.1.3 Legalization and Formalization of ASM

The Mining Laws in most developing countries like Kenya are usually not stratified and therefore not supportive and fitting to small scale and artisanal miners. This may be due to the knowledge that about 80-90% of all ASM are informal i.e. they operate outside the legal framework. As a result of its informal nature, ASM is devoid of data as there are no official figures rendering it hard to control. Data on ASM is not consistent as the mobility aspect in the sector makes the compiled data useless as it becomes outdated before being put to proper use.

Most ASM activities take place in remote areas where infrastructure is lacking or in poor states. Such areas make it difficult for the Mining authorities to access thereby contributing to the illegal nature of mining operations. In Kenya, although no concrete data on ASM exist, there are a number of ASM activities that are legalized. They form a very small percentage about 10-20% of what remains.

In order to formalize ASM within the regulatory framework, the artisanal miners need to have the necessary capacity and also realize that they stand to benefit from the same.

With the increasing awareness of ASM throughout the world, some countries have instituted mandatory policies that are stratified. The Mining Act of 1940 does not cater for the needs of artisanal miners and can be termed as "unstratified".

Formalization of ASM and subsidizing of the same sector, for instance, resulted in the Ghanaian government investing about US$1.4Million.These moneys were used to put up district licensing centres in the mining districts as well as in the construction of regional buying stations where miners could sell their products at the prevailing world prices. Revenues to the tune of US$140Million were collected. Had the government not been committed to the formalization of the ASM sector, such amounts of money would never have been realized. These funds could be used to spur development not only in that sector but also in other sections of the economy (Suttil, 1995).

We need to understand that the first step to grow the ASM is to have the appropriate legal frameworks and therefore perform formalization of the same. The laws in place to be appropriate must not ideally mean that they are perfect but that it constitutes most of the issues that have been unclear in the past Mining Policies. Formalization being the next stage of affairs needs to be encouraged especially among ASM. In many countries, challenges have been encountered during execution of the laws and regulations and a number of factors can be the reason. They include, among others, the following:

1. Disagreements on defining the activities and licensing
2. Inadequate resources on the part of the government to address ASM challenges
3. Unclear roles as specified by the mandates of various regulatory bodies.
4. A negative attitude of ASM as a deterrent to large scale mining
5. A lack of proper understanding of the ASM sector
6. No political will to develop legislation for ASM

Apart from ASM being a source of employment, various governments have recognized its contribution in terms of taxes and foreign exchange. This therefore, has necessitated the governments' prioritization of the sector by instituting regulatory policies that will act as guidelines in order to make ASM vibrant. The methods employed in mining operations in most countries are more or less similar although different countries may be endowed with different

minerals. Most of the Policies therefore differ from country to country depending on the circumstances on the ground, social, political and economic components of each individual country.

The different legislation however finds commonality in the core areas of the framework pertaining to ASM and includes the following:

1. Definition of ASM
2. Renewing of mineral rights and transfer of rights
3. Environmental management and protection
4. Mineral as a property e.g. of government or land owner
5. Clear licensing procedures
6. Health and safety concerns

Different types of licenses are available depending on the jurisdiction and the nature of operation. This is an example of how licensing can be stratified to accommodate the different players in the industry.

Six types of Licenses for ASM were put forth according to Bugnosen (2002) and are as below:

i. Strata Licensing: Rights are provided to a specified depth (e.g. 15 m in Ethiopia, 50 m in Papua New Guinea)

ii. Informal or Undocumented Licenses: Typically granted for non-commercial ASM activities (e.g. industrial mineral extraction for personal housing construction), these licenses seek to assist indigenous groups and landowners.

iii. Group Permitting: Using simplified registration procedures, associations or cooperatives of miners are permitted to mine in specified areas.

iv. Licensing by Mineral Commodity: Licensing requirements vary depending on the mineral being mined. Industrial or building minerals are often classified differently than high unit value commodities (gold, diamonds, and gemstones).

v. Staggered and Single Licenses: Staggered licensing requires separate permits for each stage of mining (e.g. prospecting, exploration, extraction), while single licenses span activities from exploration through to production and marketing

vi. National or Local Government Licenses: There should be some separation of the of licenses to be issued by either national or county governments.

Government commitment, capacity and resources to address the challenges of ASM vary across the continent. Government has a pivotal role to play in defining the policy and legal framework, incentives, and processes which determine if ASM is carried out informally or if it can become more integrated into the mainstream economy. Mining legislation and regulations are often more focused on large-scale mining (LSM) rather than on the needs and potential of ASM, however there are examples of governments addressing this, including the creation of dedicated services to assist ASM operations.

Access and rights to land, including tenure and transferability of ASM mining titles, are critical issues particularly as investment in Africa by LSM companies expands and ASM is excluded from traditional sites when they are transformed into LSM concessions.

Taxation on ASM is often carried out informally and capriciously due to lack of capacity; inadequate systems; lack of knowledge of the legal tax regime; the remoteness of sites; and opportunism by other actors. Thus, the potential return to the state is often lost. County government can have an important role to play in ASM regulation, taxation, assistance and socio-economic improvement.

5.2 Stratification of the Mining Policy

Stratification of the Mining Act enables concentration of effort not only in large scale mining but also in ASM. A number of countries have been instrumental in fostering development in their ASM sector. These countries are among those with a history of mining while others are keen on economic development. Examples of countries that have managed to create differential strata in their codes are as follows:

a. Brazil
   As a country whose population is by and large made up of artisanal miners, Brazil adopted a legislation to stratify mining activity. A special licensing regime that encourages direct exploitation without conducting exploration was created to benefit the ASM sector (Law 7.805 of 1989).

b. Peru
   Initially the Peruvian Mining Code was aimed at promoting large scale mining in the country. However, changes were made to include and protect artisanal and small scale mining. This was made possible on the basis of the production amount and the size of land where minerals occur.

It precisely states that ASM should be limited to less than 25 tonnes in less than 1,000 hectares of land, while small-scale mining must extract and beneficiate between 25 and 350 tonnes daily on 1,000-2,000 hectares (Medina, 2002).

Registration is performed once a simplified environmental impact assessment is carried out - a minimum production volume and evidence of maintaining satisfactory environmental standards are enough to uphold a license.

c. Philippines

ASM makes a significant portion of the mining production segment with mostly gold, gemstones and industrial minerals being mined. Mining is a stratified activity with their laws designated to mine safety, small deposit mining in ASM. Permits that are issued to miners are mineral specific.

Monitoring and regulation of ASM activities is carried out by Small scale Mining offices found in the mining provinces.

d. Ghana

The criteria used to classify ASM was in terms of the size of concession and the duration of the license as defined in the Minerals and Mining Act, 2006 (Act,703) which is according to the size of the prescribed block.

The regularization of the ASM sector since 1989 led to generation of employment.
The government is mandated to ensure that miners get ready market for their products.

5.3 Actors involved in the mining industry.

The mining sector in Taita-Taveta County has been in existence for quite some time. It consists mainly of precious and semi-precious gemstone mining in several areas within the Mozambican Belt and Iron ore mining in Kishushe. Gemstone mining in the county is mostly carried out by artisanal miners who account for a large percentage of gem production from the area by virtue of their numbers. A few small-scale miners (relatively large-scale in this case) are also present in the sector and most of them hold the most productive areas where

good quality gemstones can be found. The gemstone sector has for a long time been shrouded in mystery, with little or no control from the government and cartels that have had a firm grip on the supply chain. Coupled with the fact that the natives have always had superstitious attitude towards wealth from gemstones, gemstone mining has always been a preserve of the few with the means and influence required to survive in the industry.

Traditionally, the small-scale miners who were mostly non-locals, with finance, capital and equipment at their disposal, have been the main players in the sector up until recently when the locals have developed a keen interest in benefiting from their natural resources. This increased interest in the last decade or so has led to more and more people turning to gemstone mining as the main source of livelihood and an ever growing Artisanal and Small-scale mining (ASM) sector in the County. Changing weather patterns have also played a major role as more and more people turn to gemstone mining since they can no longer rely on agriculture as a steady and reliable source of income owing to unpredictable weather.

5.4 Characteristics of Mining groups and the role of government

As mentioned earlier, the ASM sector in Taita-Taveta County has been a mystery and at the mercy of cartels and well connected individuals who have quietly benefited from the enormous wealth that is associated with gemstones. For this reason, very few artisanal miners were involved and only until recently with the opening up of the sector have mining groups and CBOs come up. Mining groups mainly include several individuals who mine under a common consent that is issued to the group. There usually exists a leadership structure which helps to govern the group's day to day operations. Community based organizations (CBOs) have also of late been formed that are involved in gemstone mining.

These organizations are registered with the social services department and are recognized as entities by the government.

Most of the CBOs involved in mining usually consist of individual artisans who also mine under a common consent acquired by the CBO. The CBO also assists the miners in acquiring equipment such as compressors which can come in the form of aid from the county Government and in return the miners part with a percentage of the total revenue from any sales they make which goes to the CBO. These groups and CBOs provide a good platform through which the authorities can reach them and provide financial and technical assistance even though the County Government has been doing little to assist. There was also at some point a small-scale miners co-operative which was started in 2005 (Taita-Taveta small-scale miners co-operative) and acted as an umbrella body for small-scale miners to front the collective agenda. However, the co-operative did not last for long as political influence and internal bickering led to its disintegration.

Co-operative structures have had limited success within ASM in this county as profit-sharing is not popular in the extraction of precious metals and stones. However, where associations are established for legal compliance and to improve access to other resources, they may have greater impact. Interventions which improve product valuation skills and knowledge, marketing skills and access to new markets through technology, ASM bourses, auctions, etc, can also improve ASM as a livelihood.

5.5 Relationship between ASM and LSM

Any given ore body has its own unique mode of formation and occurrence and this will in turn dictate how its extraction will be carried out. The characterization of the ore body (i.e. its location, depth, extent, grade, quality and quantity) plays a big role in determining how the ore body will be mined and as

such, there is a role for all scales of extraction. Artisanal, small-scale and large-scale mining are all appropriate approaches depending on the location, volume and value of the resource. Gemstones as minerals also have their unique mode of formation and occurrence. In most cases, gemstones occur in concentrated forms that are not extensive and as such would warrant very careful extraction techniques to be employed. Artisanal miners have been able to survive in the gemstone mining sector by virtue of the fact that they can easily prospect for a potential reef and dig along it and find whichever stone and in doing so using the most basic of tools. This way, the artisans are able with a minimum of capital investment, albeit with maximum physical effort, to still find gemstones which they can sell at a price that represents sufficient compensation for their effort. Small-scale miners are able to put in some degree of mechanization into the extraction process and at the same time employ several people to carry out the mining operations.

In the Gemstone sector in Taita-Taveta County, these small-scale miners represent the scale at which there is sufficient financial muscle and influence and they are the ones that hold the largest land consents and licenses. Only small areas within these consents are of interest to the miners with most of this land remaining idle yet there may be small but significant deposits of commercial value that could be efficiently exploited by artisanal miners using manual labour. With increased interest and presence of artisanal miners in gemstone mining areas, land is beginning to unfold as a major issue which will have to be addressed if a sustainable gemstone mining sector is to be established in the county. Land conflicts can prove to be a major stumbling block if not resolved and avenues will have to be established to see how best the artisanal and small scale-miners can co-exist so as to ensure gains from the sector contribute significantly to the socio-economic development of the area.

The conflicts arising from land can be solved by small-scale and artisanal miners entering into agreement to share land under consent which is currently idle but has some potential for gemstones. This has been the major source of conflict in the area, together with other factors, and has led mostly to the locals encroaching on consented land which they feel they are entitled to but cannot access it. And since most of the authority governing mineral extraction in the county is vested in the central government, it plays a major role in solving conflicts and land issues as regards to gemstone mining. Land, especially in mining areas, has and will continue to be a delicate matter that requires an all inclusive approach. There has to be the political will from both the County and National government that shows a genuine concern and intention to solve this matter and make it possible for any person willing and able to engage in gemstone mining to do so. This will go a long way in ensuring that all stakeholders in the sector (i.e. the National and County government, Small-scale and Artisanal miners, among others) benefit from this resource.

5.5.1 ASM methods, processing and promotion of value addition

Artisanal and small-scale mining is carried out in many different ways depending on tradition, geology, geography, the nature of the minerals, and available resources. Prospecting and exploration are usually done in the most basic manner and uses a mix of tradition, opportunism, rumors, observation and luck, all these techniques being refined and perfected over a period of time. The main indicator of presence of mineralization is alluvial deposits which the miners first dig up and then follow underground.

Over time, artisanal miners have developed an understanding of the local geological formations in which these gemstones occur and this has acted as their guiding principle in the prospecting and digging operations. Very few if any, mostly small-scale miners with access to geological information, employ the use

of formal prospecting in their mines. Lack of information and therefore a lack of in-depth understanding of the geology of these gemstone mining areas hinder the efficiency of mining as most operations essentially amount to trial and error, wasting a lot of time, effort and resource.

Mining operation of any Ore body can either be underground or surface, and it ranges from manual to mechanized. Gemstone mining also follows this trend, most of it beginning from alluvial deposits on the surface and then advancing underground depending on the mineralization. Alluvial deposits of gemstones were a common occurrence in the early days (60's, 70's, 80's) when the sector was budding with only a few people involved, but with more and more players coming into the picture, it is very rare to find alluvial gemstones these days. Most gem mining is done underground at present with mineralization tending to occur deeper and deeper in the ground as near surface deposits become exhausted.

Mining of these deposits is a tedious undertaking given the effort required to break rock and primarily involves the use of hammers, chisels, shovels and buckets and in some advanced cases drills, compressors, explosives and excavators. Artisanal miners usually apply the most basic of techniques to laboriously dig up box-cuts then tunnels underground as they follow mineralized reefs/zones.

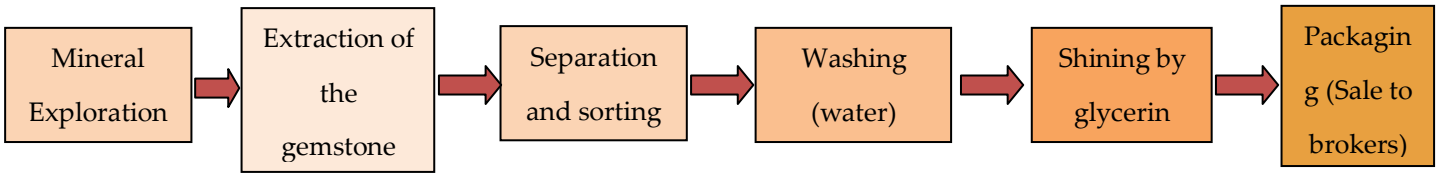
Loose soil normally forms the overburden but this soon turns to hard host rock which requires immense effort to dig through. This is done manually using hammers and chisels, pneumatic rock drills and aided in some cases by prior blasting to loosen the rock. Tunnels dug out in this manner in some instances go more than 50 meters underground, with diameters large enough to allow crawling or crouching as one goes in. Adequate space is, however, provided at the work front to allow for digging and movement of material. Waste rock is

usually removed manually using shovels and buckets or sacks but as the tunnel gets deeper, removing waste becomes a tedious task; with most miners preferring to spread it on the tunnel floor or collecting it in one area.

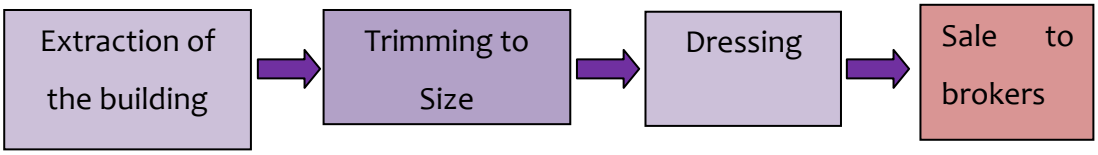
Small-scale miners employ more or less the same method of mining, the only difference being that they are able to employ machinery such as excavators, generators, water pumps etc. This enables them to mine in a relatively more planned and structured manner as compared to artisanal miners owing to more information, better prospecting and a larger pool of resources. In both cases, support of the mined out areas is not of much concern to the miners as they deem the host rock to be competent enough to support itself, though few pay attention to the fact that it is dangerous especially during the rains.

Most of the gemstones once mined, usually do not undergo any form of processing or treatment. They are just separated from the surrounding rock which they are normally associated with and thereafter sold as just raw or uncut stones to brokers who frequent mine sites, or in nearby towns of Mwatate and Voi. However, few brokers or experienced artisanal miners attempt to add value to the gemstones. A simple process may involve: separation (sorting after extracting the gemstone) this is done by hand, washing (using water) and shining (using glycerin).

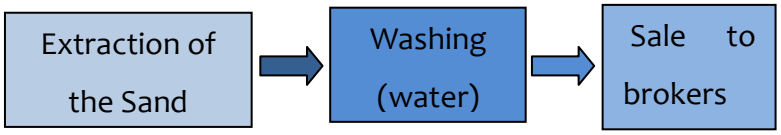
Value chain for gemstones



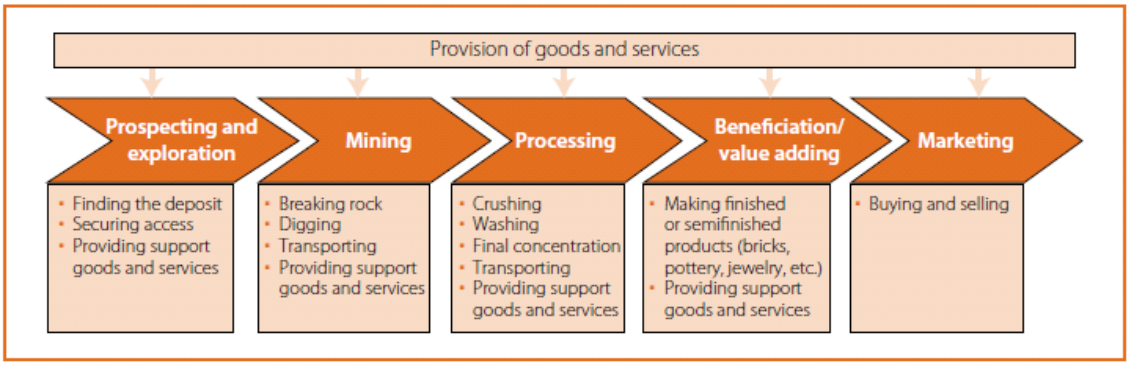
Value chain for Building Stone



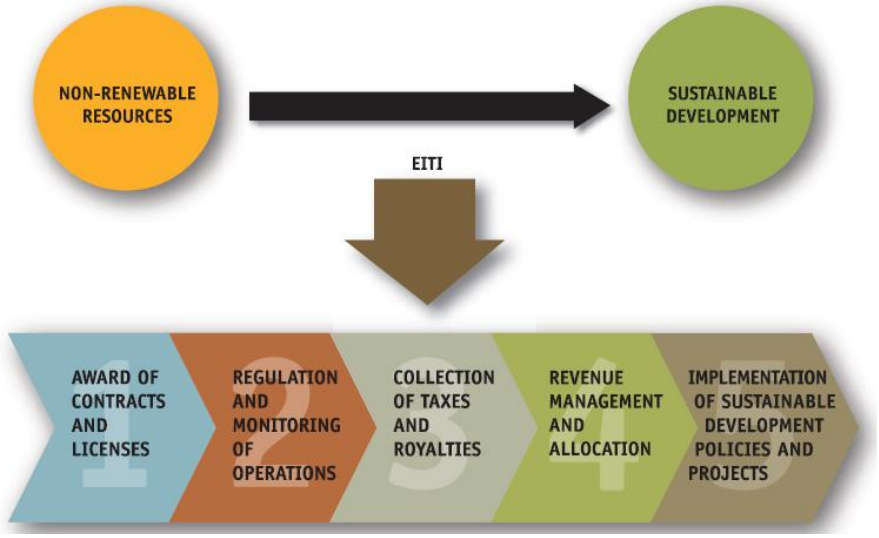
Value chain for Building Sand



Unpacking ASM value chain activities



Value chain in the governance of extractive industries



A few of the artisans access markets in Nairobi and Arusha. The small-scale miners are usually well connected and are able to sell their gemstones directly to the international market. Very minimal processing or value addition in terms of cutting for jewellery is done by either artisanal or small-scale miners for the chief reason that it is very difficult to find a buyer for cut stone which he/she did not make an order for. Essentially, it is easier to sell rough stones to be faceted by the buyers than it is to sell a stone which you cut to your own specifications not knowing what the market demands. This has been the greatest obstacle to any meaningful value addition being done to gemstones before they leave the county and has hence contributed to loss of revenue which would otherwise have remained in the local economy, had value addition been done.

5.6 Occupational health and safety

Mining – both small-scale and large scale, formal and informal – is one of the most occupationally hazardous activities in the world. In addition to injuries and fatalities from accidents, miners experience high rates of cancer, respiratory illnesses and other diseases. (Stephens and Ahern, 2001). The occupational health and safety issues that plague ASM can primarily be attributed to its informal and often illegal nature, lack of financing that leads to inadequate equipment, neglect of safety measures, a frequent lack of expertise and insufficient training. The fact that most ASM activities have remained unregulated by government authorities with no clear guiding legal framework, means that enforcing of laws and basic safety standards is a major challenge. This has in turn lead to negligence and risk-taking on the part of miners for various reasons including ignorance on importance of occupational health and safety, desperation, cost-cutting, lack of access to safety equipment and the finances to acquire such, remoteness of mine sites, lack of inspection and law enforcement and a general lack of accountability. Most occupational hazards in the ASM sector in the county can generally be attributed to ground failure (to a small extent), falls into open pits, equipment or mechanical accidents, noise and vibration, dust and fumes and physical over exertion.

Caving in or ground failure is generally uncommon in the gemstone mines due to the competence of most of the rock within which mining takes place though there have been a few such cases. The injuries include cuts and knock on the hands, fingers, legs, and feet and also splinter into the eyes from the breakage of rocks. This is further compounded by the fact that there are no health centers or clinics near mining sites neither first aid kits in most mines meaning that anyone injured must travel long distances to receive treatment.

The use of pneumatic rock drills is the main source of noise and exposure to vibration in most of the mines. The miners are exposed to high levels of noise and vibration due to their close proximity to drills and the enclosed environment within which they work. Frequent or extended exposure to loud noise can result in hearing impairment. Although ILO (2001) recommends use of ear plugs or muffs at levels above 90dbA, it can be assumed that most of these sources emit sufficiently excessive noise to warrant use of protective gear. Irreversible noise-induced hearing loss can occur once noise levels are sufficient to interfere with spoken communications (WHO, 2002).

Repeated and prolonged exposure to vibration from hand held machinery can produce pain and numbness in the hand and arm. Even exposure as brief as one hour daily can produce harmful effects, including a condition called “vibration

white finger (VWF) that commences with numbness progressing to loss of feeling and potentially gangrene (ILO, 2001). Use of low-vibration equipment, decreased operation times, and employment of a relaxed grip on handles can reduce the harmful effects of vibration (ILO, 2001).

Fine mineral particles, or dust, are generated from drilling and blasting, loading and hauling, crushing and grinding (ILO, 2001). The inhalation of fine mineral particles can result in the accumulation of scar tissue in the lungs. As this occurs, the presence of foreign material in the lungs can result in cancer. Silicosis and pneumoconiosis generated from inhalation of crystalline silica dust emitted from blasting or breaking and crushing rock, are the most frequently reported respiratory effects. Conditions resulting from silicosis include emphysema, lung fibrosis and silica-tuberculosis. This especially, is of great concern in gemstone mines in Taita-Taveta since quartz is quite wide spread in gem-bearing rocks.

Dust emissions in underground mines are often worse than in surface mines. The ILO (2001) recommends that exposure to dust be minimized through use of dust masks, wet drilling methods, and water sprays throughout hauling, loading, crushing and grinding operations. Fumes released from blasting can also result in serious health effects. Harmful gases associated with blasting mainly include carbon monoxide (CO), carbon dioxide (CO_2), nitrogen and sulphur oxides (NO_x, SO_x). ASM involved in gemstone mining normally use explosives, though illegally, and these fumes associated with blasting pose a serious hazard to miners.

The use of explosives also presents a hazard in itself as it is done illegally without regulation by the relevant authorities. Most of the explosives are smuggled to the mine sites where the blasting is done by one person who has over time through experience developed knowledge pertaining to the science. However, handling of explosives is a very sensitive issue as extreme care and caution is demanded when dealing with them. Since they are being used illegally, the pre-requisite logistics are normally not in place for the safe transportation and storage of explosives as is usually required by law. One has to have a permit from the relevant government authority to purchase and transport any explosives and must provide a standardized magazine on site for safe storage of the same. All these requirements are rarely if at all observed in gemstone mining sites and as such they pose a great safety risk due to the manner in which they are being handled.

Most of these health and safety hazards that most miners are exposed to can be mainly attributed to the informal and illegal nature of ASM, lack of basic personal protective equipment such as gloves, safety boots, goggles, helmets,

overalls, dust masks, ear muffs etc. This can be attributed to inadequate finance, ignorance and negligence on the part of miners, poor law enforcement from relevant authorities, and lack of expertise and sufficient training on importance of occupational health and safety.

5.7 Mining life cycle and phases

A formal mining operation normally goes through several phases from its commencement to closure. The first stage is prospecting which involves identification and ascertaining presence of minerals in a given area. This is done by use of either direct or indirect methods in order to determine if or what types of minerals are present. Once it has been established that a particular mineral exists, exploration is then done to define its extent and value. If the deposit is feasible enough to warrant exploitation, development of the mine can then begin to open it up for production. Exploitation then follows once the mine has been opened up and this goes on until the deposit is exhausted. Finally, reclamation of the site is done in order to restore the mine site to its original state or even better.

Most ASM operations in the county are mostly semi-formal or informal and they rarely follow the standard life cycle of a mine. Gemstone miners normally use traditional methods to prospect for and identify deposits and once this has been done, mining immediately follows. Generally, the presence of gemstones near the surface is usually taken as an indicator that more exist underground and this forms the basis of exploitation of the deposit. Most artisanal and small-scale miners do not know the extent of and general characterization of the deposits that they mine and as such their operations are mainly optimism-based, their faith that they will soon hit a jackpot being what keeps them going. This also means that most mines that are not promising are usually abandoned and are therefore not a priority when it comes to reclamation. The informal nature of ASM means that reclamation efforts are scarcely considered and this can be attributed to the fact that authorities in the first place do not follow up or enforce

environmental regulations in these remote sites, miners do not feel the importance or just simply neglect and lastly due to the cost associated with reclamation which miners feel is an unnecessary expense. A few small-scale miners do however pay attention to this aspect of mining and are able to do some reclamation by backfilling abandoned or mined out areas. Otherwise, the lack of reclamation in these mines in the long run present a serious environmental problem which is compounded the longer it goes on unattended to.

5.8 Access to finance and credit

Artisanal miners account for a larger percentage of the populace involved in the extractive industry in Taita Taveta County as compared to those in small scale mining, which in our case is relatively considered to an extent, as large scale mining. It had earlier been mentioned in the report that ASM employs the use of basic tools and in other cases only mechanized to some degree. The report has also detailed the negative impacts of ASM for example: environmental degradation, mining of only high grade ore, health and safety concerns encountered in the day to day mining of both gemstones and other minerals within the Taita Taveta County. These challenges can be attributed to the fact that ASM is a venture that mostly involves the less privileged in the society as a result of their poverty status. Most ASMs indulge in this economic activity to generate income that would be used to improve their living standards. This therefore means that there is no adequate capital to invest comfortably in the mining ventures for promising returns to be realized.

Lack of proper capital base has culminated in ASM lagging behind in terms of sustainable development. There has to be a long-term financing that is efficient from the prospecting and exploration stage right through to the closure and reclamation of the mines. Access to capital is a major stumbling block affecting most of the ASMs in Taita Taveta County as this was highly evident from the fieldwork conducted. Prospecting, exploration and other mining activities for example, demand a lot of input on the part of potential miners. The energy invested are usually rendered useless as lack of proper prospecting, exploration and mining tools coupled with the little or non-existent technical knowledge become a trial and error exercise which in most instances does not amount to any significant gains.

Artisanal mining in the case of TTC is mostly carried out in group ranches which operate on communal basis and therefore no specific individual can lay claim to a piece of land endowed with minerals. Other ASMs are lease holders to sections of land that are either communal (e.g. Tsavolite Mine in Kasigau Ranch), or privately owned by the locals or land owners. In the process of raising funds, ownership status of a given location can be an inhibiting factor as it can discourage investors who tend to look for a stable investment. This means that investors prefer to buy land or if in a partnership co-own the land or simply partner with the owner of the land with minerals.

Literacy levels in most of the ASMs in Taita County is still low as majority of the miners lack the knowledge required to prepare documents such as a business plan which is a must-have for any investor or a financing institution to even entertain the thought of advancing funds or credit to ASM. Other documents required by banking institutions include; a feasibility study report, mining licence, a document detailing repayment plan for the Credit and a proof of a market for the product to be produced. The business plan for example has to reflect the quantity and quality of mineral reserve in question and involves other technicalities of costing and analysis in order to achieve breakeven point. The afore-mentioned would be a jargon to most of the miners although a few are able to prepare such documents which are needed by financiers. Such demands continue to encourage the informal nature of ASM hence minimizing the opportunities of growth that would have emerged had a formal partnership with investors been established.

Since ASM are informal in nature, informal or not so formal partnerships between miners and 'supporters or sponsors' have been adopted in some of the mining sites. This was strongly observed in Mkuki, Kasigau and in Alia gemstone mines. The sponsors or supporters would avail the miners with food, water, mining equipment, contingency money and any other relevant item critical to the process of mineral exploitation. The same can be said of many other gemstone mines found in the other areas of the county. Most of these sponsors are exploitative as they get a large slice of the pie resulting from the sale of the gemstones as they are accorded the rights to sell the gemstone leaving only a small percentage to the actual miner. The benefit-sharing between the miner and the sponsor in most cases is unfair. This will in turn discourage the miner from formalizing the venture.

Accessing finance for ASM has and is still a difficult undertaking. A reason for this can be a lack of understanding of the extractives industry by the financing institutions in Kenya. Commercial banks and Micro-finance institutions had given the mining sector a cold shoulder as the sector had not been awarded the

level of seriousness it deserved may be due to its meagre contribution to the economy in the yester years as compared to farming which usually contributes significantly to the country's GDP; and a common connotation that "agriculture is the country's backbone" has always been used.

The local institutions of finance for advancement of credit have lacked the capacity in the form of extractive industry professionals. Very few, if any, do have the human resource with the proper background to advice these institutions on the attitude and mode of approach towards the mineral resource industry. However, in the coming years, financial institutions will increase the capacity of its human capital as educational institutions continue to offer new courses in the extractives sector pertinent to strategy focus by the finance institutions on the mineral sector.

ASM is migratory in nature i.e. will be at this point today but tomorrow would have moved to a different point or disappear. This nature of mobility does not auger well with the finance institutions as it fortifies a lack of trust and accountability in the sector, not to forget that most are informal. Some of these institutions find it hard to believe that the ASMs are capable of paying back the money borrowed within the specified repayment period without a fuss. Support in the form of loans can be impactful in the Taita Taveta County gemstone mining sector and thus considered a success if the institutions of finance are able to work with established mining groups, associations or co-operatives.

Apart from securing funds in the form of working capital from the financial institutions, it is paramount to note other sources of grants could be sought to support ASM in Taita Taveta County. Some of the alternative sources include, but not limited to, the following:

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1. Loans from buyer: the buyer of the mineral product can be responsible for financing the miner or mine operator. Once the minerals are produced, the buyer can recover his loan.

2. Government support: The government is a great source of support for ASM. Kenya should start designing and implementing key funding programmes in the sector. The support should be at both the national and the county government level.

3. NGOs and International donors: The World Bank and other donors are some of the international bodies that have supported ASM in the various forms spanning equipment support to grant allocations in a number of

African countries. However, the loans issued out sometimes may cost more during the recovery than anticipated.

In Taita Taveta County, it is instrumental to note that the county government had donated compressors, although inadequate because of the high demand exhibited on the part of ASMs. This program was a welcome gesture as most ASMs usually seek financing to purchase equipment. This lessened the financial burden on some of the gemstone miners currently using the compressors in their mining sites.

In most of the mines visited in the county, the issue of inadequate capital was widespread as even those that can relatively be termed as large scale miners also complained of a poor capital base. They therefore expressed their willingness to partner with investors who would provide the much needed capital injection to re-energize their mining activities.

It can be said that any form of funding to ASM aimed at boosting its productivity should have adequate means of monitoring the progress from the implementation of the projects through to disbursement of funds. The disbursed funds must be put to its intended use so as to avoid any misappropriation. Corruption, especially on the management of kitties, should be discouraged if meaningful development is to be realized.

The Mining Bill 2014 should also visualize on strategies for improving ASM's access to credit. One of the agendas should be to provide security to the creditors. The government should also emphasize on ASM access to credit and mainstreaming ASM loans by formal financial institutions.

Some of the strategies that can be employed to enable access to finance by ASMs include:

- Supporting the formation of formal enterprise groups such as miners associations and companies which create an enabling environment for credit advancement.
- Formalizing traditional funding systems by promoting the following: hire-cum purchase system, forward sales and mutual group savings schemes.
- Encouraging financial institutions to formulate affordable credit schemes to the miners as well as establishment of mobile banking systems that may incorporate the use of MPESA or other mobile money transfer systems.
- Promoting the use of third-party guarantees to enable other institutions to assist miners to get loans.
- Arranging mining trust fund to finance simple mining equipment.

- Facilitating the creation of mineral property markets to enable miners to sell their minerals at competitive prices.
- Encourage NGOs to establish miners' co-operative banks and informal financial institutions such as rotating savings and credit associations.
- Encouraging miners to increase their income through value-added activities.
- Conducting awareness-raising programmes to promote savings culture.

5.9 Certification of ASM Minerals

Certification of ASM products in Kenya is still in its infancy therefore there has been little assessment of impact; however lessons can be drawn from other sectors and commodities. Certification may have a role to play but consideration must be given to the need, feasibility, criteria, processes, constituency, value and potential for expansion. Standards for gold and diamonds have already been developed and efforts are underway to establish a mine-to-market system for industrial ASM minerals. However there is little evidence yet of ASM certification generating a premium other than in jewellery where an emotional connection can be made.

5.10 ASM and poverty

ASM and poverty is closely associated and the relationship between the two is quite complex. Majority of the ASMs are driven to mining due to poverty and lack of an alternative source of livelihood. Those who constitute the majority of the ASM community at the level of resource extraction, basic processing and local trading, generally live in poverty, with the gains from these activities representing their main source of income. However, the nature of ASM is such that it is exploitative; it draws people away from other more sustainable activities such as agriculture; it does not produce long-term wealth for these individuals; it creates debt; it uses resources inefficiently; and it is not sustainable. (SSM CFC report, 2008).

In most cases, the informal nature in which ASM is carried out results in poor return on resources and effort invested. Despite this scenario, most miners carry on with operations even though they may go for months on end without any substantial production. This may end up trapping most of them in a vicious cycle of poverty from which it is hard to escape.

On the other hand, ASM presents a great opportunity for miners to eradicate poverty and earn a decent living. This type of mining is usually carried out in remote areas where few opportunities exist for formal employment and as such,

provides an alternative to large numbers of people who are generally uneducated and poor.

5.10.1 ASM can alleviate poverty

ASM is particularly labour intensive and provides employment opportunity and income to a large number of people working in mines and other various areas directly or indirectly associated with mining. The sector in Taita-Taveta County has gained increasing importance as more and more locals turn to mining as their source of income. A significant number of youth work in mines scattered all across the gemstone belt and this is their main, if not only, source of income.

Most miners are uneducated or have low literacy levels and therefore cannot seek formal employment, gemstone mining being the only other viable solution to earn a livelihood. Some of the miners use the income from mining to supplement other income sources mainly from livestock and crop farming. As such, the ASM sector plays a major role in alleviating poverty in Taita-Taveta County ensuring that a significant number of the locals have a source of income, though not reliable, through which they earn a living.

5.10.2 ASM can perpetuate poverty

As with all forms of mining, ASM is a finite activity exploiting a non-renewable resource. As such, the livelihood potential associated with any ASM site is limited to the life of the resource, which is a function of the accessibility, scale and quality of the ore, efficiency of production techniques, the market, the number of miners and the intensity of their labour (SSM CFC report, 2008). ASM can be inefficient in terms of the contribution it can make to livelihoods if it lacks appropriate and adequate technical, financial and market resources. The technical aspects of the mining, which go together with financing, have to be given close attention if any meaningful benefits are to be realized. Efficient mining can only be achieved once the technical elements are taken care of which eventually leads to better production, higher contribution to the local and national economies, and enhanced development in general. Most ASM operations in Taita-Taveta County lack the financial muscle and hence the

technical capacity to ensure a high level of production which guarantees substantial income and consequently poverty reduction.

ASM might compromise the levels of education and skills for employment of young people since most of them are tied down in the mines with virtually no time to attend educational or technical institutions. This in the long run will breed a society with low literacy levels and consequently contribute to poverty.

A common characteristic of ASM is informal operation and the inefficient use of the non-renewable resources (gemstones in this case) with little revenue in terms of taxes and royalty going to the county and national government. This means that a large amount of revenue is lost which would otherwise have been used for social development.

5.11 ASM Supply chains

Trading relationships in ASM can be complex. Often a purchaser also fulfils the role of creditor and may have a degree of control over the workers through remoteness, indebtedness or threat. Alternatively, the purchaser may be the preferred trader based on loyalty and a value-adding relationship. Some interventions seek to remove the middle-men and traders from the ASM supply chain in order to improve the return to the miners; however caution is required as supply chains such as these have evolved to operate within their context and attempting to change them may have unintended negative consequences, may be resisted or the change may by unsustainable. A weakness in ASM is the lack of organization within the sector. Formalization of ASM could improve representation to government and the market; strengthen price bargaining; allow pooling of resources for credit and development; and help to achieve economies of scale.

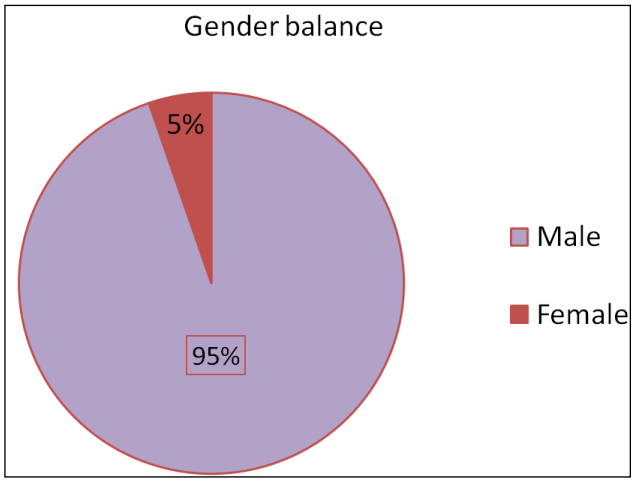
The miners themselves typically receive a very small percentage value of their product but the revenue chain may be long and complex, therefore many people may gain an income from the production, transport, processing and re-selling of the minerals. External perceptions of this chain are often that there are only two broad categories of actors – the exploited impoverished miners and the predatory wealthy traders – but this limited analysis fails to recognize that, often, it is more likely that there are much larger numbers of people all making a small income at various levels, and a handful of top actors making a significant return.

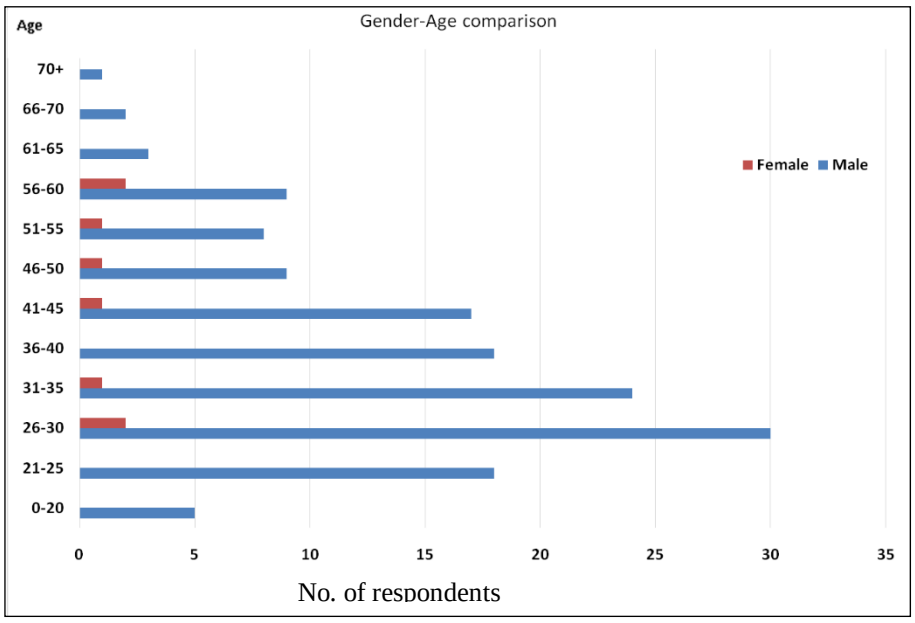
So efforts to improve their income by removing other economic actors from the ASM chain must be considered carefully. Miners may restrict their activity to the physical extraction of the minerals. Those employed as washers and transporters may only work in these activities, not in the mines themselves. If the mine is remote from its market, the presence of traders or their brokers ensures that miners do not leave the mines to travel to their buyers. The opportunity cost of leaving the particular activity sector in which any individual is engaged is a key factor which maintains specific roles and the complexity of the supply chain.

The role of mineral traders and "middle men" or brokers is crucial for the functioning of the chain in many instances. Traders typically provide pre-financing which enables the miners to purchase tools, pay entry fees to mines, and to support their families during periods of transition or when mineral returns are low. Whilst this access to credit is an essential function, it also creates debt relationships, which at their most benign, can result in preferential pricing for the traders, and at worst can result in a debt burden which acts as a trap prohibiting exit from the sector. The debt can even be passed on to the next generation.

5.12 Role of Women and youth in the ASM workforce in TTC

Women constitute 3 to 5 percent of the ASM workforce in Taita Taveta County, fulfilling roles in all aspects of mining, processing, transporting, trading and service provision to the mines. Women are often subject to gender discrimination in terms of access to the resources; ownership and tenure; types of work undertaken; and pay received. They also face elevated risks in terms of health and security and, if they have to bring children to the mines with them, the children too face physical, moral and psychological risks as well as potentially being excluded from education. Women have aptitudes and potential which make them a good focus for interventions to improve ASM livelihoods, with a related positive impact for their children and households.





5.12.1 Gender discrimination in ASM

Women play a major role in artisanal mining than in the LSM sector, and their engagement typically declines as the degree of organization and mechanization increases (WMMF, 2000). Women's roles vary between and within countries and frequently depend on the location (proximity to villages or homes) and mineral being mined (Hinton, Veiga, and Beinhoff, 2003; Lahiri-Dutt, 2007). In addition to working directly in mining, women often work part time at informal mining operations and occupy ancillary roles (e.g., as cooks and service providers). Because women are more frequently associated with transporting and processing

materials, as opposed to digging, they are not always identified as miners (Susapu and Crispin, 2001). Women's involvement is often invisible, because it frequently takes place in the domestic sphere. There thus may be significant discrepancies between the estimated and actual numbers of women involved in ASM (Wasserman, 1999). Furthermore, women typically have intensive domestic responsibilities—typically working four to eight hours more than men per day—which adds to their workload; this is largely unrecognized and undervalued.

Despite women's significant involvement in ASM, men hold the control and ownership of most assets. Evidence overwhelmingly indicates that land (inclusive of mining areas), incomes from mining and other activities, mining and farming tools, homes, crops, and sometimes even children are primarily owned and controlled by men. Similarly, the benefits from these resources also predominantly accrue to men.

Even where men and women perform similar work, women often make less money for similar tasks.

5.12.2 Risks for women and youth in ASM

The different roles men and women play can have different social, environmental, or economic implications- which may have additional dangerous implications for women in particular.

In Taita Taveta County there are reports of crime, domestic violence and incidences of rape. This is in part attributed to the absence of police and lawlessness common in many ASM communities (Kuramoto, 2001). The differences in incomes between exclusively male (who earn approximately Kshs 4,000 a month) and women mainly working as food suppliers (who are paid approximately Kshs 2,000 a month) have prompted many women to supplement

their earnings by providing additional services of a domestic or sexual nature (Heemskerk, 2000).

Women then work an additional five to eight hours more than men in domestic responsibilities (child care, fetching firewood and water, etc.), leaving zero to one hour per day for relaxation or socializing for women compared to four to seven hours for men (Hinton, 2010a).

Women, as the ones primarily responsible for fuel wood collection and for using forests for food and medicine in many ASM areas, may be more affected by changes in the availability of firewood, food, and medicinal plants due to deforestation.

5.12.3 Implications for children

Linkages between gender roles, gender inequalities, and child labor in ASM cannot be overlooked. Child labor is differentiated from child work by its general characterization as work that is "mentally, physically, socially or morally dangerous and harmful to children" including that which interferes with their education. Because of the many hazards and risks associated with ASM, child labor in ASM is characterized by ILO Convention 182 as one of the worst forms of child labor. Given women's substantial domestic work burden and— in many cases—abject poverty, children can begin work at ASM sites early, often accompanying their mothers. Factors such as control over earnings from mining, education status of mothers, and family well-being (in terms of economics, health, etc.) as well as the traditional significance of ASM in a given community all seem to play a role in child labor.

5.12.4 Opportunities for women and youth in ASM - Gender sensitive approaches

To help ensure gender-responsive project design, practical methods and measures are suggested to promote genuine participation of, and benefits to,

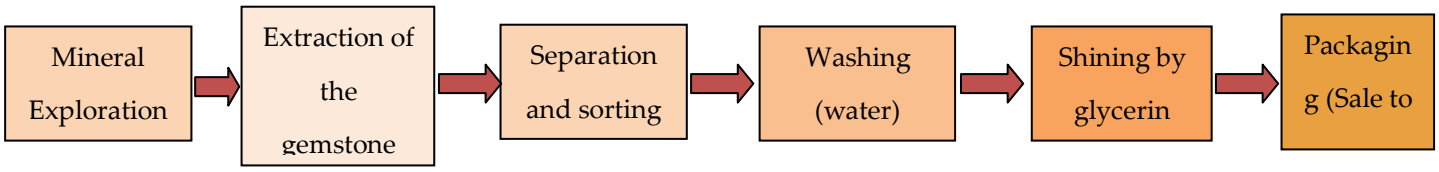
women and men in ASM communities, cognizant of the common and different barriers faced by them.

1. **Policy and legislative reform**
   Formalization and regularization is widely regarded as the cornerstone of ASM's advancement. Considering the overarching need to protect human rights, formalization is the process of integrating rather than controlling informal enterprises by recognizing local arrangements in legislation, reducing barriers to legalization, and creating clear benefits from participation in the formal system (Hinton, 2009).
2. **Relationship building and coordination arrangements**
   Identifying complementary priorities and mandates of key institutions and organizations, build understanding of both ASM and gender within specific country and community contexts, thus creating inter-sectoral dialogue to address the multidisciplinary challenges often facing ASM communities.
   - Improve linkages among mining authorities and key local government officers mandated to respond to specific challenges
   - Increase coordination among key agencies and institutions
   - Strengthen relationships between large mining companies and communities and improve outcomes from corporate social responsibility efforts
   - Facilitate relationship building between local authorities and organizations from multiple sectors and women and men miners on the ground.

5.12.5 *Women and youth in ASM associations-value chain analysis*

Identifying challenges faced by women and youth at various links in the value chain requires detailed examination of each step of the value chain shown below. Here we have used women to denote also youth.

Gemstone value chain



Assessment of gender related challenges in the value chain (women denotes both youth and women)

No.	GEMSTONES PROSPECTING AND EXPLORATION		
1	**Roles and Responsibilities**	**Access and Control**	**Impact and Benefits**
	Finding Minerals • Women lack geological knowledge • Women cannot make independent decisions without consulting spouses • Women have no control of land and no access to financial resources • Cultural believes hindering their full participation in exploration • Exploration involves entering unchartered territory & the fear for unknown and the insecurity and risks involved are greater with women	**Decisions about mineral deposits** • Since few or no women are involved in prospecting they are not involved in negotiations after the discovery of deposits hence lack control and ownership • Women lack ownership of land and hence access and benefit sharing thereof • Obtaining formal licenses and financial support for women is difficult	**Effects of these conditions** • Due to their domestic responsibilities women have less freedom of movement and since prospecting requires movement from site to site or from home to site they are disadvantaged • Women involved in mining in Taita Taveta County are perceived as being of loose morals. This social stigma has discouraged many women from active participation in exploration

2	MINING-EXTRACTION OF THE GEMSTONE		
	Extracting and Hauling • Mining pits control are dominated by men • Due to physical strength, skills and superstitions its mainly men who do the actual mining • At this stage women may be involved in clearing mining waste and tailings for this reason they get a smaller share of the benefits	**Decisions about Extraction** • Since women do not control the pits they have less power on the decisions made and benefits shared	**Effects of this decisions** • Mining often involves clearing trees and bushes. This affects the local supply of firewood and herbal medicine which directly affects women who fetch firewood for domestic use • The increased number of new comers (mostly men) and with new capital often affects the moral fabric of the society and the most affected are women. This affects family setups and women bear the brunt of family breakdown
3	**PROCESSING - SEPARATION AND SORTING**		
	Processing and adding value • Women are mostly involved in sorting and separating gemstones while men enter the pits • This is normally done in groups meaning the benefits thereof are distributed accordingly.	**Decisions about sorting** • This stage of the value chain is controlled by mine owners who are commonly men • The work of sorting and separating is seen as easy, repetitive and not for strong men	**Effects of these decisions** • Sorting involves sitting in one position for long which may affect the back after many years of practice with advancing age • Sorting gemstones in the open sunshine may also affect eye sight after a long time of exposure • This may also expose women to dust associated with drying minerals • Sorting is commonly

			done with bare unprotected hands which may corrode them and expose them to physical harm
4	**WATER-WASHING AND SHINING (GLYCERIN)**		
	Processing and adding value • Women are mostly involved in washing of gemstones with a few men • This is normally done in groups meaning the benefits thereof are distributed accordingly.	**Decisions about washing** • This stage of the value chain is also controlled by mine owners who are commonly men • Washing is also perceived as being easy work and may not attract substantial benefits	**Effects of these decisions** • Washing is often done using dirty & contaminated water with possible negative health consequences • Women trek long distances fetching the water • The demand for large volumes of water competes with domestic needs and may result in conflicts
5	**GOODS AND SERVICES**		
	Goods and services • Women are mostly involved in provision of food, water and other drinks • Women also supply basic glossaries e.g. soap, cigarettes, etc • Men provide equipments such as mining chisels, harmers etc	**Decisions about goods and services** • The decision on who is allowed to provide services on site is made by mine owners(mostly men) • Supplies are normally transported to site by Bodabodas (motor bikes) operated by men	**Effects of these decisions** • Since women require the consent of men to operate they may be compelled to offer sexual services to get favor • These services often require energy in form of fire wood which is supplied from the environment resulting in deforestation
6	**PACKAGING, MARKETING AND SALES**		
	Buying and selling minerals • Selling of gemstones	**Decisions about buying and selling** • Men have the	**Effects of these decisions** • Poor exposure of

	is done by mine owners-predominantly men who get the lion's share of the benefits • Gemstones are not bulky so they do not demand much labor in packaging. In few occasions like packing tourmaline few women are used	networks for selling gemstones. They have links to brokers (who are predominantly men) • At this stage the stakes are high so very few women may be involved	ASMs (especially the few women who may be involved) makes them disadvantaged during negotiations. • The high value of the gemstones exposes owners to security risks. Need for protection is critical and the risk is even greater for women

5.13 Designing ASM interventions

In finding solutions to ASM it is essential to recognize that there is not just one single correct approach, but rather a wide range of interventions which can suit different situations. The starting point for any intervention is to decide if the objective is to strengthen ASM's potential as a livelihood; or to finds ways to assist ASM workers in a process of transition to alternatives; or both. Whichever route is chosen, both require appropriate legislation which is disseminated and enforced to achieve their goal.

Strengthening ASM as a livelihood can include improving organisation; access to finance and resources; skills and business development; improved technologies; and assisting access to markets. It is essential to understand the context, the community, the constraints, and to create linkages to other initiatives that can contribute to the enabling environment, success and sustainability of the project. The Common Fund for Commodities' (CFC, 2008) emphasis on interventions based on commodities, markets, economic viability, improved processes and technology has much to contribute to ASM policy and practice in relation to improving its livelihood potential.

ASM is an inherently unsustainable activity as it involves the extraction of non-renewable resources. Therefore, even if ASM plays an important role in contributing to livelihoods in Africa today, this potential will eventually reduce over time as resources become increasingly scarce and increased mechanisation is required to access deeper and lower grade minerals. Transition to alternative livelihoods may be difficult, however, as these alternatives have to provide an

attractive and competitive income; transition takes time with no guarantees of success.

ASM workers often lack skills outside of ASM; and miners may be indebted or even addicted to ASM.LSM can create economic opportunities for ASM communities through sub-contracting or purchasing; creation of employment; stimulating supplier businesses; and by supporting transition to alternatives. The CFC's experience in income diversification and generation of markets can bring great value to ASM transition efforts in TTC.

Comprehensive recommendations have been made in many ASM reports from a wide variety of sources. There is much agreement on what needs to be done and many examples and lessons learned which can inform and refine the recommendations. However, the challenge lies in having enough of the right actors, working within their area of competence, in co-ordination with all others and at a sufficient scale, to have an impact.

5.14 Contribution of ASM to Sustainable Economic Development

Gemstone mining: a foreign income earner - Annual income 2014

No.	COMPANY	MINERAL	QUANTITY (GRMs)	VALUE (KSH)	ROYALTY PAID (kshs)	% of Value	DESTINATION
1	**Adson Industries Ltd**	Sapphire, tourmaline, ruby	103,000.0	139,600.0	5,190.0	**0.1**	Thailand
2	**Annie Wambui Gatonye**	Tourmaline, ruby, garnet, citrene	794,003.5	6,785,033.8	189,710.0	**5.9**	Hong Kong, Thailand, USA
3	**Awan Kenya Limited**	tourmaline	1,316,000.0	7,178,975.0	358,324.0	**6.2**	Hong Kong
4	**Blackstone mining group limited**	Tourmaline	75,000.0	343,200.0	20,143.0	**0.3**	Hong Kong
5	**Brayogo Safaris**	Tsavorite, idocrase, garnet,	311,010.0	552,345.0	27,285.0	**0.5**	USA
6	**Bridges Exploration Ltd**	Tsavorite	11.6	2,619,615.4	26,197.0	**2.3**	USA
7	**Charming Gems LTD**	Green garnet, tourmaline, ruby, tsavorite	461,361.0	9,557,699.0	475,446.0	**8.2**	India
8	**Daniel Agencies**	Tourmaline,	325,050.0	1,756,736.0	87,922.0	**1.5**	USA, Hong Kong
9	**Dataweb Enterprises Ltd**	tourmaline	88,000.0	531,860.0	26,558.0	**0.5**	Hong Kong
10	**Dorse Gems Intenational LTD**	tourmaline	156,000.0	710,700.0	35,415.0	**0.6**	Hong Kong
11	**E. A. Ruff & Kut Ltd**	Tourmaline,ruby, sapphire,	812,460.0	557,505.8	24,470.0	**0.5**	Thailand, Hong Kong
12	**East African Gem Traders**	Idocrase, sapphire, zoisite, ruby, garnet, sunstone, tourmaline	533.0	2,429,604.0	121,480.0	**2.1**	USA
13	**Geo-Exploration Company**	sapphire	5,000.0	1,000.0	50.0	**0.0**	Thailand
14	**Gilgal Investment LTD**	Tourmaline	389,000.0	2,281,160.0	115,866.0	**2.0**	Hong Kong
15	**Grace Wambui Kimotho**	Tourmaline	2,015,000.0	9,817,530.0	490,611.0	**8.5**	Hong Kong
16	**J Mbutu Gem**	Amethyst, blue zoisite, moonstone, opal, garnet, ruby, zircon, apatite, mordvite, opal, tourmaline	1,557,402.7	3,648,186.0	212,665.0	**3.1**	Srilanka, Jordan, Thailand, Hong Kong, China, India, U.A.E.
17	**John Kimani Njuguna**		398.0	-	-	**-**	UAE

18	**Joyce M Mwangi**	Sapphire, ruby, tourmaline,	448,600.0	2,167,270.0	105,497.0	**1.9**	Thailand, Hong Kong
19	**Kalptaru Gems Ltd**	Tourmaline, tsavorite, garnet,sapphire, apetite	122,100.0	1,164,500.0	61,000.0	**1.0**	Hong Kong, India,
20	**Kikisa Ltd**	Zoisite, ruby, aquamarine,Rub y, aquamarine, zoisite, amethyst, sapphire, garnet	1,058.0	453,650.0	15,974.5	**0.4**	Thailand
21	**Kitmin holdings ltd**	Amethyst, opal, agate	38,000,000.0	4,396,480.0	216,060.0	**3.8**	India
22	**Lapigems**	Zoisite, tsavorite, spessartitie, aquamarine	638.0	22,306,423.4	848,860.6	**19.3**	JAPAN,UK, USA, Singapore, Australia, Canada, Switzerland, Germany, South Africa, Malaysia
23	**Liketh Investment Ltd**	Rock samples	12,000.0	-	-	**-**	South Africa
24	**M & M Gems**	Tourmaline, ruby, hezonite, spinel , garnet, tsavorite	184,340.0	309,606.0	23,250.0	**0.3**	India
25	**Marvin Mutiso Wambua**	Garnet, tourmaline , grossular	7.9	24,937.5	240.0	**0.0**	South Africa
26	**Mary Akinyi**	Rhodolite, idocrase, sapphire, Chrysocolla, peridot	1,560,265.0	1,614,163.4	80,626.5	**1.4**	India, Thailand
27	**Mbaka Gems**	Tourmaline, tsavorite, garnet, ruby	394,100.0	7,374,520.0	328,433.0	**6.4**	Thailand, Hong Kong
28	**Milestone Gemstones (K) Ltd**	ruby	17,050.0	68,000.0	3,400.0	**0.1**	
29	**Mimo Gem Traders LTD**	Opal, garnet, tourmaline, ruby,	486,813.0	539,688.8	26,951.0	**0.5**	
30	**Napass Gems LTD**	Tourmaline, prenite,rhodolit e, ruby, sapphire, iolite,	1,815,162.3	3,435,261.7	165,969.3	**3.0**	Thailand, Hong Kong Switzerland, Srilanka

		idocrase, chrysophrase					
31	**Prestige Stone Kenya Ltd**	tourmaline	1,000.0	1,720.0	90.0	**0.0**	Switzerland
32	**Prolits Enterprise LTD**	Tourmaline, zircon, sapphire, ruby, rhodolite	1,857,500.0	6,383,557.5	303,726.5	**5.5**	Thailand, Hong Kong
33	**Saar Impex**	Zoisite, opal, green garnet, corundum, tourmaline, aquamarine, red garnet, emerald	12,786,680.0	6,336,182.0	189,500.0	**5.5**	India
34	**Samruddha Resources (K) Ltd**		10,000.0	-	-	**-**	India
35	**Shri Hari Enterprises**	Idocrase, ruby, zoisite, chrysophrase, garnet, opal, tourmaline	1,047,584.0	5,215,120.2	259,204.0	**4.5**	India
36	**Spring gems**	Diopside, apatite, garnet, rhodolite, morganite, pyrite, sapphire, spessartite, spinel zoisite	173,188.0	600,431.0	37,998.0	**0.5**	USA, Thailand
37	**Swastik Kenya gems**	Sapphire, ruby, hessonite, apatite, tourmaline	217,495.0	4,072,102.8	223,800.5	**3.5**	Thailand, Hong Kong
38	**Wamwa trading company ltd**	Sapphire, ruby	75,000.0	170,000.0	8,500.0	**0.1**	Thailand, Hong Kong
39	**Wazaire Gems**	Tourmaline, idocrase, blue zoisite, amethyst, garnet	1,069,720.0	306,909.0	9,073.0	**0.3**	Pakistan, Thailand, India
	Total		**68,689,531.0**	**115,851,273.2**	**5,125,485.8**	**100.0**	

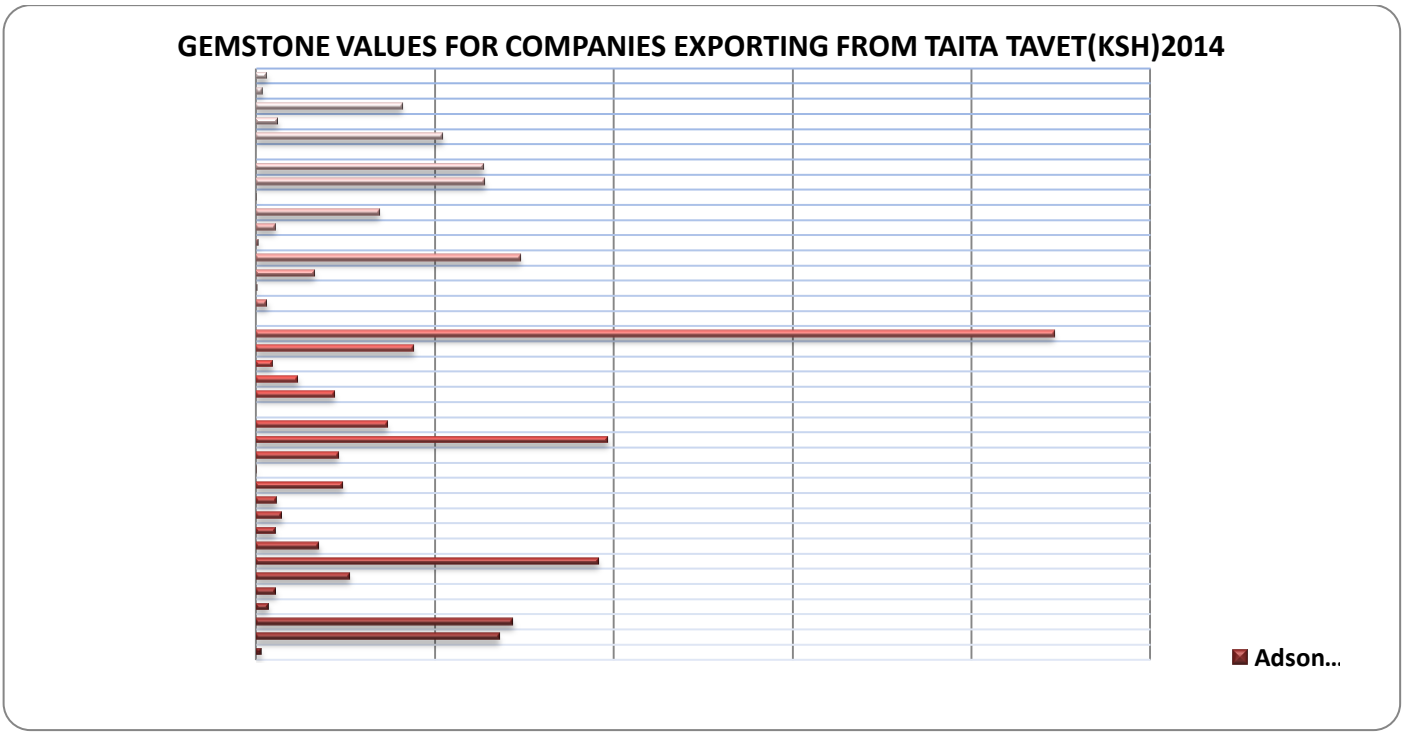
From the mineral export data acquired from the Ministry of Mining, the gemstones from Taita Taveta County significantly contribute to Kenya's foreign income earned from minerals - about 25%. Most of these gemstones are mined by ASMs. It was however not possible to establish how much of the foreign income earned directly reaches Taita Taveta county and hence it was difficult to assess its

local impacts. The royalties paid by the exporting companies are noticeably small compared to the earnings as per the data below.

Various companies are engaged in gemstone mining in the county and their earnings can be established from the mineral export data of 2014 as shown in the table and bar chart below:

Taita Taveta County Gemstone Companies' 2014 Exports data (Ministry of Mining, 2014)

Source: Ministry of Mining 2014

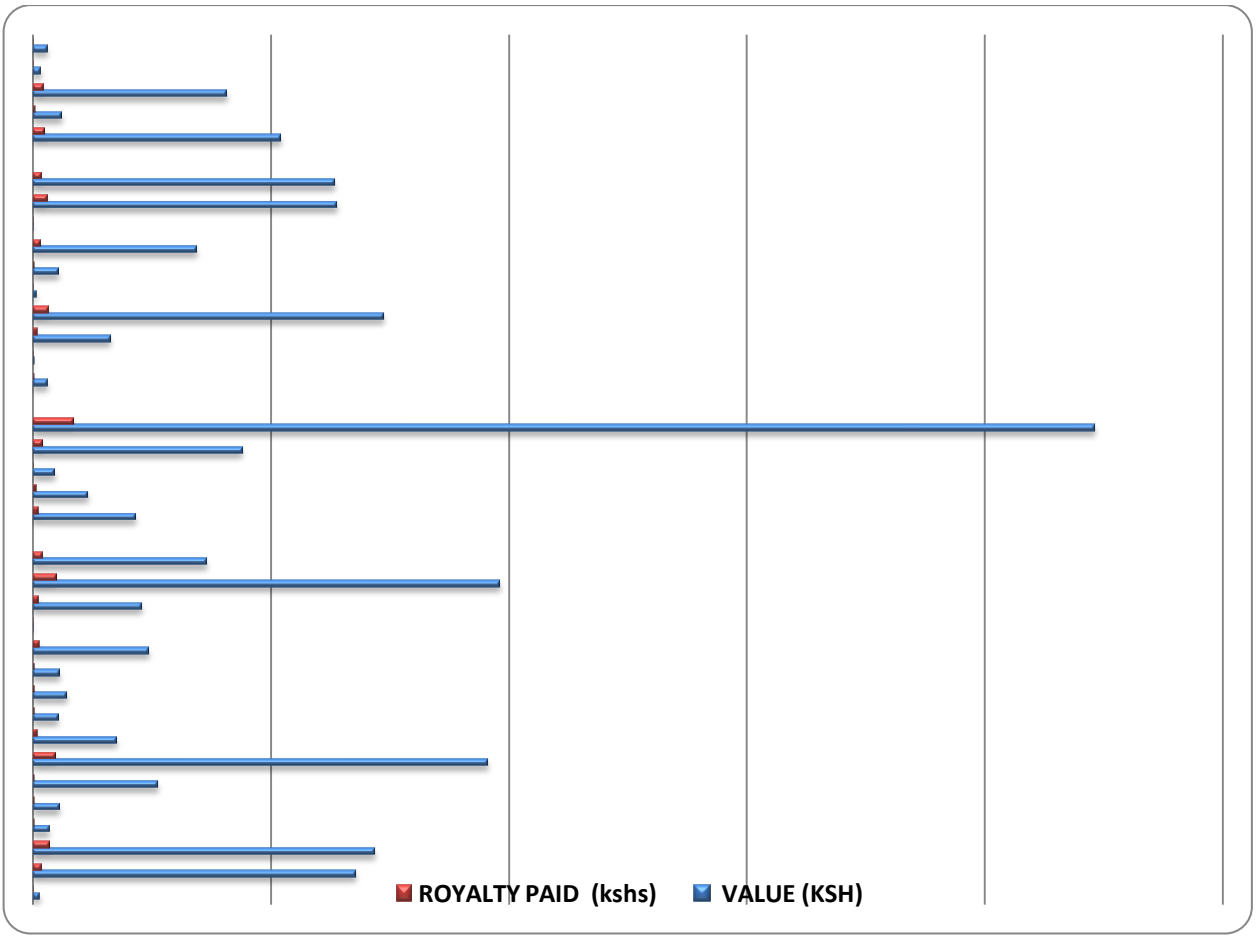


Source: Ministry of Mining 2014

Note: There appears to be big disparities between the number of Companies captured in mineral export data and those registered and actually engaging in mining

There is a staggering variation between the numbers of companies captured in the mineral export data and that of the known number of companies actually engaged in mining. The number of known and registered companies (as reported by the county government) is more than 512 but only 40 have reported export earnings.

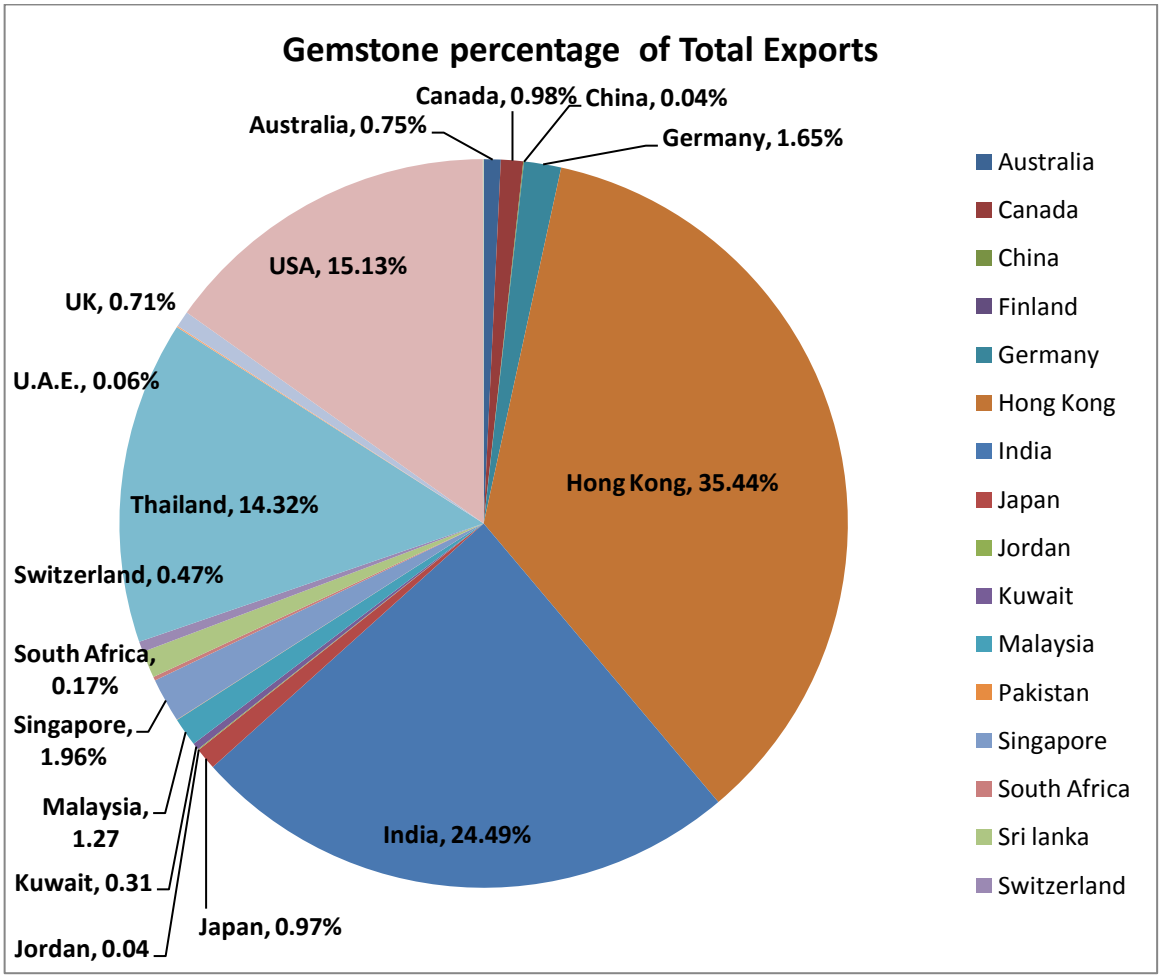
Taita Taveta County Gemstone Companies' 2014 Exports earnings and loyalties paid



Source: Ministry of Mining 2014

5.14.1 *Gemstone Export Destinations and Market share 2014*

It is worth noting that most of the gemstones are exported to Asia with Hong-Kong leading followed by India and Thailand (see pie chart below). This data shows that there is little gemstone trading with Europe. The reason for this needs to be established and strategies developed to open this market.



Source: Ministry of Mining 2014

Export destinations and values from each destination (Kshs)

No.	Importing Country	Minerals	Value(Kshs)	Percentage of Total Exports
1	**Hong Kong**	Tourmaline, Garnet Red, Pyrope Garnet, Idocrase, Tsavorite, Ruby, Rhodollite, Almitate, saphire, Blue Zoisite, Hessonite, Apatite, Rose Quartz, Rose Garnet, Sapphire	**41,058,631.0**	**35.44**

2	**India**	Color change, Corundum,Aquamarine,Idocrase,Zoisite,Chrysophrase,Idocrase,Spessartite,citrene	**28,377,880.7**	**24.49**
3	**USA**	Garnet Red, ruby, saphire, Tsavorite,Tourmaline, Sapphire, Spessartite, Rhodolite, Zoisite, Idocrase, Peridot, Blue Zoisite, Colour change garnet, Aquamarine, Grossular, Danburite, Moonstone garnet, Opal, Red Garnet,Rhodollite,Spesssartite, Tremolite, Zircon,Apatite,Morganite ,Pyrite	**17,535,341.0**	**15.13**
4	**Thailand**	sapphire, tourmaline, ruby,Tsavorite,Red Garnet,Volcanic Glass,Rhodollite,Blue,Prenite,iolite, Zoisite,Moonstone,amethyst,opal,citrene,Mordvite,Zircon,Apatite,Idocrase,Aquamarine,feldsper,red, garnet,Vessuvianite,Chrysophrase,Peridot,Zircon,Colour change, Sandstone garnet	**16,595,068.1**	**14.32**
5	**Singapore**	Blue Zoisite, Tsavorite	**2,274,070.0**	**1.96**
6	**Germany**	Blue Zoisite	**1,906,800.0**	**1.65**
7	**Malaysia**	Emerald,Blue Zoisite,Tsavorite	**1,466,519.8**	**1.27**
8	**Sri lanka**	Tourmaline,Sapphire,Rhodollite,Blue Zoisite,ruby,Change Colour Garnet,iolite,Spinel,florite	**1,376,388.2**	**1.19**
9	**Canada**	Blue Zoisite,	**1,138,810.9**	**0.98**
10	**Japan**	Blue Zoisite	**1,122,042.0**	**0.97**
11	**Australia**	Blue Zoisite,Spesssartite,Tsavorite,Zoisite	**872,854.0**	**0.75**
12	**UK**	Blue Zoisite,Colour change garnet	**825,763.0**	**0.71**
13	**Switzerland**	Blue Zoisite,sapphire,tourmaline	**544,748.0**	**0.47**
14	**Kuwait**	Blue Zoisite	**353,460.0**	**0.31**
15	**South Africa**	Blue Zoisite,Rock samples,Garnet Red,Quartz ,Tourmaline,Grossular	**195,562.5**	**0.17**
16	**U.A.E.**	Emerald,ruby %	**70,000.0**	**0.06**
17	**Jordan**	Saphire,Red Garnet,Ruby	**49,880.0**	**0.04**
18	**China**	Amazonite, ruby, Amazonite	**41,625.0**	**0.04**
19	**Other**	Ruby, Tourmaline, garnet glossular, Tsavorite,quartz	**39,200.0**	**0.03**
20	**Pakistan**	Emerald, aquamarine, Topaz, Tourmaline, Sapphire	**19,629.0**	**0.02**
21	**Finland**	Tourmaline		**0.00**
	Total		**115,864,273.1**	**100.0**

Source: Ministry of Mining 2014

5.14.2 Quantities and Values of various Gemstones exported - 2014

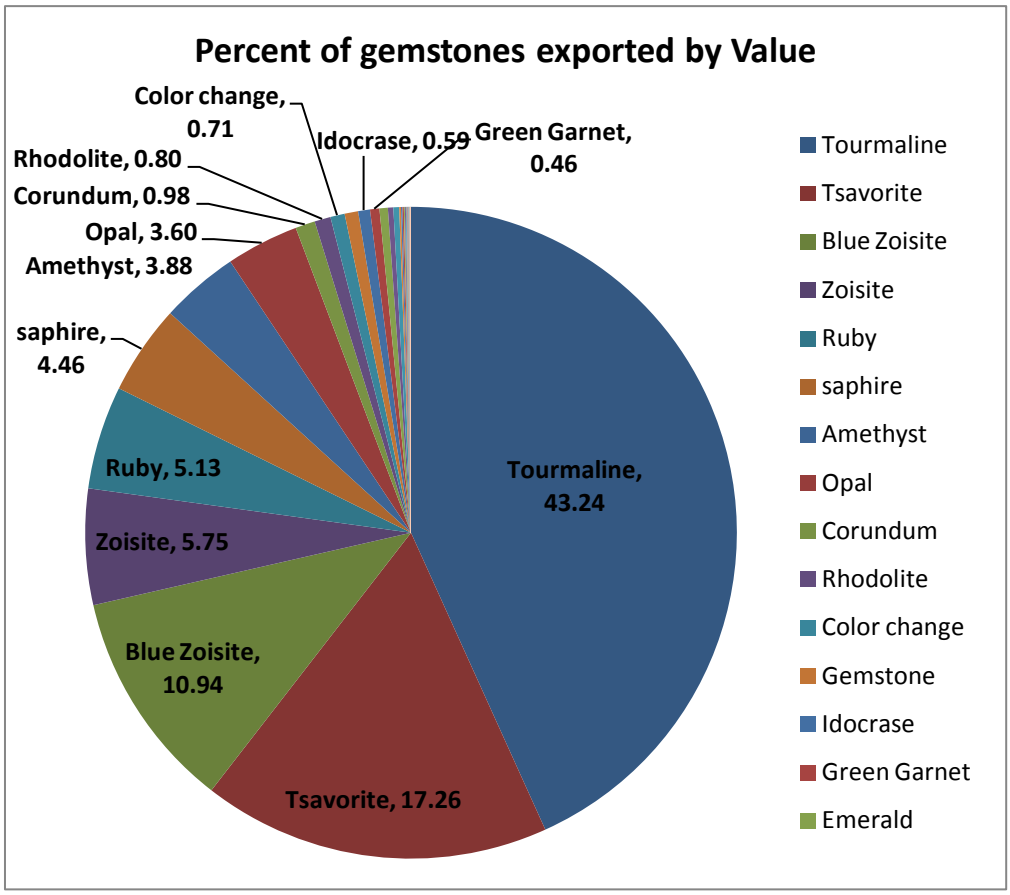
Contrary to popular belief, the high value minerals such as Ruby or Green garnet, are not the highest earners from exports. The most valuable foreign income earner is Tourmaline at 43.24% followed by Tsavorite at 17.2% and Blue Zoisite at 10.94%

Quantities and Values of various Gemstones exported from Taita Taveta County 2014

No.	Mineral	Quantity(GMS)	Value(Kshs)	Per% of total Value
1	**Tourmaline**	8,578,725.1	49,973,846.9	**43.24%**
2	**Tsavorite**	454,991.6	19,947,809.4	**17.26%**
3	**Blue Zoisite**	82.6	12,640,105.7	**10.94**
4	**Zoisite**	1,659,715.8	6,643,739.9	**5.75%**
5	**Ruby**	1,667,634.5	5,924,965.5	**5.13%**
6	**Sapphire**	6,707,903.0	5,153,141.8	**4.46%**
7	**Amethyst**	38,017,018.0	4,485,860.0	**3.88%**
8	**Opal**	2,801,823.0	4,161,759.2	**3.60%**
9	**Corundum**	4,384,000.0	1,131,770.0	**0.98%**
10	**Rhodolite**	1,159,908.0	921,744.0	**0.80%**
11	**Color change**	10,968.2	820,852.0	**0.71%**
12	**Gemstone**	342,465.0	777,880.5	**0.67%**
13	**Idocrase**	874,504.5	677,168.7	**0.59%**
14	**Green Garnet**	262,201.2	535,142.0	**0.46%**
15	**Emerald**	1,409.2	478,010.0	**0.41%**
16	**Peridot**	249.5	310,275.0	**0.27%**
17	**Red garnet**	1,083,756.9	332,873.2	**0.29%**
18	**Citrene**	940.0	100,860.0	**0.09%**
19	**Spinel**	105,719.6	84,530.8	**0.07%**
20	**Zircon**	17,353.0	77,866.0	**0.07%**
21	**Aquamarine**	54,956.7	57,589.5	**0.05%**
22	**Spessartite**	3,655.9	56,439.4	**0.05%**
23	**Feldspar**	208,000.0	46,895.0	**0.04%**
24	**Moonstone**	1,840.0	28,680.0	**0.02%**
25	**Apatite**	17,852.0	22,862.0	**0.02%**
26	**Vessuvianite**	50,050.0	22,826.5	**0.02%**
27	**Hassonite**	21,863.0	20,601.4	**0.02%**

28	**Amazonite**	35,980.0	20,125.0	**0.02%**
29	**Danburite**	175.0	18,375.0	**0.02%**
30	**Scapolite**	152.0	17,480.0	**0.02%**
31	**Pyrope Garnet**	800.0	13,840.0	**0.01%**
32	**Axinite**	920.0	11,960.0	**0.01%**
33	**Iolite**	10,697.8	10,314.5	**0.01%**
34	**Prenite**	7,500.0	8,600.0	**0.01%**
35	**Quartz**	912.0	8,112.5	**0.01%**
36	**Volcanic Glass**	39000	6,864.0	**0.01%**
37	**Chrysophrase**	12,825.0	6,213.0	**0.01%**
38	**samples**	500.0	6,080.8	**0.01%**
39	**Rose Garnet**	7,010.0	6,072.0	**0.01%**
40	**Pyrite**	3,700.0	3,145.0	**0.00%**
41	**Almitate**	1,000.0	2,924.0	**0.00%**
42	**Sandstone**	51,000.0	2,200.0	**0.00%**
43	**Topaz**	1,900.0	1,900.0	**0.00%**
44	**Morganite**	888.0	1,376.0	**0.00%**
45	**Mordvite**	710.0	1,032.0	**0.00%**
46	**Rose Quartz**	870.0	754.0	**0.00%**
47	**Rutile**	1,000.0	350.0	**0.00%**
48	**florite**	7.0	173.0	**0.00%**
49	**Rock samples**	22,398.0	-	**0.00%**
	Total	**68,689,531.0**	**115,583,985.1**	**100.00%**

Source: Ministry of Mining 2014



Source: Ministry of Mining 2014

Assessment of current contribution of artisanal mining to household income in Taita Taveta County

Overall, the contribution of artisanal mining to household income is minimal. Out of the 150 artisanal miners interviewed only less than 10% reported a significant contribution of mining to household income. Most miners were dissatisfied by the income from mining which they described as insufficient and inconsistent to rely on to sustain households.

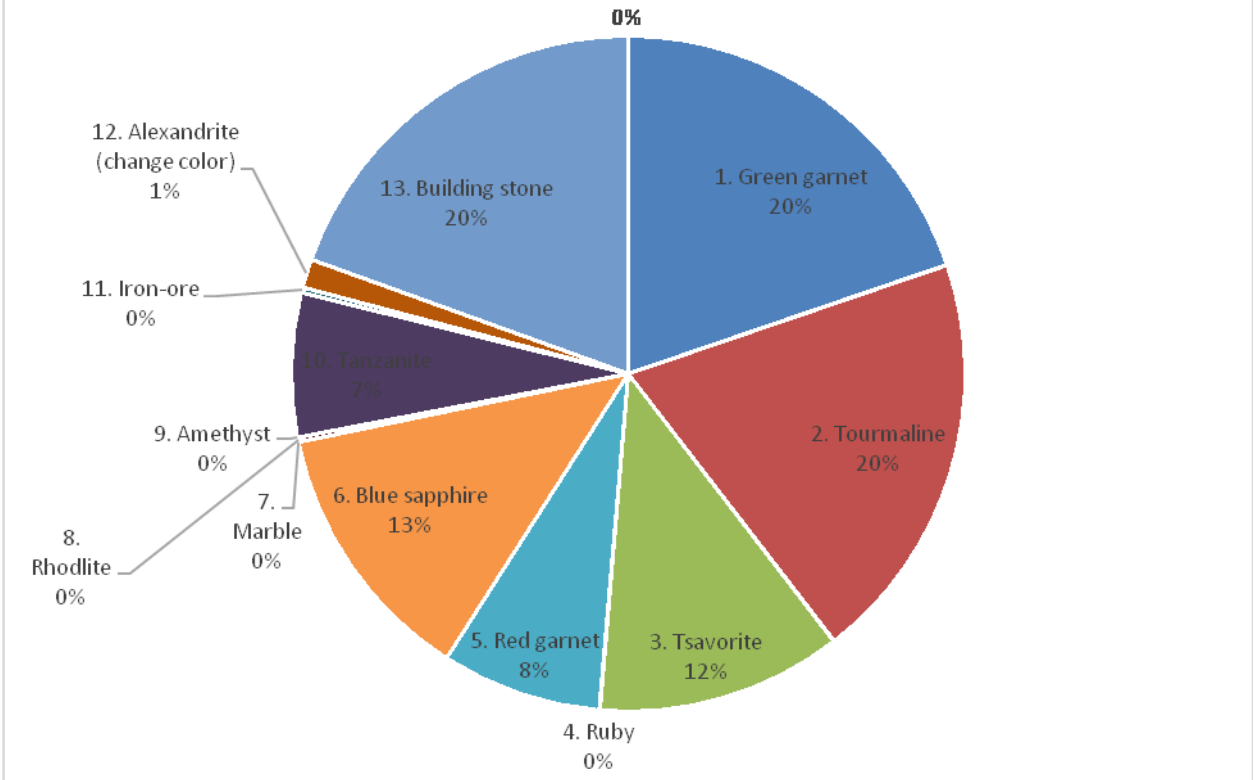
However, contrary to their dissatisfaction they did not participate in any alternative income generating activity. Less than 8% of miners reported having other alternative means of income. About90%of the respondentsreported having no intention whatsoever of considering any other alternate income generating

activity. Despite the low return on investment, their determination to continue mining is incredibly high and almost addictive.

However, artisanal miners engaged in mining building stone and sand had a more flexible attitude towards considering other alternative means of generating income. Amongst 60 miners interviewed 12% reported a desire to participate in alternative livelihood activities and 7% were already engaged in farming, business or livestock raring. The table below categorizes the different mining activities in Taita Taveta County.

Miner category	Total interviewed (%)
Gemstone Miners	74
Building stone miners	20
Sand and other miners	6

Different types of minerals mined in TTC in percentage



There is no current data available to show the actual contribution of artisanal mining to household income in Taita Taveta County. However, the Kenya National Bureau of Statistics (KNBS) carried out an Integrated Household Budget Survey (KIHBS) in 2005/06in which various income generating activities were captured showing the percentage of households engaged.

Proportion of households engaged in various income generating activities in Taita Taveta County

Income generating Activity	% of Households	Total Count
Crop Farming	82.5	62,416
Households Owning Livestock (unweighted data)	69.8	149
Other Income	6.4	65,369

Source- KNBS (KHIBS-2005/6)

It is therefore safe to assume that the contribution of ASMs is covered under 'other' income activities which may constitute about 6.4% of household income

Proportion of households growing various crops

Type of crop	% of households growing
Maize	99.2
Beans	46.4
Others	37.2
Cow Peas	30.5
Grams	24.3
Cassava	7.7
Sukuma Wiki(Kale)	4.5

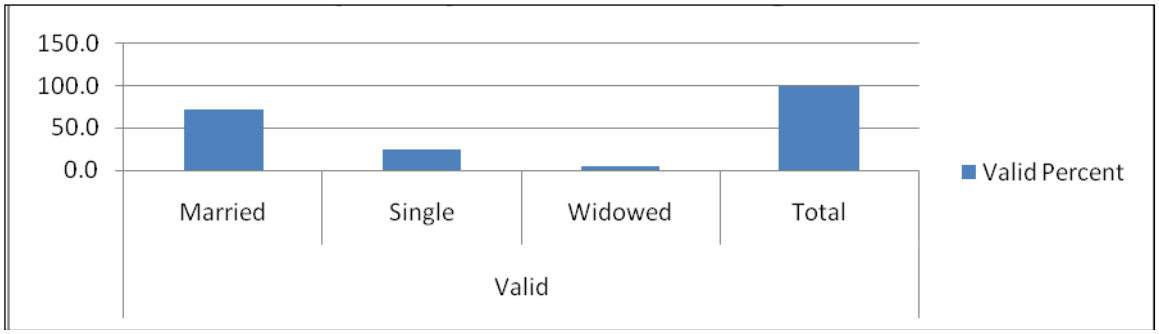
Source- KNBS (KHIBS-2005/6)

6 RESEARCH FINDINGS, INTERPRETATIONS AND ANALYSIS OF DATA FROM THE FIELD STUDY

The data under consideration was collected during fieldwork and involved approximately 150 ASMs that were actively involved in mining. The respondents were asked to indicate their knowledge and understanding of the ASM sector and how it relates to their day-to-day livelihoods and socio-economic activities. Some of the areas of interest to this study were: mining experience, marital status, education level, gender, market access, training needs, environment, contribution to household income and equipment requirement. The respondents were asked to rank in order of priority the importance of the foresaid areas. The follwing analyses are as a result of the data collected from the field based on an open-ended structured questionnaire. Most of the respondents interviewed had worked as miners for a period ranging from 1 year to 46 years. Most respodents were in the 10 years bracket.

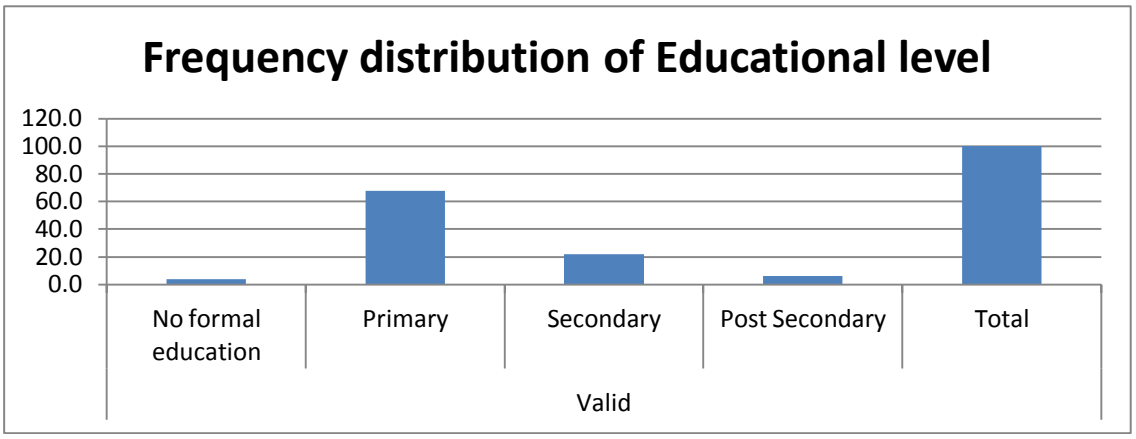
Marital status: Among all the miners interviewed 71.3% reported that they were married, 24% were single, 4.7% reported to be widowed.The table below shows the distribution of the marital status.

Table: Marital status



Source: raw field data

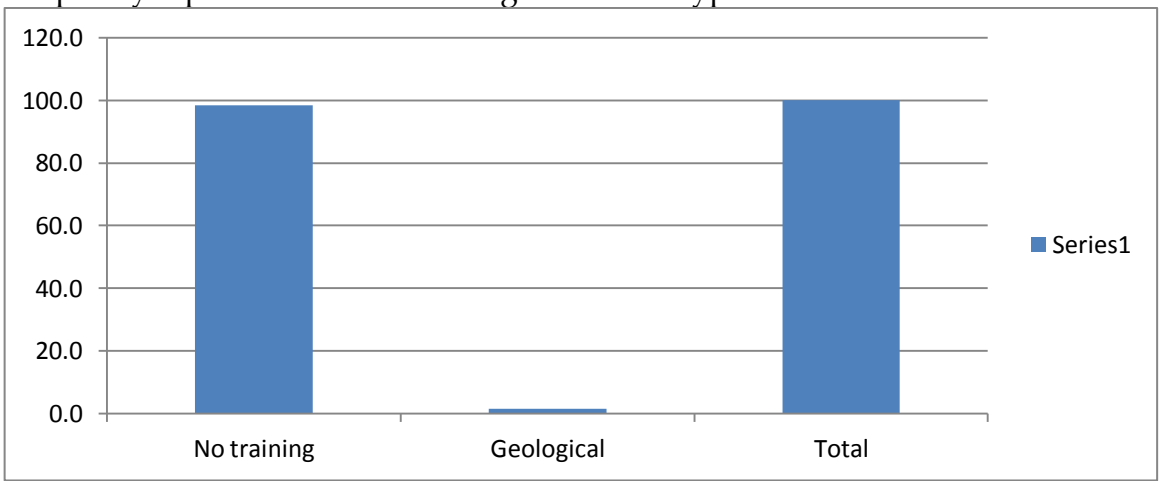
Education level: The data presented in the table below revealed that about 4.0% of the respondents had no formal education, 68% had attained primary school education level, 22% had attended secondary education level and 6.0% had attained post secondary level.



Source: raw field data

Training: The study investigated whether the respondents had received any formal training relating to mining. Of interest to the study was the type of training undertaken by the miners in, geological prospecting, business, mineral identification, or Machine operation. There was also need to identify the institution of training. The respondents who had some basic training indicated they had been trained on basic gemmology and geology at TTUC. The following table was generated to show the respondents who gave their opinion on the level of their training status:

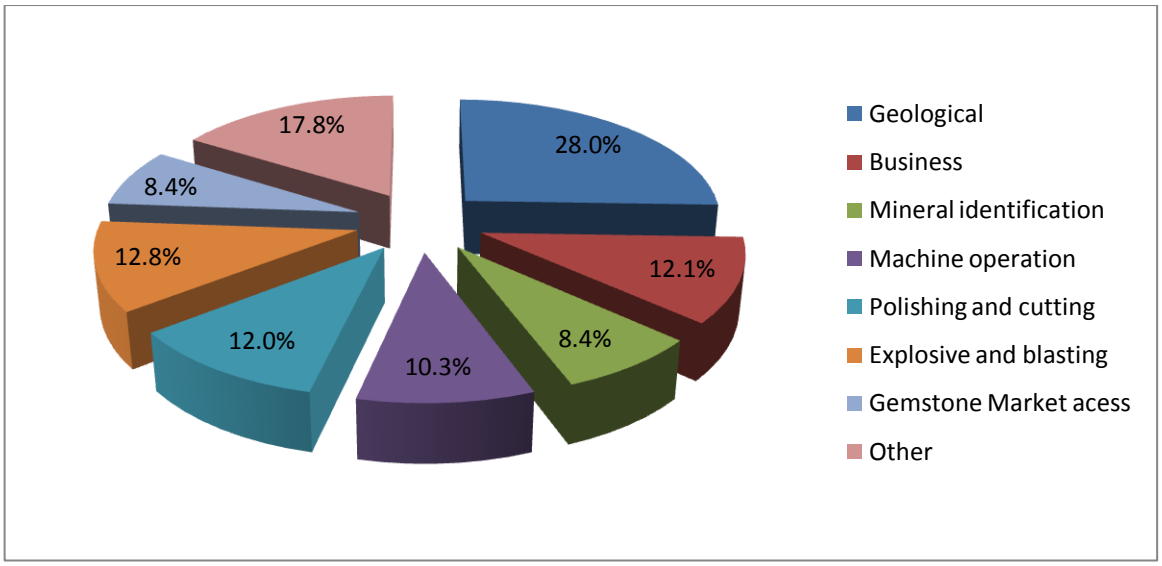
Frequency representation of training status and type



Source: raw field data

Results revealed that 98.5% reported they had received no training while 1.5% received training on geology and gemmology. Apparently no training has been conducted in business, mineral identification and machine operation, among others.

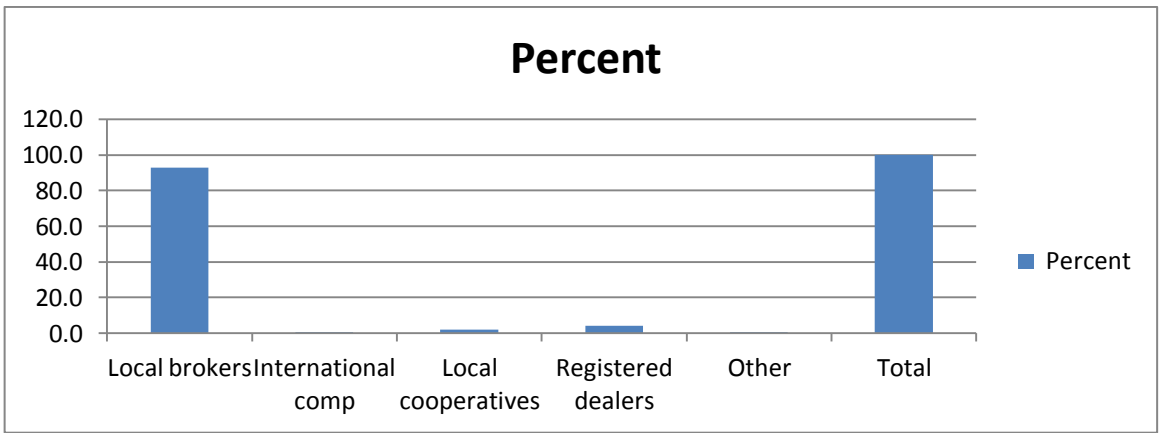
The respondents identified their preferred areas of training as follows:

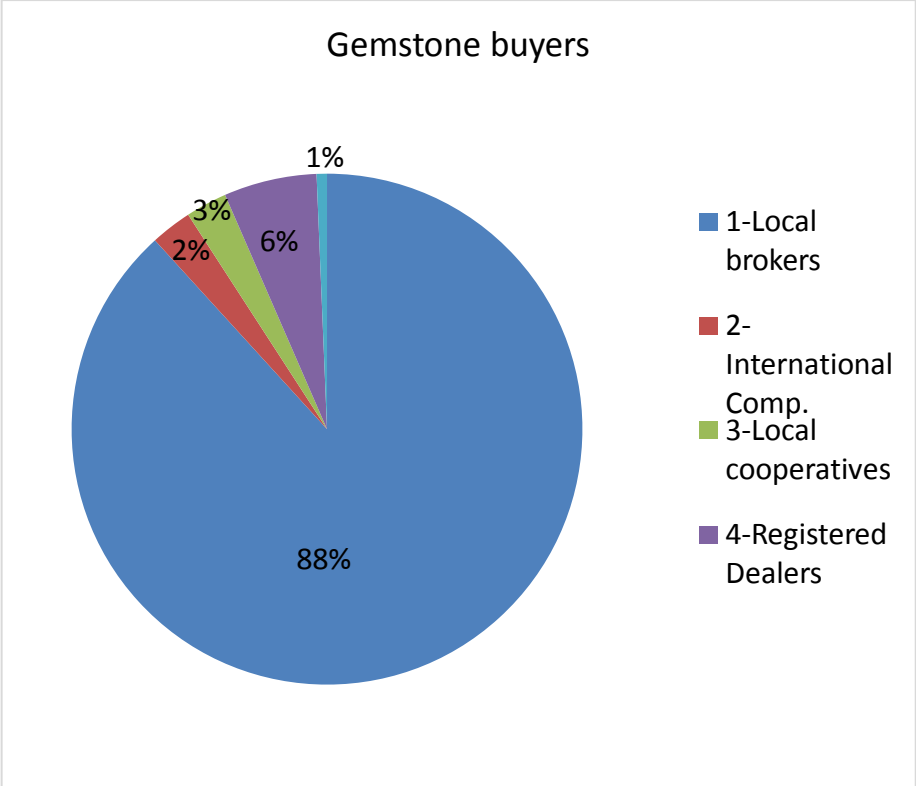


Source: raw field data

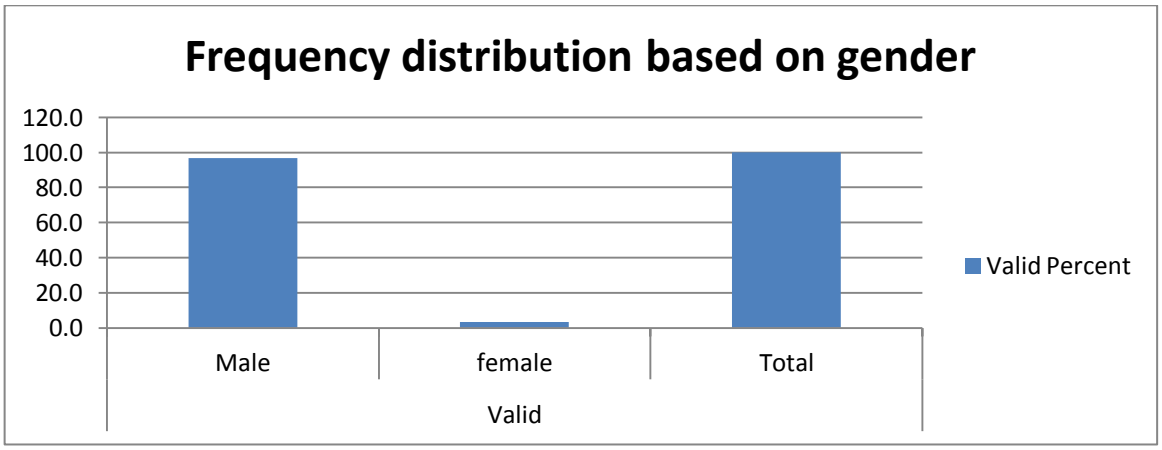
According to the findings, 28% of the respondents preferred to have training on geology, 17% opted to be trained in other areas, 12.78% had preference for trainings in explosives and blasting, 12.14% preferred business, 12.03% preferred polishing and cutting, 10.28% preferred machine operation, 8.41% preferred gemstone and market access and 8.41% preferred being trained on mineral identification.

Gemstone buyers: From the table below92.9% of the respondents reported selling their gemstones to local brokers, 0.5%to international companies, 2.0% to local cooperatives, 4.1% to registered dealers and 0.5%to others



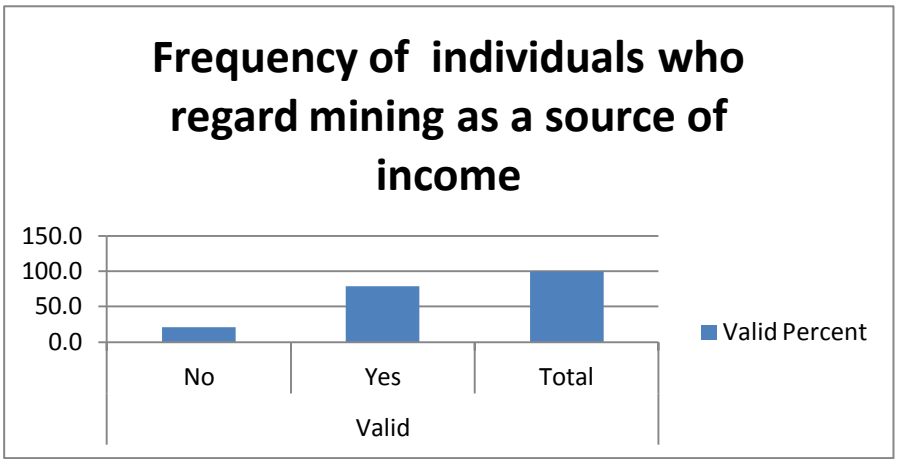


Gender: Based on the collected field data, most of the miners were maleconstituting 96.6% of the total respondents whereasthe remaining 3.4 % were female.



Source: raw field data

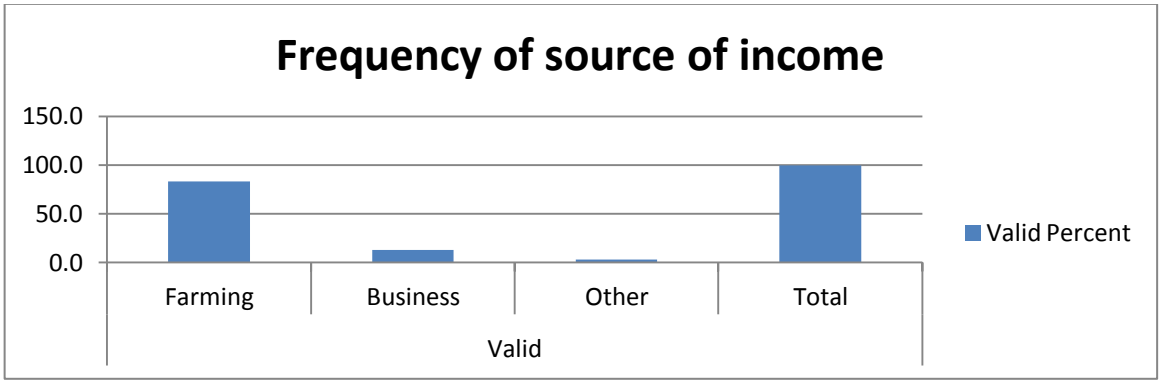
Mining as a source of income: From the data, 20.9% of the respondents reported that they had other sources of income while 79.1% indicated that mining was their main source of income.



Source: raw field data

Other source of income: The table below shows the respondents who had other sources of income apart from mining as follows: 83.3% of the respondents cited farming as their main alternative source of income, 13.3% had business to sustain them while 3.3 % indicated other sources apart from the afore-mentioned.

Alternative sources of income



Source: raw field data

Miners' perception on return on value for their efforts:
The following represents proportion of constituencies that generated this data Differences were tested statistically with various indicators among constituencies at: (p*<0.01**p<0.05p***p<0.001)

Proportion of value of effort based on constituency

Value of effort		
Constituency	% Yes (N=15)	% No(N=162)
Taveta	54.3	80
Mwatate	35.8	20
Voi	9.9	0

*Difference between the constituencies had no significant difference at p value of 0.13

The table above shows that Taveta constituency had more miners dissatisfied with return on invested effort (80%) while 54.3% reported value for their effort. Most respondents from Voi reported satisfaction with mining as a source of income. Statistically there was no significant difference between the constituencies in terms of return on effort from mining. In general, a high percentage across the constituencies expressed dissatisfaction with return on effort from mining.

Mining contribution to Household income: The table below shows that 47.8 % indicated that mining was very significant in Taveta, 34.8% in Mwatate and 17.4% in Voi. Those who reported being very low were as follows 44.4%, 50% and 5.6% for Taveta, Mwatate and Voi per constituency respectively. In general most respondents indicated that mining contributed moderately or very low to house hold income.

Mining contribution to household income based on constituency

Mining contribution to Household income					
Constituency	%Very significantN=23)	%Signficant(N=10)	%Moderate(N=38)	%Low (N=35)	%Verylow(N=36
Taveta	47.8	40	55.3	42.9	44.4
Mwatate	34.8	40	36.8	45.7	50
Voi	17.4	20	7.9	11.4	5.6
Total	**16.2**	**7.0**	**26.8**	**24.6**	**25.4**

*Difference between the constituencies had no significant difference at p value of 0.756

Equipment support and type based on constituencies. According to field observation very few ASMs groups had received any equipment support except those in Mkuki and Kasigau ranches. Each of the two groups had received a compressor donated by the Taita Taveta County government. However, these two compressors are inadequate to the needs of the ASMs. One of the compressors at Kasigau is currently not in operation due to lack of accessories and a skilled operator.

Land ownership: It was observed that land ownership in the TTC mining areas have not been clearly allocated to the ASMs. However in Taveta most ASMs were conducting their mining activities in either privately owned or leased land, whereas in Mwatate majority operated in group ranches. Other ASMs operated in county council land. In general most respondents (53.5%) operated in group ranches while those in privately owned land and leased land constitute 18.3% and 15.5% respectively

Proportion of ownership of land mined based on constituency

	Ownership of land mined			
Constituency	%Privately owned(N=26)	%Lease(N=22)	%Group ranch(N=76)	%Other(N=18)
Taveta	61.5	59.1	30.3	94.4
Mwatate	15.4	10.2	63.2	5.6
Voi	37.5	31.2	31.2	0
Total	**18.3**	**15.5**	**53.5**	**12.6**

*Difference among the constituency has a significant difference at p value 0.000

HIV/AIDS awareness: The table below reveals that 43% of the respondents were aware of the HIV/AIDS prevalence in the ASM sector while 57% were unaware in the constituencies visited. Mwatate showed the highest awareness level (50%) compared to Voi which had the lowest (4.8%)

Propotion of awareness to HIV/AIDS based on constituency

	Awareness to Hiv Aids	
Constituency	%No (N=82)	%Yes(N=62
Taveta	51.2	45.2
Mwatate	32.9	50
Voi	9.9	4.8
Total	**57**	**43**

*Difference among the constituency has a significant difference with a p value 0.035.

Accessibility to mining site: The study reveals that overall the ASMs mining sites were very difficult to access due to poor infrastructure. Most ASMs (58.7%) in the constituencies reported great difficulty in accessing their mining sites.

Proportion of difficulty to access mine site based on constituency

	It is difficult to access mining sites				
Constituency	%strongly agree(n=84)	%Agree(n=31)	%Neutral(n=7)	%Disagree(n=8)	%Strongly disagree(n=13)
Taveta	42.9	51.6	42.9	62.5	61.5
Mwatate	50	32.3	57.1	1.25	15.4
Voi	7.1	16.1	0	25	23.1
Total	**58.7**	**21.7**	**4.9**	**5.6**	**9.1**

*Difference among constituency based on mining access has a significant difference with a p value of 0.098

Effects of ASM on family stability: The data shows that 28.4% of the ASMs strongly agree that mining leads to family breakdown. Mwatate reported the highest cases of effects of mining on family stability. However, there was a statistical significant difference among constituencies.

Proportion of family breakdown based on constituency

	Mining leads to family breakdown				
Constituency	%strongly agree(n=40)	%Agree(n=17)	%Neutral(n=26)	%Disagree(n=31)	%Strongly disagree(n=27)
Taveta	22.5	70.5	42.3	62.5	61.5
Mwatate	49.2	6.8	20.3	1.25	15.4
Voi	12.5	0	18.8	25	23.1
Total	**28.4**	**12.1**	**18.4**	**22**	**19.1**

*Difference among constituency based on family breakdown had a significant difference with a p value of 0.000

Satisfaction with mining as the main source of income: The data reveals that 53 respondents were dissatisfied with mining as the main source of income. Among these 68% expressed dissatisfaction due to low income from mining activities, 11.3 due to unpredictable markets and lack of support from the authorities while 7.5% attributed their dissatisfaction to poor working conditions.

Proportion of lack of satisfaction based on constituency

	Lack of satisfaction				
Constituency	%Low income	%Unpredictable markets	%Poor working conditions	%Risky	%No support
N	36	6	4	1	6
Taveta	84.6	3.8	7.7	0	3.8
Mwatate	33.3	27.8	11.1	5.6	22.2
Voi	88.9	0	0	0	11.1
Total	**68**	**11.3**	**7.5**	**1.9**	**11.3**

*Difference among constituency based on satisfaction had a significant difference with a p value of 0.025

7 Summary of the data analysis:

1. From the data it can be inferred that there were benefits derived from mining. However, insignificant amounts of income generated reached the household level. This observation applies to all constituencies.
2. There is need to diversify marketing of gemstones and other minerals to fetch better prices thus increasing their income.

3. There is need for more diversified training to enhance productivity and efficiency.
4. There is need to provide adequate and appropriate equipment support to ASMs to enhance mining technology
5. In terms of land ownership, Taveta was mostly having privately owned and leased land for mining whereas Mwatate had the highest number of land from group ranch for mining. Other land belongs to county government. Therefore, resolving land related issues will create an enabling environment for ASMs
6. The HIV/AIDS level of awareness is significantly high among miners and cuts across all the constituencies where ASMs are conducting their activities. There is however need to educate and sensitize the ASMs through public campaigns.
7. The accessibility to most of the mining sites in the constituencies was reported as significantly poor hence efforts should be put to improve the road infrastructure.
8. A significant number of ASMs agreed that mining affects family stability and there is need to develop family support programs to mitigate the perceived negative attitude society has towards mining in the area.
9. There is a significant level of dissatisfaction with the return on efforts invested in mining among ASMs, thus relevant interventions to improve their income need to be effected by the appropriate authorities. Contrary to dissatisfaction, the determination of miners to continue mining defies logic.

An assessment of risks and challenges hindering growth in the supply of gemstones and the development of effective value chains and mitigation recommendations

After assessing the status of ASM in Taita Taveta County a number of challenges emerged, key among them; the lack of equipment and related facilities, lack of food at mining sites, lack of water etc. All the challenges and suggested mitigation measures are tabulated below. The issue of timelines was not addressed as it is essentially open-ended and depends on the time each given activity may be started.

Challenges	**Mitigation measure**	**Responsible Institution**	**Approach**
Lack of equipment and accessories	• Need to provide mining equipment • Technical support • Equipment	• National government • County government • Donors	Need to have a participatory implementation approach by all stakeholders(County,

	accessories and consumables • Training on equipment operation		National governments, Civil society, ASM associations)
Lack of food	• Provision of sustainable supply of food • Initial capital(funding) • Provide food processing equipments	• ASM associations • Donors • County government	Division of labour within ASMs for some groups to grow food & supply while others do the mining
Lack of water	• Sustainable supply of water • Initial capital(funding)	• ASM associations • Donors • County government	• Sink borehole at appropriate locations • Use Mobile trucks to supply to mining sites • Piping systems to mining site
Lack of Health and occupational safety facilities	• Provide mobile clinics • Provide first aid kits on site • Training on first aid treatment • Provision of mining protective gear • Train and prepare the ASMs for emergencies • Provision of sanitation facilities	• ASM associations • Donors • County government	• Identify ASM members that can be trained in first aid and emergency response • Sustainable supply of medications and equipment from public/private health facilities
Insecurity	• Dedicate mobile police patrols to ASM sites • Provide police escorts when transporting gemstones • Training on security logistics and self defence	County and National governments	ASM community policing in liaison with the county security
Exploitation	• Provide information and knowledge about gemstone marketing and	• ASM associations • Donors • County government	• Organize and implement trade fairs • Establish gemstone cutting, polishing,

	pricing • Provide mechanisms of identifying minerals • Create a platform for linking ASMs to potential buyers	• National government	and treatment centre. • Establish certification and standardization mechanisms • Need for mobile geological and mineral identification services
Lack of geological skills and knowledge	• Establish Training programs for ASMs • The government should carry out geological & mineral exploration and distribute the information to ASMs freely	• ASM associations • Donors • County government • National government • Tertiary Institutions	• Training needs assessment for ASMs • Identify current information sources • Establish geological and mining information centres
Inadequate infrastructure(transport, Communication, power etc)	• Provide VHF emergency radios • Mobile providers to install boosters • Improve and increase access roads to Mine sites • Extend power supply to mining sites • Provide solar energy solutions	• ASM associations • Donors • County government • National government	• Use the rural electrification program to supply power • Both national and county governments to include access roads to ASMs in their strategic Infrastructural plans • Work with the security and relevant communication agencies to provide convenient communication systems
Lack of credit facilities	• Provide loans through SMEs to ASMs • Provide asset financing facilities to ASMs • Training in entrepreneurial skills, financial management and book keeping	• ASM associations • Donors • County government • National government	• Direct (loan-based financing through domestic banks and micro credit institutions) • Indirect funding (Hire-purchase schemes, equity based financing, buyer credit schemes etc) • Public - Private partnerships (entrepreneurial

			cooperation between companies, large & small scale miners)
Shelter	• Provide temporary & affordable building materials for their accommodation in the mining sites • Provision of camping tents and gear	• Donors • County government	• Partnership between the county government with material manufacturing companies to help provide subsidised materials to ASMs • SMEs to enhance loan facilitation to ASMs
Lack of Alternative Market	• Establishment of a gemstone centre for value addition • Establishment of a mineral exchange Bank	• Donors • County government • National Government • Financial institutions	• Organization of gemstone trade fairs and expos within the county • Exchange bank to be part of the gemstone centre
Lack of clear & transparent legal framework(clear and transparent rules and procedures governing licensing of ASMs-in current mining bill)	• Educate and sensitize the ASMs on the existing legal frame work regarding mining • Encourage ASMs to seek legal registration by the relevant government agencies	• County government • ASM associations • Civil society	• Public meetings • Seminars and workshops • Publications, brochures • Use media campaigns
Mining conflicts	• Address the issue of security of land tenure and related land dispute • Exercise Transparency in the issuance of prospecting and mining permits • Avoid politicizing mining issues • Established LSM to develop a working	• County government • National Government • ASM associations	• Establishment of land arbitration and dispute resolution committee to focus on (gemstone) mining issues at county level • Need to establish a regulatory body to streamline procedures & dispute resolution • Established miners with title deeds to allow ASMs to mine within their locality

	relationship with ASMs to avoid conflicts • Section of land should be given to artisanal miners		and share proceeds
Land Compensation and resettlement	• Formulate favourable compensation criteria and standardized rates	• County government • National Government • ASM associations • Mining companies • NGOs	• Organize a participatory stakeholders forum to develop the criteria and standards
Rock waste(debris) obstructing access to building stone-quarry	• Removal of the waste debris	• County government • ASM associations • Mining companies • Donors	• Coordination with county government or any other donor to provide earth moving machinery to regularly remove the debris • Use the debris to pave the access roads leading to the mines • Debris can be sold as hard core
Superstitions	• Sensitize local communities on negative and retrogressive beliefs regarding gemstones	• ASM associations • County government • NGOs • Religious organizations	• Organize regular sensitization workshops and seminars • Use religious gatherings to educate the locals

Equipment Identification

The major stumbling block to the success of ASMs in Taita Taveta County is lack of mining equipment as identified overwhelmingly by a majority of artisanal miners. Hence this issue has been isolated for attention. Here below is a table of suggested equipment, specifications and the requisite accessories. From field observation it was noted that due to the unique geology, and hence rock type, of the area the appropriate machinery need to be used to avoid redundancy. A good example was observed at the Timbo Kubwa building stone quarry near Taveta. An investor came with a building stone cutter commonly used to cut

volcanic tuffs for building at Thika area (Thika Tuffs). This machine could not work here as the rock material at Taveta is harder than the Thika Tuffs. So the machine was abandoned and is now rusting away in the bush

Type of Equipment	**Specifications**	**Accompanying accessories**	**Type of Mineral Mined**	**Quantity/Approach**
Compressor	• Portable • 125-1600 CFM(cubic feet per meter) • 100-500 PSI	• Hose Pipe-200m • Pneumatic Jack- • Fuel for 3 moths • Drill bit • Trained operator • Maintenance accessories for 3 moths • Towing vehicle(Pickup)	Gemstones	Will depend on the number of needy and supportable ASM groups (A criteria for selecting needy cases and a responsible committee should be formed from among the stakeholders and County government)
Excavator	E.g. Caterpillar Hydraulic Excavator 330 BL Bucket Capacity – 1.3-2.1 m^3	• Bucket shoes • Breaker • Maintenance accessories for 3 moths • Fuel for 3 moths • Trained operator/mechanic	• Gemstones • Building Stone	As above
Bull dozer (optional)	• E.g. Caterpillar D9 • 474 H.Power • 16.4 M^3	• Maintenance accessories for 3 moths • Fuel for 3 moths • Trained operator/mechanic	• Gemstones • Building Stone	As above
Wheel loaders	• E.g. Caterpillar 950 G - 197 Horse Power - Bucket-2.7 M^3	• Maintenance accessories for 3 moths • Fuel for 3 moths Trained operator/mechanic • Bucket shoes	• Gemstones • Building Stone	As above
Trucks	Common Tipper	• Maintenance accessories for 3 moths • Fuel for 3 moths • Trained operator/mechanic	Gemstones Building Stone	As above

Ventilation Systems	20-1600 CFM(as need may be)	• Maintenance accessories for 3 moths • Generator fuel for 3 moths • Trained operator/mechanic • Solar powered option • Air pump • Suction pump • Fan	Gemstones	As above
Generators	8KVA-100KVA(as need may be)	Cables and wiring gargets • Maintenance accessories for 3 moths • Generator fuel for 3 moths • Trained operator/mechanic	Gemstones Building Stone	As above
Solar power Systems	150-300V(as need may be)	• Panel • Battery • Cables • Bulbs • Inverter	Gemstones Building Stone	As above
Water pumps	• 370-1500 Watts • 35 – 100 litres/minute	• Pipes • Filters • Maintenance accessories for 3 moths • Generator fuel for 3 moths • Trained operator/mechanic	Gemstones	As above
Basic Mining gear	• Standard brands • Helmets • Boots • Dust Masks • Hand gloves • Eye protective goggles(glasses)	N/A	Gemstones Building Stone	As above

Training needs and Training modules

Tabulated below is a suggested list of areas of training that were thought to be of relevance to ASMs after assessing their needs in the field and gathering their opinions. Mining is a labour intensive and time consuming activity and therefore having the technical capacity to identify potentially productive areas to mine for minerals will make a difference between profit and loss. It is with this in mind

that the following training content was developed. Great emphasis has been placed on relevance and simplicity and taking cognisance of the fact that most ASMs are illiterate.

Area of training	Training Content	Training Institution	Training Duration
Mineral identification	Physical Properties • Mineral Hardness • Mineral appearance • Colour streak • Specific Gravity • Cleavage • Fracture • Form • Magnetism Chemical properties • Acid tests • Chemical Composition Optical Property • Microscopy • Lustre • Transparency	TTUC JKUAT TUM	Two weeks
Basic geology	• Ore deposit occurrence • Types of rocks • Geology of Taita Taveta County • Sources of Geological information • Interpretation of geological maps	TTUC JKUAT TUM Ministry of Mining	Three weeks
Gemstone cutting and polishing	• Evaluating or classifying gemstone • Crystallography • Lapidary work • Heating and treating	TTUC JKUAT TUM SEAMIC	Four weeks
Health and First aid	• Dressing • Handling emergencies • Managing snake bites • HIV awareness • Hygiene and sanitation	TTUC JKUAT TUM Ministry of Mining Ministry of Health	Two weeks
Occupational Safety	• Accidents • Protective gears • Fire fighting • Rescue operations • Slope and mine stability • Air pollution	TTUC JKUAT TUM Ministry of Mining Ministry of Health	Two weeks

Conflict resolution	• The nature and trends of conflicts in the EI • Characteristics of a mediator. • The importance of consent, trust and long-term mining engagement • Models of compensation explained. • Models of mediation explained. • Perspectives of both upper-level and grassroots level actors. • Introduction to nonviolence as a strategy for change.	TTUC JKUAT TUM Ministry of Mining	Two weeks
Marketing & business management	• Assessing community vulnerability in marketing risks • Product marketing • Management & Book keeping record • Gemstone valuation • Marketing conditions • Training on access to finance and business skills	TTUC JKUAT TUM Ministry of Mining Ministry of trade and industrialization Any other relevant government institution	Four weeks
Mining	• Mining Methods • Waste removal • Underground and surface construction • Mine planning • Excavation design • Ventilation • Dewatering • Handling of explosives	TTUC JKUAT TUM Ministry of Mining	Four weeks
Prospecting	• Identification of Ore body • (grade, size, shape and depth) • Topography • Dilution • Recovery • Appropriate technology	TTUC JKUAT TUM Ministry of Mining	Two weeks

Mining & Environmental Laws	• Environmental and social issues • Licensing • The new mining act explained • Mine closure(reclamation) • NEMA requirements • KWS regulations	TTUC JKUAT TUM KWS NEMA LSK Attorney general's office	Two weeks
Mining Machinery operation and repairs	• Identification and selection of mining equipment(Shaft sinking, tunnelling) • Training on operation and maintenance of mining machinery	TTUC JKUAT TUM Ministry of transport & infrastructure Ministry of Mining	Two months

7.1 Policy Challenges and recommended mitigation measures

Some of the major hindrances to ASM advancements are mainly policy issues. Key among them is the failure by government to recognize ASMs. However, some of these issues have been addressed in the newly passed Mining Act 2014 although some might have to be handled at the implementation stage. Below are some of the key policy issues affecting ASMs and their respective recommended mitigation measures.

Policy Challenges and recommended mitigation measures

Policy Challenges inhibiting ASMs	**Interventions**	**Approach**	**Socio-economic Impact**
Access to land	• Subdivision of land to accommodate ASMs (individual and group allocations) • Regulations governing protected areas and natural reserves should be applied uniformly	• Speed up issuance of land titles and mineral right areas • Resolve long standing disputes on mining locations	• Reduction of conflicts • Improve mining productivity • Increase job opportunities
Legal recognition	• Enhance mining regulations to prevent illicit dealings • Stratification of	• Registration of all ASMs • Establish specific mineral titles suited for ASMs.	• Reduction of illicit mining • Curb gemstone smuggling • Boost revenue

	mining laws		collection • Ensure better environmental control
Inadequate resources to carry out prospecting	• Find better ways of facilitating access to finance	• Financial institutions to offer low interest rate loan facilities for EI	Discovery of new ore bodies Access to appropriate technology
Lack of promotional strategy	• Marketing of the gemstone • Discourage exportation of rough gemstones • Encourage ASMs to be members of local and international gemstone societies e.g. KCM, IGA and ICA	• Formulate a clear Marketing policy • Institute a policy to encourage value-addition (gem cutting and polishing) • Establishment of mineral(gemstone) cottage industries	• Increased foreign income through gemstone export • Increase in ASM income • Creation of employment opportunities • International recognition of local miners • Attract foreign investment
Smuggling of gemstones	• Reduce bureaucratic processes involved in gemstone dealing, sealing and export. • Establishing a gemstone centre	• Post government certification agent near or within ASM areas • Reduce cost of certification or make it free	• Increase in revenue for the county and national governments
Political interference	• Prohibit political incitement in mining industry	• Develop a county regulation with severe penalties on incitement	• Reduced conflicts
Knowledge	Improve dissemination of information on health, safety, mining and technology	• Enhance Mining education and training programmes	• Reduced mining accidents • Improved mining techniques

8 RECOMMENDATIONS

Apart from the mitigation measures that have been suggested elsewhere in response to various challenges, there are some critical emerging issues that have crystallized out of the overall assessment, which will need emphasis and special mention.

1. There is absolutely no data or information at the County or National level regarding ASMs currently. Such issues as to how many artisanal miners are in the county, the actual amount of money generated by ASM, the accurate assessment of the potential of none extracted mineral potential of the area remain unresolved. Even basic information regarding the locations in the county where mining activity is taking place is lacking. So it is recommended here that a thorough and in-depth socio-economic survey as well as a geospatial mapping survey be carried out focusing on ASMs to assist both governments and other stakeholders in planning for this key industry.
2. Increase access to government geological services by strengthening the office of the regional geologist in the county. Consider introducing mobile geological, sealing and permit issuance services and reduce the bureaucracy involved in processing permits.
3. Undertake vigorous public/ASMs sensitization on the new Mining Bill 2014, legal rights and obligations. Most of the problems in the extractive industry including conflicts are due to ignorance. Sensitize the ASMs on their environmental obligations.
4. In depth study to establish how much is made and management of the revenue from sale, distribution and control of resource.
5. Open up mining sites by developing a reliable road and infrastructural network. Development of water supply systems to mines as well as supply of electricity.
6. In event that funding is available for purchase of equipment, it is recommended that an effective criterion of identifying needy groups is developed and a committee put in place to oversee the process. This committee will be chaired by an appointee of the County government and will include ASMs, Civil Society, religious groups, the National government, NGOs and any other membership from the stakeholders.

7. Provision of mining equipment is an important support that will change the face of mining in this area for the better. However the critical challenge is the management of the equipment. From field observations it will be very important to establish a mechanism that will ensure sustainable and equitable use of the equipment. The county government bought some compressors and distributed to some groups, but currently a majority of these compressors are lying idle due to lack of an experienced operator, lack of initial fuel and lack of accessories such as pipes etc. Hence, there is need to establish a workable formula of equipment management.
8. A gemstone center needs to be set up at Voi to purchase the gemstones from miners directly in order to avoid middlemen. It can also be suggested that a gemstone exchange bank be considered.
9. A law should be enacted to ban the exportation of rough gemstones from the country and any foreign buyers should be required to declare their gemstones.
10. Invite investors from India and Thailand, and encourage them to start gemstone cutting in the country.
11. There should be established a cottage industry for mineral processing and waste gemstone artwork. Individual citizens should be encouraged to start small scale mineral processing ventures as it is happening in India. This will help create jobs and increase the household income in the county. There are small deposits of iron ore that may not be of interest to large-scale steel manufacturers but they can support individual iron smelters and steel plants to supply the local market.
12. Increase the capacity of the regional geologist's office by building state-of-the-art mineral identification laboratories and engage qualified personnel to run it.
13. Diversification of economic activities: county government with the help of other donors to support ASMs in setting up small enterprises, agribusiness, poultry and livestock farming.
14. Apply rules and regulations regarding mining in Tsavo National Park uniformly. Currently few people have been allowed to mine in the park while the rest of ASMs are not.
15. The County and National government should give this industry the recognition it deserves and invest in it commensurately.
16. Set a commission/taskforce to review and address land issues affecting ASMs with a view to coming up with a sustainable land solution.

17. Encourage larger and more established mining companies to undertake Corporate Social Responsibility (CSR) to help reduce conflicts.
18. Support and strengthen the ASMs cooperative movement. This movement is currently unstable due to poor management and internal wrangles.

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10 ANNEXES OF DIFFERENT QUESTIONNAIRES USED IN RAW DATA COLLECTION

I SAMPLE QUESTIONNAIRE

Q ID: _____

Coordinates: Longitude _____ Latitude:_____

Constituency:____ Ward: _____

STUDY QUESTIONNAIRE ON
ECONOMIC AND JOB CREATION POTENTIAL OF ARTISANAL AND SMALL-SCALE MINING IN TAITA TAVETA COUNTY.

Dear Sir/Madam,
The researcher is carrying out a study on **Economic and Job Creation Potential of Artisanal and Small-Scale Mining in Taita Taveta County** on behalf of UNDP.
Your positive and constructive response in answering the following questions will enormously assist in making the study a success in terms of obtaining precise and reliable data and recommendations. The research findings will facilitate the formulation of policies and legislation as well as point out areas of intervention that will enhance mining activities in the county.
Please fill in the appropriate answer against each statement.

1. Gender_____
2. Age of respondent_____ yrs
3. Level of education attained a. primary [ ] b. Secondary [ ] c Post Secondary school training [ ]
4. Marital Status a. Married b. Single c. Widowed
5. Size of the family i.e. number of children _____
6. For how long have you been involved in the mining and/or mining business?
   a. Less than 1 year [ ] b. between 1-3 years [ ] c. Between 4-6 years [ ]
   d. Between 7-10 years [ ] e. More than 10 years [ ]
7. Is mining your only source of income? Yes [ ] b. No [ ]
8. If no, state other sources _____
9. Have you received any training in the area of mining? Yes [ ] b. No [ ]
10. If yes (9, above), specify area of training _____ Institution: _____
11. Which training would you like to receive to improve your skills _____
12. To whom do you sell your minerals to
    a. Local brokers [ ] b. International Companies [ ] c. Local cooperatives [ ] d. Mineral Dealers [ ]

13. Do you get value for your gemstones Yes [ ] b. No [ ]
14. Does mining contribute significantly to household income a. Very significantly [ ] b. Significantly [ ] c. Moderately d. low [ ] e. Very low [ ]
15. Have you received any equipment support Yes [ ] b. No [ ]
16. If yes (15) state equipment _____; Institution:_____
17. Was the equipment adequate Yes [ ] b. No [ ]
18. Ownership of the land under mining a. Own land[ ] b. Lease [ ] c. Group ranch [ ]
19. What type of conflicts affects your mining operations _____

20. What safety risks do you encounter in your mining operations_____
21. Do you know anyone who has been infected by HIV/Aids in the course of mining and trading in gemstones Yes [ ] b. No [ ]
22. If yes (21), how many_____

23. In the tables A and B below, kindly select the most appropriate answer by ticking in the correct provided boxes:

TABLE C: Issues in Artisanal mining

S/N	ITEM/RESPONSE	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
i.	Does these mining activities affect the environment					
ii.	Conflicts among artisanal miners are common and hinder meaningful mining					
iii.	Access to mining fields is difficult					

TABLE D: Risks Associated with Artisanal Mining in TTC

S/N	ITEM/RESPONSE	Very Significant	Significant	Moderate	low	Least
i.	Regular conflicts					
ii.	Family breakdown					
iii.	Negative effects on health					

24. Are you satisfied with mining as your main source of income_____

25. If no (24), explain_____

26. What challenges do you face in your mining activities _____

27. Are you satisfied with the support you receive from the government Yes [ ] b. No [ ]

28. If no (27), state why_____

Thank you for your answers.

II SAMPLE QUESTIONNAIRE

Economic and Job Creation Potential of Artisanal and Small-Scale Mining in Taita Taveta County

Individual mine owners are investors who can unlock the full potential of this mineral endowed county. They therefore form a strategic part of this entire study. From observation, one can easily notice that most mining activities are carried out by artisanal miners. Small scale mining is indicated by presence of mechanization to a specific degree and a level of organization most lacking in artisanal mining. Individual miners who own mines are thus critical in the dissemination of information to the consultant concerning the extractive industry, specific case; gemstone mining.

Below are guidelines on the areas of questioning that lead the consultant in the process of data collection:

1. Outlook of the gemstone and jewellery business in Kenya including;
    i. Analysis of the sector in the past 5 years
    ii. Recent development and trends currently experienced

2. Challenges encountered as a small scale miner
3. Conflicts – Mining rights as a subject of dispute with emphasis on conflicts arising out of encroachment into mining locations by artisanal miners
    i. How can SSM & artisanal miners work together as/on a development agenda?
4. Human rights violation cases and the role of the mine owner in mitigating such a challenge.
5. The state of security in the mining area and if security is guaranteed
6. The method and level of technology
    i. What equipment is used and what level of mechanization it depicts
    ii. Level of expertise: Mining methods , Geological information, Environmental considerations
7. The owner to discuss the process of acquiring a mining permit especially under the devolved system of governance.
8. Discussion on the legal aspects that promote or hinder growth in the sector.

i. Has artisanal and small scale mining (ASSM) been considered in the mining act or the proposed mining bill?
ii. Incentives e.g. government subsidies. Is the government clear or what other form of support should emanate from the government

9. The level of political influence in the politicization of the mining industry in the county;
    i. How it affects and to what extent
    ii. Initiatives that lead to solutions for the stated problem
10. The number of employees employed in the mining operations and gender specific data. Mine operator can:

    i. Define the role of women in the stages of mining operations
    ii. ASSM as an economic stepping stone for women and youth by identifying the opportunities available.
    iii. Propose initiatives to strengthen women and youth
11. Community engagement: CSR programs for social development on part of the operators
    i. Is it a mandatory requirement or implementation is an act of good gesture
12. What are some of the labour issues relating to SSM that when addressing, should be given priority?
13. Description of the supply chain and value chain and owner in his/her view to provide suggestions to improve value chain.
    i. Exploration-Development-Mining-Mineral Processing- Marketing channels – Sale
    ii. Pricing of the minerals i.e. gemstones at the various stages of the supply chain
14. Is there a need for economic diversification in the county i.e. development of sustainable alternative employment
    i. Other Livelihood opportunities to be discussed and the infrastructure to enable diversification
15. The environmental impacts of mining
    i. Reclamation programmes adopted by the mine operator
    ii. How artisanal miners can be encouraged to conserve the mining environment
16. Socio-economic impacts of mining especially to the youth and women
17. The attitude and role of the county government in the development of minerals as a natural resource.

III SAMPLE QUESTIONNAIRE

Economic and Job Creation Potential of Artisanal and Small-Scale Mining in Taita Taveta County

A checklist of what to observe:

18. Nature of ASSM in the county
    - ✓ Formal or informal
    - ✓ Organized or disorganized
    - ✓ Seasonal or permanent
19. Diversification of economic activities or existence of alternate livelihood opportunities
20. Pricing of the minerals i.e. gemstones at the various stages of the supply chain
21. Method of mining and level of technology employed
22. Labour issues relating to ASSM
23. Environmental aspects of ASSM
    - Impact on land resources, water resources and biodiversity
24. The role of women in mining operations
25. The socio-economic impacts as a result of ASSM
26. Organisation, composition and activities of mining groups and associations
27. Areas of value promotion along the value chain

IV SAMPLE QUESTIONNAIRE

Economic and Job Creation Potential of Artisanal and Small-Scale Mining in Taita Taveta County

Areas of interest were identified and listed to guide the consultant in the process of extracting data from the County Geological Office under the stewardship of Mr.Edward Omito. They were as below:

1. Relationship between the county government and the local miners
2. Type of minerals , quantity and location
3. A list of all the registered and active mining sites whether for individuals, groups or associations
4. Information on the procedures involved before the issuance of mining permits
5. Key support measures to be instituted to improve ASSM in the county
6. Geological and mining information gap present
7. The environmental aspects of ASSM
8. The recent trends attributed to ASSM
9. Point out other reference areas for acquisition of relevant data

V SAMPLE QUESTIONNAIRE

Economic and Job Creation Potential of Artisanal and Small-Scale Mining in Taita Taveta County

Areas of interest were identified and listed to guide the consultant in the process of extracting data from the Kenya Chamber of Mines (KCM) representative in charge of Taita Taveta County. They were as below:

1. What is KCM's role in ASSM
2. Challenges encountered by KCM in addressing conflicts between LSM & ASSM
3. A list of the registered members of KCM undertaking mining activities in the county
4. Legal and policy aspects that need to be addressed to improve mining and boost ASSM
5. Benefits accrued as a result of KCM membership
6. Recommendation for ASSM areas of improvement
7. Relationship between KCM, county government and other administrative units in the mining industry