



**BUSITEMA
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FACULTY OF ENGINEERING

DEPARTMENT OF MINING ENGINEERING

FINAL YEAR PROJECT REPORT

**INVESTIGATING THE EFFECTIVENESS OF BORAX IN GOLD
PURIFICATION WITH RESPECT TO THE RECOVERY**

CASE STUDY: TIIRA ASM

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ABSTRACT

With the increased environmental pollution and health effects in the communities within and around gold mining areas in Tiira, Uganda, this called for a attention on how this should be mitigated. Both the government of Uganda and some NGOs like the national environmental management authority (NEMA) in conjunction world health organization states it clear that this has been caused mercury disposal from mining activities. Tiira Uganda in eastern Uganda is one of the regions which carryout gold mining including mining on a small scale, where smallest scale miners earn a living. It's noted that most miners use the mercury amalgamation method in gold processing, which disposes mercury to the environment in large quantities. This is released to the atmosphere, water bodies, soil, among others where human being, animals and fish inhale it and absorb it in their bodies, eat it through food, fish and causes very many healthy effects such damage of the nervous system, kidneys, liver, and immune system.

Never the less it has not stopped on polluting the environment but also causing impurities in the gold processed using mercury amalgamation method.

My project seeks to make research on the investigating the effectiveness of borax n gold purification as it may help give a beginning point for solving the problem. The objectives of my study include determining the gold grades at Tiira gold field; determine the efficiency of direct smelting with borax on my grades and then a lay a strategy of ensuring the miner adoptability to direct smelting wit borax. These are all entailed n chapter one. This chapter also talks about the introduction chic consists of the background of the problem, clearly states objectives, scope of my study and justification.

Chapter two consists of literature review which elaborately shows how different scholars and researchers have successfully conducted research projects about comparison of the gold processing methods particularly direct smelting with borax and mercury amalgamation method commonly used by small scale gold artisanal across the world.

The third chapter is comprised of the methodology applied. Upon collecting additional information from reports and journals, the searcher went ahead to carry out experiments, tests,

which required data collection from different fields. here both qualitative and quantitative data was collected to aid in achieving the objectives.

Chapter four talks about the results of all the activities carried out in my project well summarized and respective discussions.it also talks about the conclusion of my project where all the results are summarized, limitation as and challenges faced, which concerns with the pros, that tried to limit and stop the research from gong on smoothly, recommendations where some changes are needed for thing not going on well with in the same field and references showing the various cited articles, journals, among others, who made research about the same or related problem.

DECLARATION.

I NAKABAZI EVA hereby declare that this project report was written by me.It is original and has never been submitted in for any award by any individual in any learning institution.

Signature.....
.....

Date.....
.....

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First and foremost, I would like to thank the almighty God for the life and protection he has granted me. Special thanks goes to the administration of Busitema university faculty of engineering and technology for the tireless efforts inserted to deliver to me to the necessary knowledge for academic excellence. More thanks to my supervisor, Mr. Bagoole Christopher and Mr. Tugume Wycliffe for the knowledge, advice and time they have rendered to me to see that am successful.

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APPROVAL

I hereby certify that this final year report as original and individual work of NAKABAZI EVA OF REGISTRATION NUBUMBER BU/UP/2019/1485.It has been done under my supervision and it is ready for submission to the board of examiners of Busitema Uninivesity.

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CHAPTER ONE: INTRODUCTION

1.0 BACKGROUND.

Small scale mining involves extraction of metals, precious stones, industrial minerals and other commodities using simple technologies. At a worldwide scale, an estimated 100 million people depend on income from small-scale mining .(Appel, 2012) in Uganda, Artisanal and small scale mining (ASM) directly employs more than 150,000 Ugandans and indirectly benefits at least 1 million more women, men(*Comparison of Gold Yield with Traditional Amalgamation and Direct Smelting in Artisanal Small-Scale Gold Mining in Uganda - PMC*, n.d.) and children.(Appel & Jønsson, 2010) Overall, more than 90% of most minerals mined in Uganda are produced by ASM including gold, limestone, stone aggregate, clay, sand and marble among other minerals. It is found to be a source of income to many small-scale artisanal miners especially in Tiira ASM, whereby miners mainly deal in gold mining. Mainly rudimentary technology like hammer and chisel are used, because they are cheap, easy to access, and they don't require skilled labor to operate.

Over many years ,many different methods have been used by the enterprising miners and one of the earliest methods was using a simple sheepskin left over in the river to collect gold flecks within its fleece, leading to the myth of the golden fleece(Appel, 2012).However, there was introduction of better methods in gold purification though some are toxic. In Tiira, Uganda it is found that mercury amalgamation gold extraction method is commonly used way of extracting gold, where mercury captures fine gold particles.

Although trading in mercury has been forbidden for years in the world(Wiltje et al., 2014)

, the biggest small scale miners still use it, which calls for its manufacture, in spite of its negative effects to the environment. Reseach shows that mercury is continuously used because it is used to process small amounts of gold in the ore which fits small scale miners. They continued to say that mercury use takes less time compared to other methods of gold extraction and the fact that many miners need to process small quantities of gold on daily basis to get what can earn them a living. It is well established that using retorts can virtually eliminate the release of mercury from

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