UNIVERSITY OF CAPE COAST

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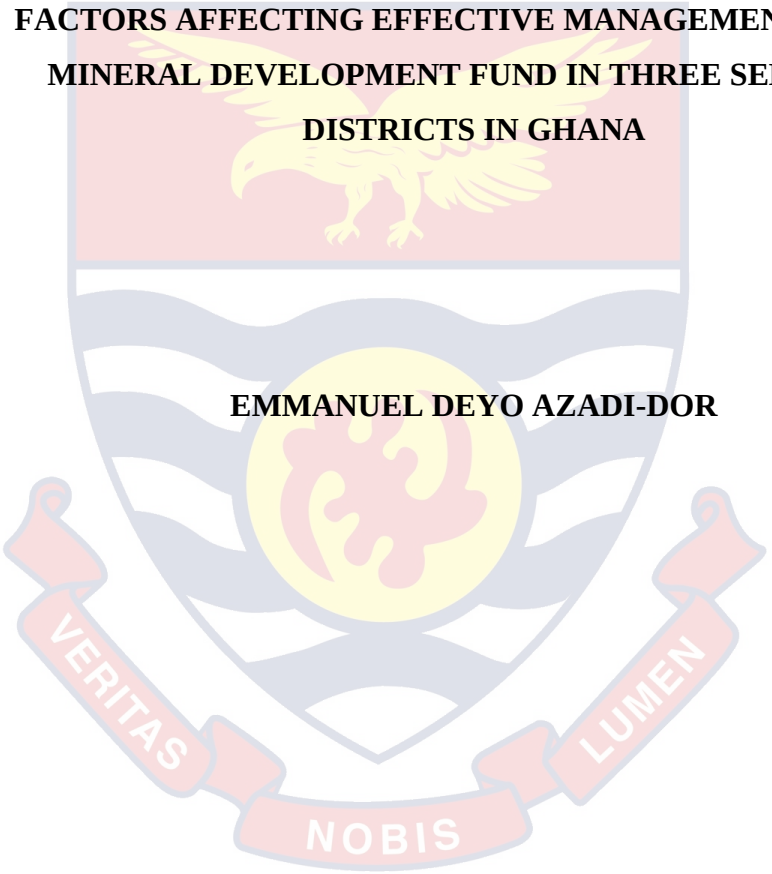
EMMANUEL DEYO AZADI-DOR



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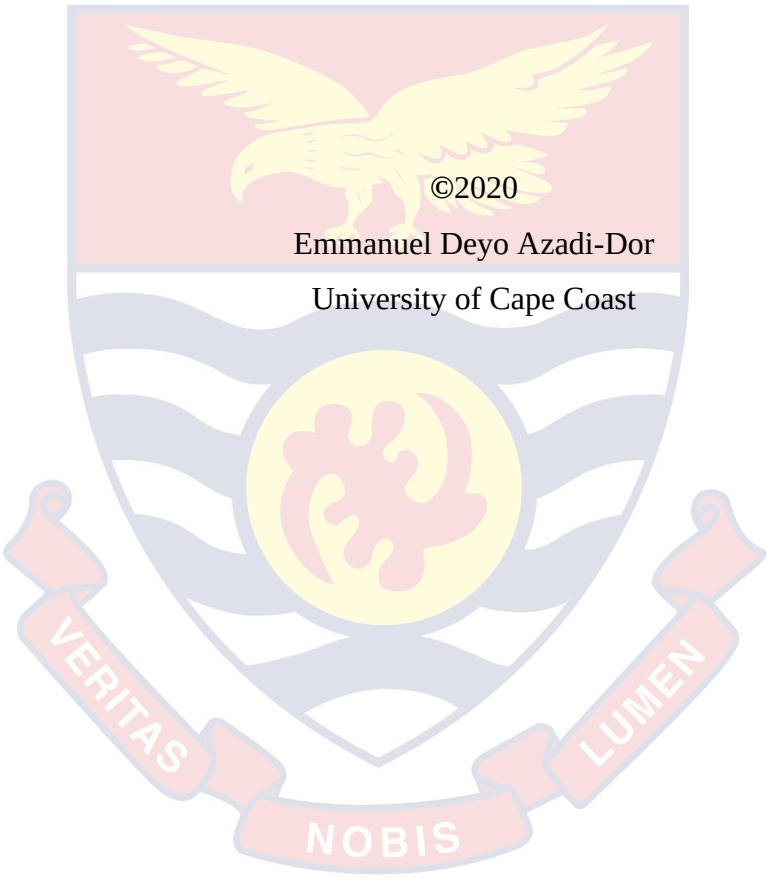

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FACTORS AFFECTING EFFECTIVE MANAGEMENT OF THE MINERAL DEVELOPMENT FUND IN THREE SELECTED DISTRICTS IN GHANA

BY

EMMANUEL DEYO AZADI-DOR

Thesis submitted to the Department of Agricultural Economics and Extension of the School of Agriculture, College of Agriculture and Natural Sciences, University of Cape Coast, in partial fulfilment of the requirements for the award of Doctor of Philosophy degree in Non Governmental Organisation Studies and Community Development.

OCTOBER, 2020

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:..... Date:.....

Name: Emmanuel Deyo Azadi-Dor

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature:..... Date:.....

Name: Prof. Ernest Laryea Okorley

Co-Supervisor's Signature: ..... Date:.....

Name: Dr. Albert Obeng Mensah

ABSTRACT

The Government of Ghana in 1993 by an Executive Fiat established the Mineral Development Fund (MDF) to enable the District Assemblies which host mining operations to undertake development projects to mitigate the effects of mining in affected communities. The purpose of this ex-post, quasi experimental design using proxy pretest, survey and focus group discussions is to undertake an evaluation of the programme since its inception to assess the factors affecting effective management of the Mineral Development Fund in Tarkwa, Prestea Huni Valley (PHV) and Obuasi District Assemblies who have received GH₵17,673,830.25, GH₵18,277,241.00 and GH₵10,922,654.89 respectively. A total of 211 projects were examined and the factors identified to be affecting the effective management of the MDF include Districts adding the fund to IGF, several discrepancies in royalty disbursements and Districts receipts, no technical risk assessment to identify the harmful effects of mining, low efficiency rates, project cost and time variations, misappropriation, misapplication, mis-targeting of beneficiaries and carrying out frivolous projects. In Super DEA analysis Obuasi District is the most efficient. Direct logistic regressions were performed and the models correctly classified 69.9%, 85.5% and 88.7% of the cases for Tarkwa, PHV and Obuasi Districts respectively as effective projects. The ranking of the factors which affect the effectiveness of infrastructure projects by key stakeholders indicated adequate funding, adequate plans and specifications, political influence, Project Manager's competence, constructability and risk management as the top six factors to be taken seriously throughout the project life cycle. It is therefore recommended that there should be timely collection and disbursement of the Fund; risk analysis be done to identify MDF related projects; Officials who have misapplied the Funds be sanctioned; an agency be set up to manage the Fund at the District level; key stakeholders, especially the affected communities, be involved in all stages of management of the MDF. Finally, a law should be passed to provide clear guidelines as to the collection, disbursement and management of the MDF in order to achieve its objective.

KEY WORDS

District Assemblies

Effectiveness

Efficiency

Evaluation

Mineral Development Fund

Projects

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Finally, I wish to render my sincere thanks to my family, especially my mother Grace Dogbatse and my friends Theophilus Soku, Godwin Amoakohene, Jonathan Awuah Dapaah and Dr. Selorm Akaba for their support.

DEDICATION

To Dzigbordi, Selasi, Emmanuel, Emmanuella, Mawulormi, Mawufelorlor and Mikafui Deyo

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LIST OF ABREVIATIONS

Admin	Administration
CCR	Charnes, Cooper and Rhodes
CEO	Chief Executive Officer
CHPS	Community-Based Health Planning and Service
CIPP	Context, Input, Process, Product
CIRO	Context, input, reaction, and outcome
DA	District Assembly
DCE	District Chief Executive
DEA	Data Envelopment Approach
DHMT	District Health Management Team
DMU	Decision Making Unit
EITI	Extractive Industries Transparency Initiative
EPA	Environmental Protection Agency
FDI	Foreign Direct Investment
FGD	Focus Group Discussion
GHEITI	Ghana Extractive Industry Transparency Initiative
GMC	Ghana Manganese Company Limited
GRA	Ghana Revenue Authority
GSS	Ghana Statistical Service
HIV	Human Immunodeficiency Virus
IBM	International Business Machines
IBA	Impact and Benefits Agreement
ICMM	International Council on Mining and Metals
IGF	Internally Generated Funds
IMF	International Monetary Fund
IPO	Input, Process, Output

JHS	Junior High School
KASA	Knowledge, Attitudes, Skills, and Aspirations
KG	Kindergarten
MDF	Mineral Development Fund
MTDP	Medium Term Development Plan
NDCBP	Niger Delta Citizens and Budget Platform
NDPC	National Development Planning Commission
NGOs	Non Governmental Organizations
NRF	Natural Resource Funds
NRR	Natural Resource Revenue
NRRM	Natural resource revenue management
OASL	Office of the Administrator of Stool Lands
OB	Obuasi
OEM	Organisational Elements Model
OECD	Organisation for Economic Cooperation and Development
OMA	Obuasi District Assembly
PHV	Prestea Huni Valley
PHVDA	Prestea Huni Valley District Assembly
PIPA	Participatory Impact Pathways Analysis
PM	Project Manager
PNDCL	Provisional Defense Council Law
RC	Roman Catholic
RLBR	Reaction, learning, behavior, and results
RII	Relative Importance Index

ROI	Return on Investment
SAP	Structural Adjustment Programme
SEE	Social, Economic and Environmental
SHS	Senior High School
SPSS	Statistical Package for the Social Sciences
St	Saint
STD	Sexually Transmitted Diseases
TK	Tarkwa
TMA	Tarkwa District Assembly
TOP	Targeting Outcomes of Programmes
US	United States
WASH	Water, Sanitation and Health
WC	Water-closet
WB	World Bank
WBS	Work Breakdown Structure

CHAPTER ONE

INTRODUCTION

Background to the Study

Mining in Ghana was started long ago even before the Europeans arrived in the then Gold Coast (Akabzaa & Daramani, 2001). The variety of minerals mined consisted of bauxite, diamonds, manganese, lime and salt but gold, bauxite, diamonds and manganese constitute the main minerals extracted in commercial quantities in Ghana (Addy, 1998). As custodians of lands, Chiefs exercise high authority over the mineral resources and guided its sustainable exploitation. According to Allen (1958), between 1901 and 1902, it was found that the reef in Tarkwa was the same as that of South Africa and this resulted in increase gold production. There were several investments in the Tarkwa area but the impact was minimal due to poor infrastructure. After independence, Ghana went through both negative and positive history of development and by the 1980s, the economy was on its knees. As a result of the economic downturn, the government of Ghana implemented the SAP to help revive the dying economy in April 1983 (Awudi, 2002). The SAP was meant to provide inducements to the investors, reduce inflation, repair infrastructure and promote economic development economic and export. The main drivers to economic growth and employment opportunities were private investments in the mining sector (Awudi, 2002). The legal framework crafted and policies during the Economic Recovery Program were aimed at making the mining sector open so as to draw foreign investors into mining activities in

Ghana (Amponsah-Tawiah & Dartey-Baah, 2011). Many enticements were offered to private investors in the mining sector such as the reduction in Import Duty and Foreign Exchange Tax; corporate income tax; abolishment of Mineral Duty, exclusion from the payment of Duties on plant, machinery, equipment and accessories imported for use in mining just to mention a few. The previously practiced underground mining by most of the large scale State owned mining enterprises was substituted by surface mining which required large tracts of land for mining activities (Tsuma, 2010). Environment laws and policies were not given the needed attention which resulted in serious damage and effect on the vegetation, soil, air, water, economic and the socio-cultural life of the host communities.

In view of the social, economic, cultural and environmental devastating impact of mining, the Government of Ghana in 1993 by an Executive Fiat established the Mineral Development Fund to lessen the impact of mining activities on the people in the affected communities in order to raise their socio-economic living standards. Therefore a fraction of the MDF is ceded to the District Assemblies hosting mining operations to undertake development projects. The Districts are to utilize the Mineral Development Fund to undertake developmental projects and programmes in the affected communities which would reverse the harmful effects of mining; empower the inhabitants; provide alternative livelihood opportunities and restore the communities to their former status.

The windfall in mineral revenues to these beneficiary District Assemblies present a big challenge in an already deficient revenue

management at the local government system. For some time now the Serious Fraud Office's reports lift up worry about the financial management of Ghana's local governance system and how it hinders development. The major areas of worry include instances of bribery, corruption, escalating stealing, misappropriation, misconduct, fraud and mismanagement of financial records and improprieties in most government institutions (Asibuo, 2006),

According to the 2011 Auditor General's report, after examining accounts of 117 District Assemblies, over GH₵12.1 million could not be traced, due to what the report says were internal control weaknesses and managerial ineffectiveness, leading to widespread irregularities in the financial administration of the various MMDAs. The Auditor General (2012) after an audit of the District Assemblies' Common Fund made the following observations:

> The outcome of my audit of the management and utilization of Common Fund and other statutory funds for the 2012 financial year is not different from those of previous years. The Assemblies continued to violate rules, regulations, policies, procedures, directives and legal instruments which had been introduced to ensure effective and efficient management of resources made available to the MMDAs. The management letters and annual audit reports, the contents of which formed the basis of this report, therefore disclosed recurring weaknesses in internal controls and lapses in operational areas such as cash management, contract administration, procurement and stores management and tax administration all of which are highlighted. This

> sordid state of affairs in the management of resources by the MMDAs is primarily the result of the lack of interest and dedication to duties and responsibilities exhibited by both the Ministry and managements of the MMDAs towards the implementation and enforcement of my audit recommendations. I have again recommended appropriate methods of improvement through effective supervision, monitoring and enforcement of existing statutory and regulatory frameworks, together with imposition of sanctions. I have also recommended improved risk management and controls to safeguard the proper utilization of resources within the MMDAs (Auditor General, 2012, p. 3).

Giving highlights of the magnitude of the problem in a transmittal letter of the report to the Parliament of Ghana, the Auditor General (2012) said:

> The outstanding and unresolved issues are attributable to deficiencies and weaknesses in internal controls in the operations of the audited Assemblies. Weaknesses such as non-compliance with existing legislative framework and instruments, managerial lapses and weak monitoring procedures at both the ministerial, legislative and administrative levels of the Assemblies were pervasive as evidenced in my management letters. The deficiencies noted in the operations of the Assemblies created avenues for some officials to mismanage the funds and resources of the Assemblies to a financial value of approximately GH₵48,435,279.59 during the year under review. The lapses and

deficiencies were identified in transactions such as cash management which repeatedly recorded payment cycle irregularities, unsubstantiated payments, misapplication of funds, unauthorised payments and unaccounted payments, procurement, store and contract irregularities in the transactions of some Assemblies as well as tax irregularities (Auditor General, 2012, p.4).

In the face of these improprieties, uncertainties and the public outcry for effective resource management in the local government system of Ghana, especially those hosting mining operations as the conditions of mining host communities keep worsening by the day after over 20 years of the existence of the Mineral Development Fund, an in-depth study is needed to examine the factors affecting effective management of the Mineral Development Fund.

Statement of the Problem

The District Assemblies have been in the forefront of development especially in the rural communities. Most of these communities in Western and Ashanti regions of Ghana in particular host mining operations and therefore suffer from all the negative effects of gold production and therefore beneficiaries of the Mineral Development Fund. The Government after collecting royalties from these companies cedes part of it as Mineral Development Fund to the Districts in the operational areas of the mines to undertake developmental projects. These projects are expected to lessen the suffering of the inhabitants in these communities.

Despite the huge sums that have accumulated to the Mineral Development Fund and over 20 years of its life, there is increasing public disquiet about increasing devastation of the environment, terrible social amenities and high unemployment in the mining areas which the Mineral Development Fund was meant to address. A lot of studies have been done in Ghana in respect of management of financial resources at the local governance level. Appiah-Agyekum, Danquah, and Sakyi (2013) did a study on Local Government finance in Ghana. They investigated the disbursement and management of the Member of Parliament's share of the District Assemblies Common Fund while Bavere (2011) did a comparative study in Jaman North and South District Assemblies to investigate the function of the District Assemblies Common Fund in development the local economy.

The only two studies relating specifically to the Mineral Development Fund were Standing (2014) entitled Mineral and Mining policy of Ghana: ensuring that mining contributes to sustainable development and Quarshie (2015) entitled Mining and Development: A case study of the Mineral Development Fund in Obuasi District Assembly. The latter is a qualitative case study which looked at the factors that led to its establishment, how the Mineral Development Fund has been exploited by the Obuasi District Assembly and the Chiefs and the extent to which they can be held accountable in the utilization of mineral revenues received.

Despite the insights revealed by the above mention studies, there was the need to examine other relevant aspects of the Mineral Development Fund and in a wider setting. Therefore any research, design to examine the Mineral

Development Fund should not only examine its utilization but extend to other relevant factors such as the context for Mineral Development Fund , efficient and effective collection, disbursement and management of the Fund, factors considered by stakeholders as critical and most important in Mineral Development Fund infrastructure project delivery and finally impact of such programmes on the members of the beneficiary communities. Besides this, such a research design should also have large study units and employ mixed method to enhance the quality of the results obtained.

Objective of the Study

The general objective of the study was to examine the factors affecting effective management of the Mineral Development Fund in three selected Districts in Ghana. The specific objectives are:

1. Examine the context for establishing the Mineral Development Fund
2. Assess the trend of funding of the MDF programmes.
3. Examine the structure and process for managing the MDF.
4. Evaluate the efficient and effective management of the MDF by the three District Assemblies.
5. Examine whether the District Staff and Contractors differ in ranking factors affecting effectiveness of the Mineral Development Fund infrastructure projects.
6. Assess the impact of Mineral Development Fund on the mining affected communities.

Research Questions

The following research questions were developed from the specific research objectives to guide the study

1. What was the context for establishing the Mineral Development Fund?
2. What was the trend of funding of the MDF programmes?
3. What were the structures and processes for managing the MDF?
4. How efficient and effective were the management of the MDF by the three District Assemblies?
5. Was there a difference between District Assembly Staff and Contractors in ranking factors affecting effectiveness of the MDF infrastructure projects?
6. What were the impacts of MDF on the mining affected communities?

Hypothesis

1. H_0: there is no difference between District Staff and Contractors in ranking factors affecting effectiveness of the MDF infrastructure projects.

H_i: there is a difference between District Staff and Contractors in ranking factors affecting effectiveness of the MDF infrastructure projects.

Significance of the Study

The study was significant because of the benefits it affords the stakeholders in the following ways. First of all, it brought to the fore the discrepancies in the payments and receipts of the Mineral Development Funds to the government agencies concerned. The discrepancies were in terms of the amount due, the amount paid and the amount received and also the lapse of

time between payment and receipt. Acting on the recommendations of this study, the government agencies would put in the right measures to collect the right amount of royalties due and disburse same in a timely fashion. This would enhance the work of the agencies concerned.

Secondly, the affected Districts would receive bigger disbursements to complete projects quickly and thereby bringing to the barest minimum time and cost over runs. The recommendations in the study would inform the various Districts, which projects were considered relevant to the objectives of the Mineral Development Fund and therefore able to lessen the harmful results of mining on the local people. This would eliminate wastage of the Mineral Development Fund on frivolous projects. If the recommendations are fully implemented, a separate government agency would be set up to manage the Mineral Development Fund. This would improve project initiation, planning, selection, execution and project close out phases undertaken by the Districts.

Thirdly, the improvements along the value chain would ultimately lead to an enhanced benefit to the affected communities through increased Mineral Development Fund receipts, good project planning, selection and implementation which is in tandem with the objectives of the Mineral Development Fund. The coming into effect of a legal framework outlining clear guidelines regarding the use of the Mineral Development Fund would minimise the incidence of mis-targeting, misapplication and mismanagement of the Fund. Finally, in academia, the findings added to the existing knowledge on the efficient and effective management of financial resources at the District Assembly level in Ghana.

Delimitation

Out of the 11 beneficiary Districts the study covered only three District Assemblies, namely Tarkwa District, Obuasi District and Prestea Huni Valley District Assemblies. The Mineral Development Fund came into being in 1993 but data collected covers periods between 2003 and 2016. This was as a result of data unavailability in previous years. The projects and programmes included in the study were those which have been completed by the three Districts, using only the Mineral Development Fund since 2003 and not all projects done in the mining districts to lessen the effect of mining on the inhabitants.

Limitation

The research was limited by the availability of required information both at the District Assemblies and the local communities. Some of the assembly staffs at the three District Assemblies had taken up their postings not too long ago and therefore could not tell or explain some of the things that happened before assuming post. At the community level, because of the length of time the Mineral Development Fund have been running, some information about the programmes cannot be remembered especially when it came to recollection of figures. The research also lacks a baseline survey and therefore depended on recall in order to have an appreciation of the situation before the intervention. The use of the proxy pretest as a means of baseline information before the intervention also reduced the internal validity to some extent but triangulation was employed to improve reliability and validity.

Organisation of the Study

The thesis was organized into seven chapters. Chapter One introduced the topic and gave a brief background about the genesis of the SAP and its accompanying policies in Ghana, its negative cultural, socio-economic and environmental effects on the inhabitants and the subsequent Government Fiat in 1993 establishing the Mineral Development Fund and what it was meant to achieve. It also provided the statement of the problem, the objectives of the study, research questions, significance of the study, delimitations and limitations of the study.

Chapter Two presented the theoretical literature review, conceptual framework and empirical literature review. The areas covered under the theoretical review includes definition of evaluation, the theory tree of evaluation methodology and models of evaluation, efficiency and effectiveness, factors affecting effectiveness of the Mineral Development Fund infrastructure projects and finally the impact of the MDF projects on beneficiaries. Areas covered under the empirical literature review included an overview of natural resource, natural resource revenue management in natural resource rich countries and the wastage of natural resource revenue and its effects on those economies, the allocation and management of natural resource revenue in two states in Nigeria, the Mineral Development Fund in Ghana and the factors affecting the effectiveness of MDF projects.

Chapter Three, presented the research methods, comprised of the philosophical underpinnings of the study, the study area, research design, the study population, sampling technique and sample size selected. It also

included data collection and analysed in order to achieve the objectives of the study.

Chapter Four, presented the results obtained and the discussion of these results in line with the stated objectives one and two. These were the context for establishing the MDF and trends of funding the Mineral Development Fund Mineral Development Fund programmes.

Chapter Five, presented the results on objectives three and four which were, examining the structure and process, efficient and effective management of the Mineral Development Fund.

Chapter Six also presented the result of objectives five and six. These were, factors affecting the effectiveness of the Mineral Development Fund infrastructure programmes and impact of Mineral Development Fund projects on the affected communities.

Chapter Seven was the final chapter, made up of summary, conclusions and recommendations. It provided a summary of the main findings and the conclusions. Appropriate recommendations were made based on the findings. In addition, possible areas of further studies are suggested.

CHAPTER TWO

LITERATURE REVIEW

Introduction

The research was to examine the factors affecting the effective management of the Mineral Development Fund by three Districts namely Tarkwa, Obuasi and Prestea Huni Valley District Assemblies. These three Districts host the largest mining companies in Ghana and also received over 56% of the allocation of the Mineral Development Fund. This section was made up both theoretical and empirical literature reviews. Areas covered under the theoretical review included effectiveness, assumptions, effect of programmes, definition of evaluation and selected evaluation models among others. The empirical review comprised of natural resource revenue management, utilization of the Mineral Development Fund, factors affecting effective management of natural resource revenue and factors affecting the effectiveness of infrastructure projects.

Theoretical Literature Review

This section covered a review of materials on evaluation, measurement of efficiency, effectiveness, effect and the assumptions under which the objectives are achievable were examined. The concept of the evaluation theory tree and proponents of individual evaluation models were also looked at.

Definition of Evaluation

Rossi and Freeman (2004) observed that evaluation is the methodical and objective appraisal of a programme, its design, implementation and outcomes with the intent of determining the significance and achievement of objectives, development efficiency, effectiveness, impact and sustainability.

The Organisation for Economic Co-operation and Development (2007) defined evaluation as the method of assessing the overall efficiency (are the right things done?), effectiveness (are things being done right?) and economy (is there value for money?) of a project. The agreement between a project's outcome(s) and the project's objective(s) is (are) the main premise of evaluation.

The focus on causality is the trademark of evaluations. In the same vein, the ability to properly identify the causal relationship between the programme and the expected outcomes is the main problem usually encountered in carrying out effective evaluations. The following section explains the main theories underpinning the research.

The Evaluation Theory Tree

The evaluation theory tree was propounded by Alkin and Christie (2004) which provides a guiding framework for evaluation work. They maintained that all evaluation theories must consider:

a. the methodology being used,

b. how the data are to be judged or valued, and

c. the user focus of the evaluation effort.

The relationships between theories are represented in the form of an Evaluation Theory Tree with each of the main branches standing in lieu of one of the dimensions: methods, judgment/valuing, and use. The evaluation tree system of grouping evaluation models is based upon the relative emphasis within the various models.

The middle branch of the theory tree is the method branch in which evaluation is mostly guided by research methodology. Theorists on this branch are in generally concerned with knowledge construction in the most meticulous manner in the light of any particular limitation within that evaluation (Shadish, Cook & Leviton, 1991). Essential to these theories is the work of Campbell (1957) which defines the conditions for appropriate experimental and quasi-experimental designs.

To the right of the Methods branch is the valuing branch, which was firstly encouraged by the work of Michael Scriven. Scriven (1967) stated that evaluation is not evaluation without valuing. He pointed out that the work of evaluation is making a value judgment about the object that is under study. This branch is divided into two (objectivist and subjectivist) which differentiate the two basic perspectives informing the evaluation process. Scriven said, the role of the evaluator is to do that valuing and has influence the objectivist sub-branch to the left. In the subjectivist sub-branch to the right, advocates argue that reality is an ongoing, dynamic process and truth is always relative to some particular frame of reference or context.

The third branch of the tree is Use, which originally focused on an orientation toward evaluation and decision making. Work by early theorists on the third branch focused exclusively on those empowered to use the evaluation information; mostly individuals who had contracted for the evaluation. Successive theorists have expanded the use branch to broader use stakeholders and to evaluation capacity building within the organisation being evaluated. The three tree branches are not meant to be viewed as independent but rather have been drawn in a manner that mirrors their relationship to one another. This is significant because theorists are located on each branch in a way that reflects not only their primary emphasis, but also the other major tendencies of their particular approach. The following specific evaluation models have emerged due to different emphasis given by researchers and practitioners in the field of evaluation.

Kirkpatrick's four Levels of Evaluation Model

Kirkpatrick (1998) propose that his four level model of evaluation are meant to basically aid in assuring the significance of the effects of training on a group. Another reason of the categorization is to help in assessing the design and implementation of training so that it can be always enhanced.

Level 1, Participant Reaction evaluation entails assessing participant reaction. Reaction can be thought of as how the participants appreciate the programme. The main objective for measuring at this level are valuable feedback for the facilitators, quantitative data for management, feedback for future programmes and information for use in establishing subsequent

programme. This level measurement also enhanced information collection on areas such as the facilities, the schedule, the trainee, the facilitator among others (Kirkpatrick, 1994).

Kirkpatrick viewed this level as significant for the following reasons: (a) participants provide the information on which management conclusion on maintaining funding the programmes are based; (b) the information from trainees can help to improve programmes and (c) participants must like a training program to obtain the greatest gain from it (Kirkpatrick, 1975).

Level 2, Learning outcomes measures the learning that occurred in the course of the programme. The philosophy, essentials, and procedure which were learned by the participants are the learning outcomes. This implies that, the emphasis is not application of these philosophy, essentials, and procedure (Kirkpatrick, 1975). It cannot guarantee that the trainee: (a) know when to use the skill learned , (b) will have an chance to use the skill, or (c) will exhibit the skill when an opening is available. The use of pre and post testing is one way to evaluate what has been leant.

Level 3, Behavior changes evaluates changes in skill and performance on the job. This level is said to be complicated to assess, as it attempt to tease out modification in intellect, ability and behavior on the job caused by a programme intervention. Direct reports, observation and performance contracts with trainees, surveys and interviews of colleagues, superiors are some of the techniques for carrying out an assessment at the behavior change level. Records of production, superior of output, waste, time to accomplish a

task, uptime of machinery among others provide the necessary information to tease out changes in skill (Kirkpatrick, 1975).

Level 4, the Results effect on organisational outcomes such as increase sales, ROI, reduce turnover, reduce accidents and reduce defects and the information is usually obtained through perceptual data, performance data and financial reports. The main purpose of this appraisal is to find out the effect of a programme on the organisational bottom-line. Programmes aimed at concrete outputs, rather than to abstract philosophies, theories, ideas and principles, should be appraisal accordingly (Kirkpatrick, 1994). Kirkpatrick gave no direction as to the technique to use in assessing this level. It is done less frequently compared to the earlier three levels because of the difficulty of assessing the effects of training programme that do not have precise, quantifiable results such as leadership (Twitchell, Holton, & Trott, 2000).

Weaknesses of Kirkpatrick's Four Levels Model

There is a suggestion that there is a positive and causal relationship between the four levels of evaluation. In order to ascertain this assertion to be true or not, it would be sufficient just to assess whether participants have positive reactions to the training intervention, from which it could be inferred they learned from the training, they would improve performance, and ultimately positively contribute to the organisational results.

An additional issue that keeps coming up has been whether the model is hierarchical; which would require that an appraisal at level four would necessitate assessment from level one to three. The hierarchical nature of the

Kirkpatrick model has been refuted by many studies (Alliger & Janak, 1989; Clement, 1982). It came out in evaluation research that, a high course reaction measurement at level 1 did not result high knowledge and skill acquisition at level two and level three respectively which in turn did not culminate in high level of job performance at level four. Kirkpatrick (1975) stressed that there is no assurance that a positive reaction to the training programme would result in learning, behavioral change, and positive organisational outcomes. This is the reason why it is vital to appraise both reaction and learning in case no alteration in behavior takes place so that it can be found out with certainty whether there was no alteration as a result of an ineffective training intervention or of unsuitable job environment and lack of motivation (Kirkpatrick & Kirkpatrick, 2006).

Another assumption is that the four levels are positively inter-correlated. It would be just enough to appraise if participants have level one positive reaction to the training programme, from which it could be deduced they learned from the programme, they would increase their job performance, and definitely add to the organisational outcomes if these assumptions were true. Throwing light on this matter, Kirkpatrick (1975) pointed out that there is no certainty that a positive reaction to the training programme assures learning, a behavioral alteration and positive organisational outcomes. It is therefore vital to measure both level one and level two which are reaction and learning in case no change in behavior occurs. Deductions can then be made with assurance that there was no alteration as a consequence of an

unsuccessful programme intervention and lack of motivation (Kirkpatrick & Kirkpatrick, 2006).

Expansion of Kirkpatrick's Evaluation Model

Holton (1996) came out with three outcomes of training interventions as learning, individual performance, and organisational results, all of which are still analogous to Kirkpatrick's Levels 2, 3, and 4. Holton emphasized that reactions out not be regarded as a principal result of training intervention. He is convinced that positive reactions and learning are not automatically correlated (Holton & Naquin, 2004). The model produced by Holton has reaction as having effect on learning outcome; therefore, its control is not completely ignored. Bomberger (2003) commented that the model developed by Holton indicates the desired outcome as a result of training programme intervention and conditions which positively or negatively encourage or restrain it. It is therefore a good toting up to the catalog of evaluation models since it recognizes many more variables considered to impact effectiveness of a training intervention. Despite its enhanced nature, it has not been applied as commonly as Kirkpatrick model. After almost a decade, Holton (2005) said that regrettably, a complete evaluation of his model has never been performed as apparatus to quantify the constructs in the model is not yet in existence.

Brinkerhoff Six-Stage Evaluation Model

Brinkerhoff (1987) critique Kirkpatrick's model making the point that the tools to properly and adequately assessed the instructional design or needs

analysis, instructional planning and development and implementation stages are not available. There is a close relationship between the Brinkerhoff model and the Kirkpatrick model, although the former added an additional stage 1 to address and measure the instructional design functions, which are jointly referred to as needs analysis.

Brinkerhoff and Gill (1994) who were advocates of the system evaluation also proposed circular evaluation by which all the instructional design elements are adequately measured. Brinkerhoff (1987) added two additional stages at the beginning to the already four existing levels which he entitled formative and summative evaluation. The components of the Six Stage Evaluation Model begin with needs assessment and discover the objectives of the programme. Stage two and stage three measures the programme design and programme realization respectively. These two levels are comparable to Kirkpatrick's Level 1. Stage four measures the learning, and is akin to Kirkpatrick's Level 2. Stage five measures behavioral change and is identical to Kirkpatrick's Level 3. Stage six measures the extent of the learning which is transmitted to the outcome, same as Kirkpatrick's Level 4.

Organisational Elements Model (OEM)

Kaufman and Keller (1994) pointed out by saying that Kirkpatrick's model was meant for measuring training programmes and that as businesses now require to assess different kinds of programme interventions, the model has to be adapted. Societal contribution was added to Kirkpatrick's model as a construct. They said that manufacture organisations are ever more prevail

upon to take into consideration public influences such as social costs and social benefits. Needs assessment and planning, an evaluation of the desired outcome and an appraisal of the availability and worth of resources were some of the additions made to the model. They put forward that costs can be looked at as a variable in measuring efficiency at the starting point and at the highest level at the end.

Kaufman and Keller in collaboration with Watkins re-categorized the construct in the Organisational Elements Model into six levels as follows:

Level 1. Input, this is akin to Kirkpatrick's reaction level but considers value, relevance and addition made by technique and assets used.

Level 2. This level is identical to the reaction level but involves an analysis of whether the programme was executed properly to accomplish stated goals.

Level 3. Acquisition is parallel to the learning level and evaluates ability and capability.

Level 4. Performance associate closely to the behavior level and measures the application of skill and knowledge.

Level 5. Macro is akin to the results level and looks at the bottom line of the entity.

Level 6. Mega an added level examines social cost and social benefits.

Context, Input, Reaction, Outcome Model

Warr, Bird, and Rackham (1970) offered a model consisting up of context, input, reaction, and outcome (CIRO). Context appraisal entails

acquiring data on the present state to make a decision on intervention requirements and objectives. This level entails gaining an insight into the trainees' appreciation and enjoyment of the programme to enhance the procedure, and is identical to Kirkpatrick's level one. Outcome level appraisal entails getting information about the ultimate benefits of the programme. This outcome stage consists of immediate enjoyment to long lasting results which is analogous to learning, behavior, and results of Kirkpatrick (Phillips, 2003). The CIRO model points to a hierarchical relationship of the levels so that to evaluate outcome level, there is need to evaluate reaction level first.

Warr, Bird, and Rackham (1970) pointed out that the result appraisal can however be left out or unutilized. This is unlike the modern waves and development in personnel management and Human Resource Development profession, which demand attention to be centered and focused on the higher level measurements.

Input, Process, Output (IPO) Model

Bushnell (1990) developed a model which is more identical to many system design models. The input stage is made up all the essentials that influence and affect the effectiveness of the training programme intervention. These variables are facilities, equipments, training resources and trainer expertise. To enhance the effectiveness of the process stage, there is the requirement for proper planning, design development and the delivery of the programme intervention. The immediate output stage is in fact made up of Kirkpatrick's first three levels which are participant reaction, knowledge

gained and enhanced performance on the job. Bushnell incorporates Kirkpatrick's fourth level, regarding it as long-term impact on the organizations' bottom-line, such as increase sales, return on investment, increase market share, customer satisfaction and increase shareholders' worth.

The IPO Model is the model IBM employs in its Human Resource Development programmes. The IPO Model is an integration of essential components of Kirkpatrick's four-level Model and Brinkerhoff's six-stage Model. Bushnell (1990) point out that, organisations that utilizes it can easily ascertain if the intervention meets its objectives, adjustments needed for programme advancement, and if indeed the participants get the desired talents and expertise. Bomberger (2003) suggests that the IPO model make available an opportunity for its application anytime during programme execution, providing both formative and summative evaluation. It moves a step further by making effort to reveal the merit of training in financial terms. The IPO assists in following workers advancement by establishing performance measures at each level. The levels in the model are as follows:

a. Input level- these are the experiences, qualifications, resources, materials employed.
b. Process level- this is made up of adequate planning, system designing, development, installation and programme delivery.
c. Outputs level- these are the enjoyments in terms of the appreciation of the programme, knowledge gained and expertise acquired and enhanced functioning at the task assigned.

d. Outcomes level- these are the return on investment, increase market share, increase sales, increase shareholders worth and customer satisfaction.

Logic Model

Logic Model, programme theory, theory-based evaluation, theory of action, intervention logic, impact pathway analysis and programme theory driven evaluation science are the many different means of designing a model that evidently show a causal relationship between the inputs of a programme and processes to a string of desired results and then employing it to structure and direct an appraisal (Rogers, Petrosino, Hacsi & Huebner, 2000). Most techniques to construction models such as the logic model have focused attention on simple, linear models, but some have investigate how non-linear models may be employed (Funnell, 2000) to adequately visualize programmes implementation and appraisal.

Many logic models often involve some variation on these five components namely inputs, processes, outputs, outcomes and impact. The most prevalent method for designing and utilizing logic models is shown in Figure 1.

Figure 1: Simple Logic Model

According to Kellogg Foundation (2004) using programme logic methodology is both a learning and management tool that can be employed

during a programme's life; whatever your interest in the programme. Employing logic model culminates in efficient programming and provides better learning opportunities, excellent records of results and mutual understanding about what works and why. The function of a logic model is to offer those with a stake in the programme with a road map outlining the flow of correlated occurrences linking the need for an intervention with the expected outcomes. Logic model is basically a systematic and schematic way to represent and communicate the relation between inputs, the processes and the outcome of a programmed intervention. The logic model is read from left to right and shows the chain of evidence in reasoning from the start to finish.

The main aim of the logic model is to offer a description of series of interrelated occurrences linking the problem to be resolve and the ultimate outcome. This serves a road map to all those with a stake in the programme to visualize, follow and appreciate the resources, the processes and other activities needed for the accomplishment of the expected objectives. Programme logic offers the opportunity to stakeholders to experiment with concepts, theories and ideas and thereby bring them to life. The logic model requires stakeholders to make explicit assumptions with regards to their expectations about the reasons the intervention would resolve the problem, create new opportunities and exploit available resources to the max. The logic model gets the attention of stakeholders focus and engaged on programme objectives after assisting to create common understanding about programme layout, processes and results (Funnell, 2000)

In Planning and design, the logic model function as the structure that links the current state, the processes required and the desired destination. It fills in the gap between the current condition and the expected future. It provides a framework for clearly understanding the situation that demanded the need for an intervention, the expected end state and how resources, activities, processes invested are coordinated to obtain the desired results. Logic models are helpful in creating the framework for programme design which incorporates self-evaluation predicated on common appreciation of what is to happen. During the planning phase, employing logic model requires those with a stake in the programme to examine best practice in research, expert knowledge and experience on the backdrop of the approach and activities selected to accomplish concrete outcomes. Whether charting a course of strategy, managing a programme or moving from one state to another needs an application of some form of a logic model (Millar, Simeone & Carnevale, 2001).

In programme management, the logic model exhibits the relationship between resources, activities and outcomes. It serves as the foundation upon which management plans are developed in detail. During the execution phase, a logic model is employed to clarify, follow and examine operations, processes and functions. It serves as a management tool as well as a structure to examine reliability of the management plans. A logic model serves as the nucleus for a focused management plan that helps you recognize and gather the information needed to monitor and enhance programming. Logic models assist in prioritizing the programme phases most vital for tracking, reporting

and making amendments when necessary (Rogers, Petrosino, Hacsi & Huebner, 2000).

During programme appraisal and strategic reporting, the logic model is the fundamental way forward and the most relevant tool that assist decide on the time and the aspect of the programme to appraise so that evaluation resources are put to the best usage. Throughout the life span of the programme, the appraisal reveals the efficacy of the programme theory. That is how the programme is believed to work.

Figure 2 showed outputs to be consisting of activities and participation but the impact is divided into short, medium, and long-term results.

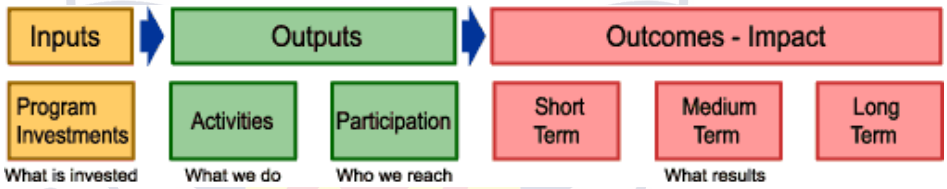

Figure 2: Expanded Logic Model

Inputs are the capital assets invested in the programme. Work activities, processes are performed to convert inputs into outputs. Outputs are those products that are intended to reach specific shareholders. The impact are the enjoyments that these individuals, groups, communities realised out of the outputs produced. The impacts do not occur at once, but rather occur over a long period of time. The outcomes are the benefits that are offered the individuals, groups, families, households, organisations, or communities range between short to long-term results. Outcomes relate to changes in conduct,

custom, judgment, understanding, approach, competence, drive, dexterity and other results of the programme intervention.

Barnes, Sullivan and Matke (2004) posit that adoption and utilization of models like the logic model for appraisal presuppose a secure setting where any failure during execution would be adaptable to modification in respect of existing facts. To represent a simple chain of a theory of change, the simple logic models are most likely to be employed, instead of exhibiting various viewpoints of the many stakeholders of the expected results and how it can be made manifest. On the backdrop of these concerns, Wholey (2003) has delineated a rather thin collection of programmes appropriate for results-oriented administration faction upon a simple logic model. These are programmes in which the objectives are established and measurable and where progression in attaining results can be fairly assessed and finally where processes, activities and outcomes is more amendable to monitoring and supervision.

Participatory Impact Pathways Analysis (PIPA) Model

This is a programme management methodology and strategy where individuals and groups participating in the programme in addition to final beneficiaries work together to construct their own theory of change (Alvarez, 2008). The PIPA theory describes credible impact pathways through which programme outputs can be utilize for the accomplishment of series of outcomes which has impact on social, environmental or economic conditions. Impact pathways are a version of logic model, which together form a model

that illustrates the sense of what the programme is expected to do, what it is doing and what it has already done. PIPA assists people participating in a programme to confer and document their own theories and assumptions about the way programme activities, processes and outputs can result in the expected objectives. When the assumptions and theories are described then the programme's impact pathways is described. PIPA is useful in:

a. Making clear and communicating programme's logic and its probability to produce the desired result.
b. Sharing common knowledge of programmes and recognizing possible fields to explore together.
c. Creating a sense of working towards one goal which can facilitate superior project combination.
d. Constructing an excellent story of the programme's sequence of events.
e. Bringing into being a structure which can be utilized later on to scrutinize and appraise the programme.

PIPA is amendable to be employed anytime in the projects life time. This can be at the start, half way or at the closing stages to provide documentation of the lessons leant from the implemented programme. PIPA illustrates the project's impact logic in two dimensions:

1. Portraying the linkages between the outcomes, outputs and activities by which the programme is deemed to accomplish set targets; and

2. Arrangements of ever changing interaction between those having a stake in the project.

Balanced Scorecard Model

The Balanced Scorecard refers to a group of attentively chosen quantifiable variables derivative from an organisation's long term policy. The variables chosen for the Scorecard symbolize an instrument for management to utilize in informing those with a stake in the project the results and the catalysts and enablers through which the entity can accomplish its goals and long term objectives. Its greatest strength is the act of balancing and giving a sense equal attention to internal business processes and learning, financial results, customers and growth. When selecting variables from the customer viewpoint of the Scorecard, organisations must provide answers to three crucial issues: who are our customer base? What service or product do we want to provide better than others? What do our customers require from us? On the surface this looks relatively easy however in reality these issues present difficult obstacles confronting the organisations (Kaplan & Norton, 2001). In relation to a firm's customers, a firm is likely to choose one of the following:

1. Operational excellence- the entity following this perspective would like to engage in low cost pricing, handiness usually with no add-ons.

2. Leadership in product development- entities choosing this perspective would endeavor to enhance the organization's service or products. An effort

made in this direction is towards the goal of bringing a top product onto the market through constant innovation.

3. Customer understanding- organisations pursuing this perspective would do whatever is required to provide solutions for client's peculiar requirements.

The emphasis is in developing and establishing a lasting understanding and relationship building through excellent appreciation of the customers being served instead of looking for an immediate one time business deal. Irrespective of the value perspective chosen, it would usually consist of measures generally considered and employed in this modern time. These measures include after sale service, repeated sales, customer satisfaction, customer loyalty, increase market share, and customer gaining. These variables are looked at in the following viewpoints:

Internal Process viewpoint- here there is recognition of the critical processes the firm must perform extremely well in so as to keep on utility clients and other interest groups. The job entails the recognition of those processes which are relevant. This would assist in the establishment of the best alternate objectives and indicators to monitor advancement. The satisfaction of various stakeholders' desired expectations may need the recognition and discovery of a completely new innovation of internal processes instead of investing in incremental approach of existing activities. Important measures such as product development, production, manufacturing, delivery and after sale service are indicative of the organisation's excellent performance.

Employee knowledge and development viewpoint propels towards attainment of grand outcomes for internal processes, consumers and other

interested groups. The goals and indicators in this viewpoint are the real and actual drivers of the rest of the other three viewpoints. As a matter of fact, they form the fundamentals for the construction of the Balanced Scorecard. The indicators and initiatives in customer and internal business process viewpoints are evaluated, once objectives are identified. There is high probability of uncovering some mis-alignment between the current situation and the desired destination. This may be in terms of employee skills, information systems and the environment which are relevant and required if sustainable outcomes are to be sustained. The goal and indicators articulated in this viewpoint will assist in sealing the mismatch between now and the future to guarantee excellent progression.

Financial viewpoint measures are the most important aspect especially for organizations that are set up with the main purpose of making profits. The goal and indicators in this viewpoint reveal if tactical execution is resulting in enhanced bottom-line results. Emphasis could be focus on doing better on obtaining customer loyalty, improved and enhanced products, timely delivery of product or service. The point must be made that without any signal of their influence on the organisation's bottom line, they are of no real importance to profit making organizations.

According to Spitzer (1999) the financial indicators will continue to be and remain a fundamental and important component of any organisation's attempts to take an account of how well it is performing, however the indicators must be balanced by how the financial advancement will be enhanced. It is noted that the indicators such as internal business processes,

innovation and employee knowledge are equally important as monetary indicators in appraising the health status of the organization. The management would be seen to be doing well in overcoming this challenge if they are able sell the concept within the organisation.

Bennett's Hierarchy Model

Bennett (1975) argued for the conception of the ladder in the programme management succession and that assessment should take place at all these levels. Since Bennett (1975), there has been a significant move up the ladder so that the focus is now impact of the intervention.

7. End results

6. Practice change

5. KASA change

4. Reactions

3. People involvement

2. Activities

1. Input

The Bennett staircase describes a series of pecking order of evidence of programme effects, starting from the bottom staircase with resource assignment to a programme and moving up to the top, end result of impact which is the long term desired outcome. Even though theory based evaluation represents decomposable causal structures employing quantitative techniques, could be regarded as taking a leaning towards experimental research approaches. The idea of qualitative methodology may be more appealing,

because it incorporates both the rich narrative and the modification of causal assumptions throughout the life span of the project. Unfortunately, most authorities prefer and give more weight in favour of the positivist approach (Connell & Kubisch, 1998).

Targeting Outcomes of Programmes (TOP) Model

Bennett and Rockwell (1996) developed the Targeting Outcomes of Programmes Model to be applied in programme development and evaluation. TOP is based on a pecking order which incorporates programme appraisal within the programme designing phase. TOP utilizes the framework as shown in Figure 3 to aim at definite results in programme design and later on carry out an appraisal to examine the level to which targeted results have been accomplished. The Targeting Outcomes of Programmes Model has the following levels as shown in figure 3.

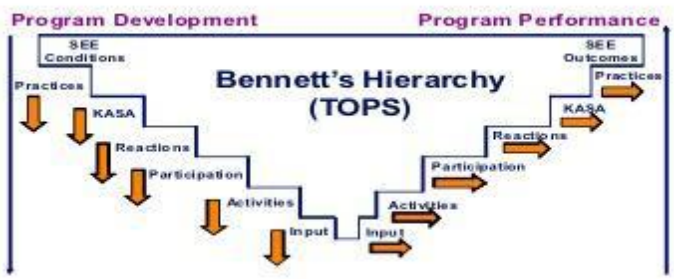

Figure 3: TOP's Two-Sided Hierarchy Model

Level 1: Social, Economic and Environmental state of affairs which require fixing. The outcomes may represent public or private costs which

decrease as solutions are provided by utilizing theory based recommended behaviors.

Level 2: At this level the SEE conditions are persuade by patterns of behaviors, procedures, or actions. The adoption of practices and technologies by individuals, groups, organisations, and communities that result in SEE outcomes are achieved through educational programmes, when the knowledge attitudes, skills and aspirations acquired during a programme intervention is practically applied.

Level 3: KASA moderates the acceptance of chosen way of doing things and the equipments to help accomplish desired communal, financial, and ecological results. The intellectual ability acquired relates to academic materials, understanding economic, social, environmental principles, individual and group decision-making processes. Attitudes are the way of life, outlook, mind-set, or perception s of the individual. Skills are therefore intellectual and physical capability to utilize new practices. Aspirations are the aspiration, optimism, objectives, or expectations. Modification in KASA is likely to happen when individuals react positively as they partake in programme tasks.

Level 4 Reactions refers to the extent of either optimistic or pessimistic appreciation of the programme. An intervention programme that helps to offer relevant, research-based materials to participants can help hold patrons interest. There is the likelihood of individuals getting informed and educated and assisted through various channels at the same time. Therefore their

reaction to programme implemented by one agency may be influenced by supplementary programmes carried out by other organisations.

Level 5: the participants in an intervention programme include persons, folks, members of group, organisations, or societies. Participants appropriate their engagement in all facets of the programme tasks to attain KASA and accepted way of doing things needed to enhance SEE.

Level 6: The different kind of educational materials, actions and strategies made used off to enlighten, teach and train specific individuals, groups, organisations or communities constitute the activities. The activities are a variety of approaches including but not limited to direct contacts, indirect hi-tech and mass communication techniques.

Level 7: Input are resources such as time, money, and staff utilized to prepare, publicize, execute and appraise programmes. Other resources employ are educational materials, communication technologies transportation, and organisational maintenance.

Context, Input, Process, Product (CIPP) Model

Stufflebeam's (1987) CIIP Model is founded on the principle which says that appraisal is fundamentally the collection of data which must be relevant to the requirement and needs for decision making. For a particular data to relevant and important is based on the circumstances and type of choices to be made. The model was developed at a time when the US public educational institutions were trying to overcome the difficulty of evaluating their federal assistance programmes employing variable manipulating,

comparative and controlled experiments (Stufflebeam, 1966). The model is targeted at helping programme managers and personnel to methodically assemble data on programmes and to utilize that data when programmes are executed. The CIIP Model is made up of the following:

1. Context- the context in the CIPP model is defined as the scope of the problem in relation to the setting and the stakeholders involved (Spaulding, 2014). Therefore, it is prudent to begin the evaluation with a clear understanding of expectations for the programme framework in the organisation. Context evaluations assess desires, troubles, resources and openings to aid those who are to make important and critical decisions able to clarify objectives and what is needed most and afford other stakeholders the opportunity to make informed judgments about the objectives and results of the intervention. It is thus essential to make a comparative analysis of this anticipation and expectation to the reality of affected communities. If the purpose of a programme is to solve a problem, then it is relevant to appreciate and understand the context of the problem being addressed by the intervention. While similar issues may be present in different situations, individuals people confronted with these issues may adopt and implement different solutions to address the problems. Therefore, understanding the problem from the perspective of multiple stakeholders is referred to as establishing the context (Spaulding, 2014).
2. Inputs- are the assets both human and financial that were made available and utilized in the design and implementation of the

programme. Assessing the output, efficiency, outcome, effectiveness and effect requires making available inputs entering into the turning process and its related activities. In the private sector information is common on the determination of inputs and their values, the same cannot be said of the public sector. This because the public accounts are at a disaggregated level which makes obtaining input costs problematic. These concerns led Estache, Gonzalez and Trujillo (2007) to make the point that public sector budgets are not typically faction monitor individual detailed spending. Input appraisal evaluates different methods, rival tactical plans, employee engagement and development plans and financial plan for their practicability and possible cost-effectiveness to accomplish needs and objectives. the selection of a particular course of action therefore is based on the result of the evaluations performed which then offer other interested parties to judge the appropriateness of the decision taking on resources allocation, staff assignment, work scheduling among others.

3. Process and Structure- This is the stage where the work of turning the inputs into outputs is done. This is in providing solutions to the problem noticed by increasing access and leads to enhancement in living standard of the affected communities. The structures bring to the fore objectives, actions of the programme and perform methodical examination of the programme intervention process in the light of what was done, by whom, when and for what (European Commission, 1999). It runs through the project life span and systematically monitors

programme and provide information that guides execution of strategies, events, actions and the mechanism both positive and negative outcomes. The processes of managing the implementation of projects are divided into three main categories consisting of pre-execution, the actual execution and the post-execution stages.

a. Pre- Execution Stage -At the pre-execution stages, efforts are geared towards planning and organizing for the project implementation. This involves activities like

   i. Conceptual Development- the initial ideas about the programme to resolve a specific challenge is generated at this stage. To make sure the desired outcomes are accomplished efforts are put into recognizing challenging areas, the constraints and the different routes of action before setting objectives and the subsequent implementation of the projects.

   ii. Scope Definition- The scope definition is about identifying and establishing criteria for all the items of work which may be needed in order to successfully undertake and finish the programme. The work breakdown structure (WBS) is utilized to further to sub-divide the scope into convenient job packages to which responsibilities can be assigned for accomplishment. These work packages can be further sub-divided into a detailed activity list which forms a key input.

iii. Work Authorization- At this stage, the scope of work, the planning schedules, the budget, the specification and contractual requirements are scrutinized to make sure they would meet the objectives of the programme after which official communication for the start of the project is issued.

iv. Actual Execution Stage- this is the stage where the actual carried out during which monitoring is undertaken to guide and make sure procedures are well matched with established specifications. This requires reporting format which is facilitated by designing and operationalizing templates to record data regarding the progress and condition of the project. The reporting format is communicated and put in circulation from the start to finish of the project (Burke, 1993). Another critical aspect of programme execution is the process evaluation which involves frequent appraisal of the strategy and project management plans designed at the pre implementation stages. It is a methodical running evaluation which provides information employed to guide and strengthen project strategies, activities and the procedures to determine whether things are moving as planned or not. In there are deviations, the reasons are investigated and corrective actions put in place.

4. Product/ output- output appraisal is utilize to recognize and evaluate both immediate and medium term results whether planned or unplanned to aid the organization concentrate effort and attention results which would demonstrate to stakeholders that the objectives of

the programme is being accomplish. In the private sector, the market value of output is reflected in the national accounts. Because of the unavailability of market prices for public outputs, input costs are frequently used as substitute for the value of the outputs in the national accounts. Public more outputs can be produce when more resources are employed. A method such as this cannot be applied in efficiency measurement. One of the most creative means of resolving this difficulty and arrive at purposeful, significant and relevant measurement is to undertake a comparative analysis between the Decision Making Units on the use of resources to produce the outputs.

Limitations of the CIPP model

Even though the CIPP model has been employed frequently and is demonstrated to possess a lot of quality ingredients over other evaluation models, it unfortunately has certain limitations. According to Randall (1969) some of the major problems associated with the CIPP model are:

1. Identifying decision makers: identification of stakeholders involved in the decision making process becomes complicated especially when it includes not only those who have ultimate power in taking decisions but other stakeholders having persuasive power over the ultimate decision makers.
2. Right time to make decisions: the right time to make decisions is very crucial however it depends on receiving the relevant information needed to help in that direction. Relevant information received late

becomes useless and worthless to the decision maker because it cannot aid decision making. Sometimes deferment of certain decisions is feasible but often such a delay is not possible. It is hard to state and foresee all decisions to be made prior to fulfilling appraisal requirements. Decision making alternatives established at the start of the appraisal process are only estimate. Often administrators give information for decision making that gives strong indication of management inclination as to the direction of the appraisal process.

3. Identifying decisions alternatives: decisions making alternatives that are faced are not always easily noticed. Most often than not decision makers are oblivion or unaware of the decisions alternatives they are confronted with. The decision making criteria may change over time as new things occur, new information is obtained and conditions change.

Efficiency

The relationship that gives us the efficiency is dividing the outputs by inputs. The relationship looks relatively easy and quite straight forward however the reality is the exact opposite. This is because recognizing and assessing resources invested and the results obtained is a complicated issue in the public sector. As typically characteristic of the public sector, mostly the short time economic enjoyments are missing in the public sector. If for instance a school is built in a community which entails material cost, labour cost, wages, cost of land and other incidental cost in the construction of the

structure. The said community would benefit in terms of having the young children to acquire the needed education at a reasonable cost. This opportunity would help increase the literacy level in the community resulting in better labor market, higher living conditions and an enlightened society which are results of this single investment but these indicators listed above are very difficult to quantify in monetary terms. A highway which is built as a public investment would be regarded useless if consideration is only given to the time it would take for the project to payback initial capital investment from the collection of highway tolls. The main reason for this type of investment is not only economic returns but rather the reduction in the heavy vehicular hold up, long hours it takes to travel along the stretch with its attendant high rate of road accidents (Mandl, Dierx, Ilzkovitz, 2008).

Efficiency can be decomposed into several concepts depending on the level of emphasis required. The various dimensions are technical efficiency, allocative efficiency, and overall efficiency. Technical efficiency has as its focal point to lower expenditure. This is achieved when the maximum possible output is obtained at a given cost for a set of inputs or a certain level of output at the least possible cost (Worthington & Dollery, 2000). Allocative efficiency answers the question of whether the right things are being done. This is when resources are signed and utilized to increase social enjoyment which is closely related to the concept of Pareto efficiency. This is situation where it is impossible to make a person better off without making another person worse off. Le Grand (1991) defined an allocative efficient level of production of a commodity as that level for which the difference between the total social

benefits from the consumption of the commodity and the total social costs of its production is as large as possible.

Effectiveness

A measure of effectiveness concerns how well the results of a system can match its goals (Sproles, 1997). In other words, a measure of effectiveness determines if the right things are being done whilst performance determines if things are being done right (Sproles, 1997). The common objective for assessing effectiveness have been noted as directing, forecasting, incentive, encouragement, celebration, learning and enhancing (Padovani, Yetano & Orelli, 2010). Effectiveness can be evaluated through internal and external performance measurement indicators. The Internal indicators concerns the objectives of the organisation and are often carried out through well-defined variables while the external indicators such as stakeholder satisfaction can be obtained through stakeholder satisfaction survey results (Swindell & Kelly 2002).

Swindell et al (2002) made the point that stakeholders' satisfaction is seen as more desirable and better measurement of effectiveness than financial returns for services provided at the local government level. An effective incorporation of this concept is identification of the relevance of local government-citizen relationship and mainstreaming it. Where citizen satisfaction is regarded as a important and relevant aspect of accountability and transparency, then citizens can take part in the decision-making process at

the local government level through feedback and communication between them and District representatives (Burke, 2005).

Edwards and Thomas (2005) said that end users' satisfaction can be achieved when the expectations, needs, and desires of stakeholders are taken into consideration. Swindell and Kelly (2002) discovered that the thought of stakeholders with regards to success of public programme intervention is subjective and is mostly positively related to their outlook, exposure, experiences and mind-set, all of which might be influenced by factors not related to the project. The effectiveness measures can be as narrow as specific outputs such as increasing the number of bore holes constructed or as broad as achieving improving the ecosystem or even enhancing community living standards and livelihoods. The services provided by local government system can be evaluated at the following levels:

1. Cost effectiveness variables are measured at the level of technical efficiency which is analogous to productive efficiency. These variables show the estimated costs of producing one unit of an output.
2. Programme effectiveness variables are geared towards approved measures of evaluation, correctness and quality. These obtained variables indicate the degree to which these goals are accomplished.

Assumptions

Challenging stakeholders to make explicit the assumptions and risks inherent in a project at the beginning is an important and valuable requirement

for conducting a valid appraisal. The task of recognizing specific results and their prerequisite entails an explanation of the why it is expected that the theory will work when implemented. Assumptions may be as a result of an Empirical research work or knowledge of expert practitioners can inform the construction of project assumptions. There are three kinds of assumptions:

1. The assumption linking resources, activities and outputs and the prerequisites resulting in long-term impact stand for a number of assumptions that are the causes of the selection of preconditions and the order in which they are arrange along the pathway.
2. The specific relationships drawn between inputs and the various outcomes in a pathway depend upon assumptions. Assumptions of this type relates to the reason why one outcome may be a prerequisite to another. This would determine the particular selection and assignment of activities along the causal pathway. Assumptions of this type are contained in the drawing but are best made vividly clear through explanation and clarification.
3. The other type assumptions are those made about the environment in which the project is implemented. The conditions in the environment form the basis for constructing the assumption. If organizers of an employment training programme make the assumption that work will be accessible for which people are being trained and if this assumption turned not to be true, it would mean that the hope of trainees of getting into paying jobs would be a mirage making the assumption ineffective.

These types of assumptions are best made clear as prerequisite along the casual pathway. Therefore jobs being availability as in the example above as an assumption would be tested.

All types of assumptions are contained in the arrangement of outcomes along the pathway and should also be made clear, giving justification for specific causal relationships in a written narrative. The expected whys and how the theory would work should be clear and made clearer by delineation the change process thereby reducing the threat that achievements can be result of the programme intervention. With regards to theory-based programmes, appreciable details are outlined, inputs, processes and outcomes assessed making it easy to recognize and measure success or failure and the lessons therein leant.

Impact of MDF Programmes

The impact refers to the long lasting effects of public programmes in terms of welfare and captures the various dimensions of society values. Such accomplishments points to the effectiveness of different kinds of policy implementation. It is difficult trying to separate the effects of different policies and their impact on the beneficiaries. Frequently, there exist lapse of time between the execution of the intervention and the impact and trade-offs yielded. This situation could create vague impression of specific accomplishment of public programmes. Impacts of programmes are often moderated by external factors, such as life style and socio-economic

backgrounds of the members of the beneficiary communities. The isolation of one transmission channel from another then becomes problematic. Even though policy makers and implementers are more interested in the final results of the policies, this is only partially under their direct control and is not always achievable within one time period. For example, public sector takes steps to boost class enrolments and enhance services given by community libraries and opening more schools in order to achieve higher education but there are other intervening variables mediating these conditions (Wholey, 2003).

Increasing the effect and impact of local government programmes means getting the same results with fewer resources or at the same level of public spending with greater outcomes. Two important measures crucial to maintaining the fiscal discipline are project cost and time variations. Project cost variation is the situation where goods or services are procured at a higher cost or at a lower cost than was agreed initially by the contractor and the person financing the project (Gansler, 1989). The problem of upward cost variation, especially in infrastructure project, is a global occurrence. The consequences of project cost variation especially upward variation is a source of arguments, disagreements and hostilities between project owners, the consultant and the project contractors. Upward project cost variation poses a considerable economic risk to clients and has the likelihood of delaying or stalling the project completely. Despite the remarkable improvement made over the years, the bane of infrastructure programmes have always been upward cost variation and completion behind schedule (Odeck, 2004)

Le-Hoai, Lee and Lee, (2008) posit that whether project costs are varied or not varied and the magnitude of that variation depends on variables such as the location, the size and the kind of project being undertaken. Frimpong, Oluwoye, and Crawford (2003), stated that upward cost variations are more common and considerable in mega programmes than in average to small projects. Gkritza and Labi (2008) have the same proposition but were quick to add that cost variations are also more common in long running projects. Odeck (2004) however holds a different and contrary view when he made the point that mega projects have less cost variations because those responsible for the project results have the technical knowhow, the machinery and equipments, highly qualified and experience labour force and other soft skills needed to comprehensively manage the projects than those in charge of small projects.

After reviewing about forty literature works on different kinds of programmes cost variations Morris and Hough (1987) concluded that approximately about half of infrastructure programme's and project's actual final spending were well and above the initially agreed sum when making the contract. He found out that these project cost variation were between the range of 40 and 200 percent. The position held by Morris and Hough was agreed upon by Nevan (1997 but quick to make the suggestion that an innovative way to resolving this issue of upward cost adjustments is by adding half the cost of every item estimated and half the cost of the final estimated value of the entire project. According to Flyvbjerg et al (2002) 90% of the infrastructure projects studied has their costs under estimated. For an arbitrarily chosen project, the

probability of real cost being higher than budgeted cost was 86%. The probability of real cost being lesser than or equal to budgeted cost was 14%. The real cost of projects are on average 28% bigger than forecasted. The costs of projects are not only under forecasted much more often than they are over projected, but are also incorrect by a substantially larger margin than when overestimated. Avotos (1983) being a little conservative stated that, it is normal to expect that the cost of a project exceeds the original total amount by 10-20 percent.

The problem of programme completion behind schedule is a worldwide phenomenon. In Australia as claimed by Chan and Kumaraswamy (1996), it was discovered that seven-eighths of infrastructure projects studied were finished behind time while in Hong Kong, seven out of every ten of infrastructure projects were completed behind their schedule time of completion. Al-Khalil and Al-Ghafly (1999a) established in a study conducted in Saudi Arabia that contractors working on infrastructure projects agreed that 37% of all projects experienced significant amount of schedule delays. The consultants on the other hand confirmed that schedule delayed projects constitute about 84% of all projects under their supervision. They did another study, which partially confirmed the earlier study by concluding that seven out of ten of all public projects had experienced time delays. These situations made infrastructure programmes one of the most observable ineffectiveness and therefore drawing much criticism from stakeholders (Chan & Kumaraswamy, 1996). Odeyinka and Yusif (1997) showed that a study carried out in Nigeria have 70% of building projects studied were completed behind

schedule during the time of implementation. Caulkin (1996) observes that, of twenty-three programmes examined, almost all were late with an average slippage of 31months and cost overrun of £700 million.

Good and adequate planning at the early stages of a project is relevant and critical for reducing the occurrences of project completion behind schedule and upward cost adjustment. Upward adjustment of cost can lead to schedules losing its balance because some activities and processes may have to be postponed simply because of inadequate funding. According to Gansler (1989), upward project cost adjustment and project delays are positively interconnected and strengthen each other. This is because often programme schedule extension is the only way to fit the higher cost into the initial amount which ultimately also has an implication on the time of completing the project. The negative impact of upward cost variation and schedule extension on a particular project can only be determined with certainty when there is a properly planned and executed evaluation.

Using the CIPP Model for Evaluation

Stufflebeam gave direction for designing the framework of the CIPP Model namely the context, input, process, effect, effectiveness, sustainability and transportability evaluations. It is worth noting at this point that it is the product which was further divided into effect, effectiveness, sustainability and transportability. The elements could be used depending on need and in diverse succession and concurrently. What made the CIPP model appealing for this study is that its expressed purpose regarding evaluation is to improve rather

than prove making it adequate for formative evaluation. It also provides a focused evaluation tool to review an organisation's decisions, appraise a programme history and publicize the effective services provided to targeted audiences. The final report of the appraisal results are used to communicate to the variety of stakeholders about what was attempted, done, accomplished and what lessons were learned are the hallmark of the CIPP model (Stufflebeam, 2002).

Currently the CIPP is in its fifth installment and now includes a ten element checklist to further decompose the product evaluation into four subparts in order to help assess a programme's long-standing feasibility (Stufflebeam, 2002). The checklist for the fifth installment of the CIPP model is as follows:

1. Contractual agreements
2. Context evaluation
3. Input evaluation
4. Process evaluation
5. Effect evaluation
6. Effectiveness evaluation
7. Transportability evaluation
8. Sustainability evaluation
9. Meta-evaluation
10. The final synthesis report (Stufflebeam, 2002).

Conceptual Framework

To focus on research objectives and guide the direction of a study a conceptual framework is developed (Cooper & Schindler, 2010). The conceptual framework for this work is based on the CIPP Model (Stufflebeam, 2002). The overall structure of the CIPP model and its expressed goal of aiding in programme improvement are what made it an ideal tool to be used in this study. The conceptual framework has eight components, namely, context, input, structure and process, output, efficiency, effectiveness, impact and the assumptions to be fulfilled (Figure 4).

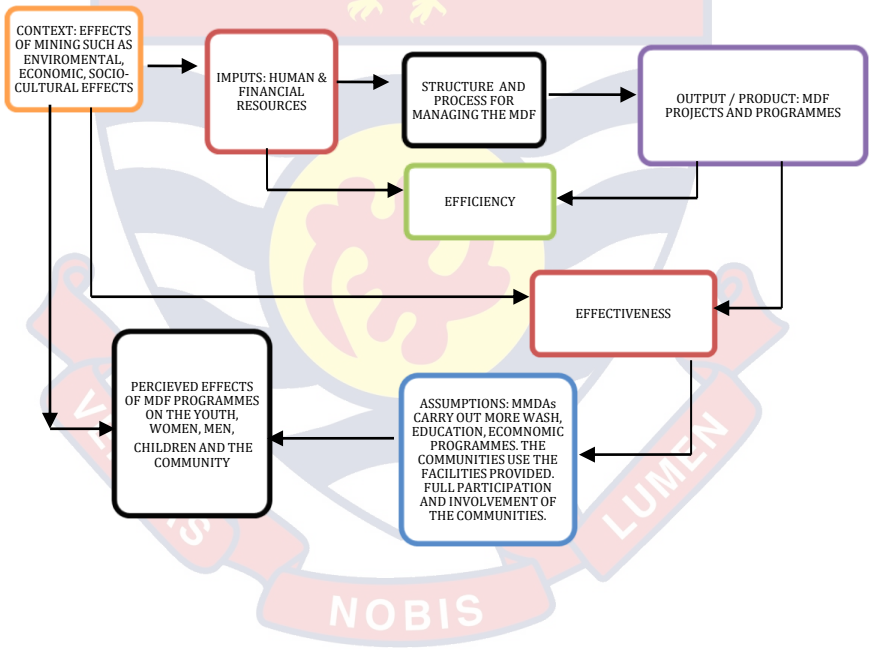

Figure 4: CIPP Model Conceptual Framework, 2018
Source: Adapted from CIPP Model (Stufflebeam, 2002)

Context

In most parts of the study area, the ecosystem has undergone and is still undergoing fast depletion and its immense economic worth is going down

from year to year, due mainly to the intense mining activities in the area. The land, water and air which are the main components of the ecology have been brutally impaired by mining operations. The ability of ecosystem to sustain the welfare and growth of the members of the affected communities is currently a matter of concern. Chemical effluence and the existence of heavy metals higher than the allowable limits are harmful to human health and the ecology especially aquatic life. Therefore the Government of Ghana in 1992 by an Executive Fiat established the MDF as a result of the negative environmental, social, economic and cultural impact of mining activities.

Inputs

Inputs are the assets both human and financial which were made available and utilize in the design, development and execution of the programme. The inputs are turned into outputs by work activities and processes. In the current study, the inputs are made of the District Assembly staff and the MDF received by the respective Assemblies. These inputs and outputs were used in the computation of efficiency and in the logistic regression analysis.

Structure and Process

This stage is the execution phase of the intervention with the goal of filled gaps identified in order to facilitate increase access and enhancement in living standard of the affected communities. The Assembly is the main decision making body of the District which is made up of the General

Assembly, the Executive Committee and Sub-committees as well as the Coordinating Directorate and the Decentralized Departments (Friedrich-Ebert-Stiftung, 2010). The Assembly undertakes planning, lawmaking and supervisory roles with the Presiding Member as the leader. In order to perform the above roles, the Assembly functioned via the Executive Committee and the auxiliary committees in line with the Local Government Act, 462 of 1988.

Output/ Product

The outputs are those products that are produced by the work activities, by the processes and by the system which are meant for specific stakeholders. The outputs produced by the District Assemblies using the Mineral Development Fund include school blocks, toilet facilities, roads, culverts, bridges, training, market stores, refuse containers among others.

Efficiency

The relationship that gives us the efficiency is dividing the outputs by inputs. The relationship looks relatively easy and quite straight forward however the reality is the exact opposite. This is because recognizing and assessing resources invested and the results obtained is a complicated issue in the public sector. As typically characteristic of the public sector, mostly the short time economic enjoyments are missing in the public sector. If for instance a school is built in a community which entails material cost, labour cost, wages, cost of land and other incidental cost in the construction of the structure. The said community would benefit in terms of having the young

children acquire the needed education at a reasonable cost. This opportunity would help increase the literacy level in the community resulting in better labor market, higher living conditions and an enlightened society which are results of this single investment but these indicators listed above are very difficult to quantify in monetary terms.

Effectiveness

A measure of effectiveness concerns how well the results of a system can match its goals (Sproles, 1997). In other words, a measure of effectiveness determines if the right things are being done whilst performance determines if things are being done right (Sproles, 1997). The common objective for assessing effectiveness have been noted as directing, forecasting, incentive, encouragement, celebration, learning and enhancing (Padovani, Yetano & Orelli, 2010). Effectiveness can be evaluated through internal and external performance measurement indicators. The Internal indicators concerns the objectives of the organisation and are often carried out through well-defined variables while the external indicators such as stakeholder satisfaction can be obtained through stakeholder satisfaction survey results (Swindell & Kelly 2002).

Impact of MDF Programmes

The impact means the long lasting effects of public programme benefits and includes the various dimensions of societal values. Often, there is lapse of time between the execution and the impact of public programmes

which can make vague specific accomplishment. The impact of the Mineral Development Fund is the long term benefits offered the members of the local communities hosting mining operations. This would be determined by to a large degree by when of the projects, where of the projects, how of the projects and what of the projects which were carried out using the Mineral Development Fund.

Assumptions

Challenging stakeholders to make explicit the assumptions and risks inherent in every initiative is one of the most important and valuable aspects of a proper evaluation. The process of identifying clear results and their prerequisite involves an amplification of the basis it is expected that the theory will work in practice. Assumptions may be made based on the empirical knowledge of expert or on research facts.

Empirical Literature Review

The literature review under this section covered the effort made by many resource rich economies to create the right conditions for the development of natural resources such as gold around the World especially those in Africa. This effort led to the influx of several mining multinationals into those countries. The effort also covered strategies adopted by various governments to generate revenue through taxes and other fiscal regimes. Part of the revenue so generated from the exploitation is manage by setting up

variations of natural resource funds which is made available to the local communities in order to halt and if possible to reverse the devastating socio-economic, cultural and environmental damage caused by these mining companies. The management of these natural resource funds and reasons why some of the management strategies fail were also examined.

According to the World Bank (2011) despite the impressive mineral resources bequest and the efforts of attracting investors, the continent of Africa is still poor and has not seen any appreciable development. The inflow of natural resources revenue to the continent was not properly utilized to promote economic growth and development of the countries endowed with those natural resources. The positive relationship expected between the natural resource sector and other segment of the economy is non existence in most of these resource rich countries making the economies fragile, weak and vulnerable. In countries where mining has assisted to enhance economic development outcomes Countries such as Botswana, Morocco, Namibia and South Africa, where the mining sector has assisted in enhancing economic development and industrialization, it has been discovered that the achievement can be associated with having in place adequate infrastructure base, good administration of the sector, respect for the rule of the law, good management of the entire economy leading to the creation of a congenial and positive atmosphere for business to blossom.

According to Pedro (2006) mineral revenue can enhance to local economic growth through the provision of the following:

a. Vital social amenities such as power grids, dedicated ports, water systems, roads, health and education
b. Aid talent and skills acquisition and development thereby creating local human and social capital
c. Drive and encourage the springing up minerals clusters made up of goods and service inputs entities, processing companies along the value chain, supporting industries, and incubation centers.
d. Curtail rural-urban drift migration through the creation of employment avenues in the rural areas.

Governments of resource rich countries normally devised and utilized diversity of financial policy regimes to generate and share income from the mining sub-sector. Fees, taxes, ground rent and charges which applied to all normal profit-making ventures are some of the fiscal instruments employed. As additional measures, most countries utilize mineral royalties along with variants of value added taxes, corporate taxation, customs duties that apply to only mining operations. The two philosophical concepts of royalties (Guj, 2012) are:

1. They are payment by the mining companies for exhausting State owned finite resources. This way it is seen as reimbursement for the gradual shift of possession to the mining companies of an asset of the State.
2. They are regarded as a tax on mining. The government uses this fiscal tool to adequately get a share of the rent produced by the mining.

In line with the method of government, whether unitary or federal and the provisions in the constitution, the managers of the economy may select different echelon and arrangements to effectively allocate revenue from natural resource to sub-national governments after revenues have been collected. Cameron and Stanley, (2017) stated that at one end of the continuum is a system where the central governments collect all taxes without any redistribution towards mining communities whist at the other end, the State may allow for financial autonomy in which sub-national governments can collect taxes. Three modules have been identified

1. Revenue sharing system institutionalized as adopted and practiced in Ghana, Indonesia and Peru.
2. Sub-national governments are given autonomy to impose taxes as a way of financial decentralization as in Canada and Australia.
3. Direct distribution to communities may be allowed as done in Papua New Guinea.

All these measures are geared towards citizens having a share in a portion of the gross tax earnings from mining activities when utilized to construct infrastructure projects these communities. Allowing local governments to impose taxes or giving financial autonomy in connection to expending mineral resource earnings does not always culminates in superior payoffs for the members of the local communities. A public financial administration system which states clearly the roles and responsibilities of the different stairs of governance is significant to enhancing effectiveness

allotment of earnings. It is said that sub national financial independence under a decentralized system has given impetus to the misapplication of natural resource earnings which can be utilized to tackle the sharp deficiencies and poverty in the affected communities (Human Rights Watch, 2007). According to Andrews-Speed & Rogers (1999) Mongolia and Alaska have instituted an innovative approach to distribute natural resource revenue with citizens through cash transfers.

According to Acosta (2012) Papua New Guinea in designing a structure to adequately account for and mainstream the local context concept stipulates that:

1. At least 20% of revenue from royalty receipts by government goes to landowning communities of the mining lease jurisdiction. Reconciliation of accounts is done between the mining companies and government after royalties are paid directly by mining companies to the agreed beneficiaries for auditing purposes;
2. Special Support Grants of about 1% of gross income of the mining companies be disbursed to the provincial governments.
3. Preferential treatment in terms of education, employment, training and business development assistance should be accorded the members of local communities in the areas hosting mining operations.

Likewise, in Canada, an innovation called Impact and Benefits Agreements involving mining companies, local communities and government where mining operations takes place within indigenous lands. The Impact and

Benefits Agreements offer employment, skill training for the locals, equity acquisition and profit sharing in the mining companies (Noble & Findler, 2011)

Setting up of Natural resource funds have been seen as a key stride in resolving the difficulties of managing natural resource earnings. This view has been confirmed by Sachs and Warner (1995) when the point has been made that governments in resource rich nations predominantly manage the natural resource endowment through the setting up of Natural Resource Funds (NRFs). A Natural Resource Fund is defined as a king of sovereign wealth fund owned and operated by government as a special purpose vehicle which is financed principally by earnings from natural mineral resources of the country. The central theme for setting up natural resource funds is for it to as a safeguard and cushioning instrument protecting the public financial system from market volatility. These funds also known as buffer funds tries to provide long term revenue inflows generated from a finite natural resource so the name future generation's funds. From the foregoing discussions, Natural Resource Funds (NRFs) are set up in many resource rich countries to be an instrument performing the following functions:

1. Cushion and protect economic programmes from variations associated with natural resource earnings (stabilization motive).
2. Provide inter-generational equity by saving part of the wealth generated for future purposes (savings motive)
3. Enable the economy to withstand variability in spending by managing uncertainty (precautionary motive) (Daniel, 2002).

Natural Resource Revenue Management

Natural resource revenue management (NRRM) according to Drysdale (2008) means guidelines and steps taken by governments to administer and supplement earnings from natural resources. These guidelines and procedures include:

1. The State receives all earnings from natural resource;
2. Stating the roles of revenue administration;
3. Making intelligent investing decisions of the revenue received;
4. Ensure accountability and transparency; and
5. Setting up of investment funds primarily funded from natural resource earnings for future generations.

According to Drysdale (2008) the two ways of spending the natural resource earnings are:

1. The spend-as-you-go strategy- this philosophy of spending assumes that revenue windfalls must be shared between central government and public investment
2. The scaling-up or incremental strategy- this spending philosophy undertakes investment and gradually scaling it up. This results in the creation of a financial cushioning which allows steady spending pattern in the future.

Notwithstanding the above, Oxfam (2009) made the point that a good spending policy demands a tap on at least two essential ingredients. These are:

a. how earnings from natural resource are utilized
b. what the earnings are spent on

The strategies employed by Indonesia and Norway are consistent with the nature of finite natural resource and relevant for successfully managing natural resource earnings. The earnings are high but exceptionally unstable. Taking the necessary measures to lessen the impact of exploiting non-renewable natural resources on local communities and ecosystem were consistent with the nature of natural resource earnings. Important areas to concentrate effort are as follows:

1. Expenditure must be in sync with a clear long term policy for development aimed at:
    a. Sustaining and meeting globally accepted quality benchmarks and quantity of essential basic social amenities and services for education health, water, and sanitation, A minimum of 20 percent of the government's financial plan should be allocated to education and 15 percent assigned to health.
    b. Indigenous and the affected communities whose ancestral resources are depleted are taken care of using guidelines to make sure that new and sustainable livelihoods are generated.
    c. Employing public expenditures to enhance economic endeavors in different segment of the economy geared at social and long-term programmes.
2. Responsible expenditure:
    a. Conscientious, properly planned and structured spending because most countries that are affected normally experience weak and vulnerable economies.

b. Avoid spontaneous expenditures by wisely investing income inflows too large for the economy to absorb.
c. Drawing on reserves in periods of low revenue inflows so as not to put social programme at risk.
d. Sustainable public spending must be maintained so as not to render current social investments for future generations ineffective.

Landon and Smith (2014) looked at the real effects of natural resource revenue stabilization funds in promoting wellbeing. They found that there exist livelihood potentials and wellbeing but added that it was discovered some of the funds achieved insignificant results. The main reason for the poor state of affairs is the too much build-up of assets. Excessive build up of assets which requires a forfeiture of current consumption for future benefits was the bane of the performance of these stabilization funds. The most successful funds are those which stabilize expenditure while limiting the accumulation of assets and debt. Landon and Smith (2014) suggested that high performing funds are those having both fixed deposit and withdrawal rates. This technique renders it reasonably strong to modification with respect to the earnings on assets, interest rate, revenue derived from resources, the degree of risk dislike and the model of investment being pursued. The funds that had high yields were those which found a perfect equilibrium between investment and consumption.

Natural Resource Funds are regarded to be more effective, when it achieves its set targets. For a fund to successfully achieve its targets requires

certain key propellers. Bauer (2014) enumerated seven major propellers which advance excellent accomplishment of Natural Resource Funds. These are:

1. Establish clear objectives of the fund.
2. Set up financial guidelines with regards to deposit and withdrawal which is in sync with stated objectives.
3. Institute investment portfolio guideline which is in tandem with stated objectives.
4. State unambiguously the tiers of official duties of those managing the fund, such as the fund manager, the operational manager and the different offices exercising supervisory roles.
5. Making public relevant information such as listing portfolios invested in, particulars of managing firm and auditors on regular basis.
6. Set up autonomous authorities for the control, supervision and enforcement of guidelines.
7. Formulate and put in force ethical guidelines and conflict of interest standards.

In countries such as Alaska, Kuwait, Venezuela, Oman, Norway, and Chile where Fasano (2000) did studies on Natural Resource Funds, found that repeated variability in financial regulations, guidelines and departure from planned objectives particularly with regards to expenditure plans led to poor yield of many of the funds. While the revenue from the Natural Resource Fund in Azerbaijan was employed for investments purposes in health, education and

basic social amenities, often times it was utilized on programmes with unreliable returns. The fund has been utilized to pay workers, retirement benefits and for defraying the country's debt obligations. This has resulted in a crowding out effect and made it difficult for economic diversification and industrialization to take place.

The Fiscal Responsibility Law of Chile established the structure for maintaining equilibrium in regulations and guidelines. This actually entails forecasting the financial income inflows which will be attained less the negative impact uneven indices of economic and commodities and expenditure in sync with long term level of revenue. Chile's Fiscal Responsibility Law (FRL) as pointed out by Korinek (2013) has ensured a predictable, procedure oriented framework and structure for administering income from taxation thereby reducing the circumstances of natural resource income capture by the executives.

Yucesoy (2013) is of the opinion that inappropriate investment portfolio diversification can result in malfunctioning of the Natural Resource Fund in accomplishing set goals. Examining the variety of expenses or investment done by the administrators of these funds are the two critical elements in assessing their effectiveness. The fund should concentrate effort on providing solutions to rural underdevelopment such as lack of basic social amenities and inadequate industrialization in countries with low income and vulnerable economy.

Gelb, Tordo and Halland, (2014) make the point that investment options; whether abroad or internally must also be determined by investment

guidelines. Investment decisions to a large extent are dependent on the hunger for risk and the expected dividend, which in cases must be compatible with the stated objective of the fund. Some of the possible areas where investments could be done include real estate, stocks, bonds, derivatives or even infrastructure. Gelb, Tordo and Halland, (2014) posits that the extent of investments should be determined on a competitive basis when investments are made in domestic assets and not fixed at a certain portfolio share. Investment guidelines should also take account of procedures to enable investment portfolio diversification.

Acosta (2012) in a detailed study of Natural Resource Revenue Management, looked at the possibility of Natural Resource Funds to enhance social investments, particularly education, employing examples from Botswana, Peru, Mongolia, Zambia, Indonesia, South Sudan and Nigeria. The critical variables for the high yield of investment and stabilization funds comprise of the existence of proficient institutional structure, an autonomous administration to prevent untenable expenditures and the misuse of earnings by the executives and the authorities in power for political gain. When the Executive have uncontrolled discretionary power which may result in greater doubt about obedience to rules and regular changes of existing regulations with changes in governance, the efficient operation of Natural Resource Funds may be compromised.

Gelb et al. (2014) stated that indicators like independent and sovereign governing body, transparent and accountable reporting, expert personnel and autonomous auditors are preconditions ensuring sustainable, efficient and

effective operation of Sovereign Wealth Funds. Additionally the purpose of the Natural Resource Funds must be explicitly codified in law and policy guidelines as done in the case of Norway. Some of the enablers of excellent performance of natural resource funds are robust internal controls, making regular and publicly available internal audit reports, effective monitoring of external fund administrators, ethical guidelines for fund employees, and self-governing oversight at every level, most importantly over staff personnel, administrators and the board.

Establishing and making operational mechanisms to guarantee accountability and transparency in fostering proper functioning and effectiveness of natural resource funds play an important function. This in addition to reducing the probability of mis-utilization of natural resource funds by those in authority gives assurance of aligning the public's general expectations with the purpose of the fund. Guaranteeing that relevant information is available to the public on Natural Resource Funds can decrease the likelihood of abuse of funds (Ibadoglu, 2015). Accordingly, accountability and transparency in Natural Resource Funds is associated with:

1. Unambiguous state the duties and functions for administrators and policy actors;
2. Making the public have access to relevant information;
3. Practice an open door policy of decision making processes; and
4. Reporting and accounting to citizens on timely and regular basis.

An examination of the administrative success stories of Chile, Norway and Timor-Leste of managing their Natural Resource Funds, revealed that these economies have incorporated transparency mechanism via an act of law or policy document. These countries on regular basis share with citizens detail information related to their Natural Resource Funds volume, transactions, savings and drawings, portfolio types and earnings on investments. Korinek (2013) pointed out that in Chile; the fund administrators permit stakeholders' discussions on fund management techniques. As an In additional requirement to this the administrators issue reports every four weeks on investment portfolio and volume of the funds and publish reports every three months on the performance of the funds as per its growth on the backdrop of relevant benchmarks established. In Azerbaijan, though Natural Resource Funds is the main component of financing the public financial system, lack of lucidity in spending has rendered the fiscal and macro-economic stability unsustainable in the country (Aslanli, 2015). There is a signal and an indication of Azerbaijan moving towards greater transparency and accountability in the future since joining the Extractive Industries Transparency Initiative (EITI).

Bahl and Tumennasan (2002) said there is in place a mechanism employed to share natural resource income between the various levels of the administration in Indonesia. According to the authors, taxation is the primary tool for generating natural resource revenue which is legally disbursed through an approved tax sharing technique. A fraction of earnings raised through taxation from natural resource exploitation is shared where part goes to central

and part to local government system. The disbursement of earnings at the local governments is realised in two fashions:

(i) a fraction of the revenue is disbursed to where mining operations is undertaken.

(ii) a fraction of the revenue is disbursed to all eligible authorities in the region or province.

Warner and Alexander (2006) posits that Sub-national governments can receive payments of resource revenues through two main mechanisms namely

1. Intra-governmental revenue disbursements assignment: Natural resource revenues are collected at national level and then assigned to sub-national levels in the form of grants or matched funding.

2. Intra sub-national level governmental disbursements: These include transfers from a federal or provincial account to district government authorities and from district levels to community levels.

Thirty one out of the fifty-eight resource rich countries surveyed have established mechanisms for natural resource revenue disbursement (Bauer, 2013). Examples of countries having some mechanisms institutionalized for sharing natural resource revenue are Ghana, Uganda, Canada, Ethiopia, Angola and the Philippines among others. Over 80% of regional governments' budgets in countries such as Nigeria and Peru are dependent on resource revenue disbursements from their central governments. Bauer (2013) enumerated the various difficulties encountered by the sub-national resource-

rich governments in management. Among the difficulties are unpredictable resource revenue transfers between national and sub-national governments, inaccurate forecasting capacity, difficult development planning. Natural resource revenue volatility may result in unsustainable spending, poor-quality investments, an unpredictable business environment and slow non-resource sector growth. Finite natural resource earnings can in some cases lead an extended period of depression preceded by an era of economic growth and development and difficulty in scaling up efficient public investment when experiencing a revenue fall. The lessons from the above study helped Bauer to develop a 10 point recommendation for fashioning and executing a robust, resilient, sustainable, equitable, effective, fair and stable resource revenue sharing system. This includes the following:

1. Clear objectives in all areas of revenue management.
2. Revenue disbursement mechanism should be in sync with its purpose.
3. Select and apply suitable revenue generation and fiscal tools such as property taxes, royalties and corporate income taxes.
4. Smooth out central governmental disbursements to governments at the local level.
5. The formula for revenue sharing should be simple and applicable to help verify compliance.
6. When political and economic conditions change, the system should be flexible to accommodate it.

7. Permit governments at the local level to tackle and handle income instability independently via setting up sovereign wealth funds and debt management.
8. Develop nationwide agreement on revenue allocation formula in order to ensure its stability especially in politically polarized environments.
9. The revenue sharing formula should be written in law.
10. Establish autonomous oversight body to ensure accountability and transparency.
11. Ensure that revenues inflows and outflows at the local government level be aligned so as to control spending.

Another problem which needs equal attention is about the strategy and system for sharing the natural resource income to beneficiaries. Gupta, Segura-Ubiergo, and Flores (2014) argued that to achieve an equitable disbursement, restrictions may be needed on direct transfer to individuals by aiming at the underprivileged section of the affected communities may be the most suitable and appropriate method. Direct disbursements to the poorest individual members of the affected communities may be made upon fulfilling certain criteria like upholding the principles of child labour. It has however been discovered that, favoritism, nepotism, embezzlement, mis-targeting are usually characteristics of direct distribution schemes to citizens. Direct disbursement to individuals has the potential of drying up resources which otherwise could have utilize in the provision of essential public services and infrastructure. Designing direct disbursement schemes to women according to Sala-i-Martin and Subramanian (2003) is the most appealing because of the

existence of high and positive correlation between women empowerment and development outcomes. The authors were quick to note that if the direct disbursement scheme is not properly implemented, it has the probability to curtail labour supply for productive work in other sectors of the economy. Rodríguez, Morales, and Monaldi (2012) said that to strengthen transparency and promote a healthy State-citizen relationship and collaboration, individuals recognized and selected as those to benefit from the direct allocation should be taxed.

A study conducted by Ushie (2012) in Nigeria's Akwa Ibom and Bayelsa States between 2008 and 2012, show the extent of utilization by State governments in the oil endowed but troubled Niger Delta province of income generated from oil to solve the underdevelopment, environment degradation, deprivation and loss of livelihood in the affected communities. A detailed evaluation of the State government's budget statement revealed the following:

Akwa Ibom State had made a total public expenditure between 2008 and 2012 of N 1.5 trillion which is approximately US$ 9.8 billion and an average of N 305 billion per year. Agriculture, health and education programmes were allocated approximately 7%, 4% and 4% of total infrastructure expenditure in that order between 2008 and 2011. Likewise, in the same period, the government's programme to supply portable water, sending development to the local communities and electricity extension received on average, a little less than 3% of total capital expenditure in the period under consideration. A colossal 26% of average annual capital expenditure budget allocated to general administration which is not a capital

spending item in the budget. The so called mysterious 'security vote' was given a total capital expenditure of 3% in 2011 which was higher than disbursement to agriculture, portable water and electricity extension programmes. On average, allocations of total capital budget spending to education were lower than disbursements to the office of the Governor which received 7.95% between 2008 and 2012. This trend of spending earnings from finite natural resource revenue was a clear sign of misplaced priorities for the State. The wasted revenue if properly utilized could create an enabling economic environment for inclusive and sustainable development.

A civil society group in Akwa Ibom State in the Niger Delta reviewed their budget and discovered several anomalies. These anomalies includes but not limited to vague expenditure classification, duplication of items, unfinished and abandoned infrastructure projects and the inability to make public financial and budgetary information contained in the annual budget (NDCBP, 2011).

In the case of Bayelsa State, Ushie (2012) pointed out that Bayelsa State receives substantial oil revenues which currently stand at 5.7% of total revenues distributed between the States. The budget expenditure of Bayelsa's State has being on the ascendency since and significant since 2008. Ushie (2012) pointed out that the State made a total expenditure of N476 billion, approximately US$ 5.8 billion between 2008 and 2011. Year on year fluctuation which is typical of oil revenue inflow dictated expenditure pattern which points to the fact that the State was particularly over dependent on federal revenue disbursements. In 2008 and 2009, projected expenditures were

higher than budgeted income inflows by a whopping 33% and 22% respectively. Comparatively, agriculture, health, water and education programmes were allocated an average of 6%, 8%, 3% and 12% respectively between 2008 and 2012 of budgeted annual capital expenditure. General administration which is an overhead item received an average of 14% of the capital budget expenditure. What really surprise many close watchers was that in the capital budget of 2012, no disbursement was made for programmes in the rural areas.

Management of the Mineral Development Fund

The mineral Development Fund according to Standing (2014) has undoubtedly provided funding programmes in the affected communities but the sum total of funds made available for programmes expressly developed geared towards enhancing the living standards and lessening the negative impact of mining operations is woefully inadequate. A substantial amount of the Mineral Development Fund is spent on public sector institutions by supporting programmes to build capacity in order to effectively regulate the mining sub-sector. Clearly, this type of expenditure from revenue generated by non renewable resource indeed does not look like a prudent, appropriate, relevant and sustainable expenditure which will benefit the members of the affected local communities.

Similarly, the Environmental Protection Agency (EPA) set up with the mandate of making sure mining activities are done in an ecologically friendly manner is completely and conspicuously left out when it came to the

disbursement of the Mineral Development Fund (International Council on Mining and Metals, 2015). There is no legislative instrument to govern the operations and management of the Mineral Development Fund. The result of this is the arbitrary nature of decision making which characterize the disbursement of the fund. At the local government level, the Mineral Development Fund does not have its own separate auditing and budgeting procedures. Allocations to the fund has been inconsistent because in the past it has received allocations of less than the 10% of the total mining income to government which it receives now. The World Bank (2011) consequently in an internal assessment report said the effort to apply the mineral resource income by the government of Ghana to implement pro-poor development programmes needs much to be done. Pedro (2006) has argued that the governance framework of the Mineral Development Fund of Ghana is characterised by low involvement of key stakeholders as a consequence of non existence of a legislative instrument, the absence of accountability and transparency. Project progress reports of the Obuasi District Assembly showed that most if not all of the projects executed by the Assembly were located in communities which are not directly affected by activities of mining. Quarshie, (2015) claimed that communities affected by activities of mining were Sanso, Binsere, Ahansoyewodea, Kunka, Anyinam and Dokyiwaa most of the projects were built in Boete, Bediem, Asonkore, and New Nsuta among others. This revealed that communities affected by activities of mining were not really given any priority with these projects which is widening the inequality gap between mining affected communities and non-mining affected

communities in terms of development progress. This means that the utilization of the Mineral Development Fund was focused on non-mining affected communities to the neglect of communities directly affected by mining activities (Quarshie, 2015).

Quarshie (2015) found that the Obuasi District Assembly used the MDF on general development projects which have no relation whatsoever to mitigating the adverse effects of mining. The Assembly did not also focus attention on the mining affected communities in the use of the Mineral Development Fund. This led to the situation where non affected communities benefit from the Mineral Development Fund to the neglect of badly affected once. Many of the projects are also carried out in the big towns to the neglect of the local host communities where the effect of mining is evident. The members in communities that host mining operations were of the view that although mining activities take place in their communities they do not have clinics and other amenities therefore when having health issues they would have to travel to the big towns to seek medical care. In fact members of the contacted communities were not aware of the MDF facility and therefore could not press for their needs to be addressed. She argued that apart from the fact that the Assembly structure is designed to cater for the entire assembly, there is also no guidelines for the utilization of the Fund. He also found that there was a general institutional weakness especially at the local government level. This led to poor accountability, fluctuations in royalty disbursements and delays in the release of the Mineral Development Fund.

According to Quarshie (2015), the percentage of the Mineral Development Fund utilized for infrastructure development in education, for scholarship scheme, for general infrastructure, for health, for sanitation, , waste management were 46% 12%, 4%, 3% 1% and 34% respectively. The high expenditure on waste management is as a result of the large number of people who are attracted to these mining communities and therefore increasing the generation of both liquid and solid waste in the District.

An evaluation of the financial report of the Obuasi District Assembly by Quarshie (2015) showed that a lot of these MDF projects that were implemented in communities which are not in the least affected by mining activities. Sanso, Binsere, Ahansoyewodea, Kunka, Anyinam and Dokyiwaa are among communities directly affected by mining operations but did not benefit from a single MDF project rather Boete, Bediem, Asonkore, and New Nsuta among others were the beneficiaries. This was indicative of the fact that priority was not given to mining affected communities over unaffected communities with respect to these projects thereby widening the already existing inequality gap between mining affected communities and non affected communities in terms of development progress. Mineral revenues were utilized on projects implemented in communities unaffected by mining operations instead of affected communities.

Effective Resource Revenue Management

According to Sachs and Warner (1995) the management of large mineral revenue inflows presents an enormous challenge to many countries

endowed with natural mineral resources. At the community levels of governance which are plagued with the so-called paradox of plenty, the management of revenue inflows from natural resource has always been a difficult issue. The temptation in spending the huge influx of mineral revenue inflows is high especially if the level is far more than the annual budget expenditure for the agency. There is the legitimacy to expend the extra revenue as a result of the more liquidity and there may be pressure to do so, but due consideration must be given to the expenditure meeting the achievement of sustainability and long term goals of development. This situation of having huge inflow of mineral revenue can be likened to a person winning the lottery. These revenues are regarded as bonuses and therefore spent with the expectation receiving more in the future.

Auty (1993) posits that because of the low quality of established institutions and structures to manage the revenue are non existence or weak, natural resource revenues are not utilize properly. Essential factors at the core of the difficulty in managing the natural resource earnings are the adequate planning and the human resource capabilities to carry out the plans developed. Estimating the level natural mineral earnings, its allocation is at the heart of the planning process but the forecasting of natural resource revenue by Governments of mineral economies have been unreliable and difficult. The nature of natural resource revenue inflow is difficult to predict because there are many variables that are factored into the prediction which are subjected to frequent changes that are normally determined by outside forces. Some of these variables include exploration results, market prices, production plans,

exploitation of fields and the amount of resources needed to undertake all these activities and operations. The forecasts and estimates of natural mineral revenues are done with much assurance and certainty making them way off the real figures obtained later. Apart from the unreliable nature of the income inflows, these resources rich governments spend the revenues with the expectation that more earnings will be forthcoming. When there occurs revenue shortfall because of the unreliable nature of the estimates, planned expenditures are put in jeopardy.

Many writers have been cited for stressing the point of extracting and utilizing natural resources and the revenue from it to benefit both present and future generations. The theory of inter-generational equity and per capita consumption to remain constant over time was employed by Hartwick (1977) to produce a guideline for the investment of the earnings generated by exhaustible natural resources for the purpose of intergenerational equity. It has been pointed out that unsustainable spending of revenue from natural minerals has the tendency to affect both present and future generations but the effects may be more on generations unborn. Consideration of the variable nature of natural resource earnings is at the heart of managing natural resource wealth well. The most appropriate thing to do is to save earnings when there is a rise in earnings generated by natural resources or utilize it to generate further income in periods when earnings are exceptionally low. The insistence request for better living conditions, public pressure to spend and politicians kowtowing to this pressure because of short political time frame in office is largely accountable for the poor planning and therefore ineffective natural

revenue management. The amounts spent on projects are often higher than the additional earnings generated by the income from the investment made and most of the projects implemented are geared towards short term fulfillments instead of their long term capabilities (Auty 2001).

Other rationale cited for the huge wastage of earnings from natural resources is the inadequate institutional readiness and capability to efficiently plan, predict and execute the financial plans of the organization. Often times the organization may not be functioned to handle such high level of income inflow though it may posse the capacity to some extent. An instance may be an organization functioned to operate a budget expenditure of about GH₵ 300 million would find it extremely difficult to execute a budget of GH₵ 7000 million the coming year. The unexpected huge jump in revenue inflows may pose a challenge resulting in poor spending decisions.

Stevens (2003) suggested that adequate planning, expenditure and human capital are essential for any country to avoid the resource curse. Often cited as one of the resource rich economies which has managed its mineral resource earnings in a sound manner is Botswana. Stevens (2003) makes the point that financial discipline and adherence to laid down plan to develop physical and social amenities including spending much on social services were key to the success story of Botswana. Throwing more light on the case in point, he said senior bureaucrats who are highly competent are a major variable universal to all resource rich economies which steer off effectively the resource curse menace. Several authors have also recognised knowledge and skills of technocrats which influence effective resource revenue

management. Low levels of human skill and knowledge has been identified as having negative effect on the management of natural resource revenue resulting in turn down in development and industrialization.

According to the World Bank (2011) the outcomes of utilizing Natural Resource Funds in developing countries have not been very encouraging, even though when efforts are made to overtly connect them with attainment of social objectives and goals. Lack of an appropriate institutional environment, a situation which unfortunately is prevalent in most of the resource rich economies of the world was a major rationale for this situation. Additionally, using revenues expenditures to attain social objectives have failed because they are not connected to either prescribed or unofficial responsibility and transparency frameworks in decision making with regards to public expenditure. The issues confronting good public expenditure in achieving growth and industrialization are complicated in such environments necessitate employing coordinated and an integrated set of solutions. In setting them up, it is of a fundamental importance to make sure that a self-governing, responsible and competent agency is charged with the duties of managing the Natural Resource Funds. A vital ingredient in all these recognised good practices is to make available and on timely basis appropriate information about natural resource funds to the general publicly and shared with other stakeholders. Therefore as has been clearly illustrated, these natural resource funds are not a panacea to wasteful use of mineral rents.

Factors Affecting Effectiveness of Infrastructure Projects

According to Chua, Kog and Loh (1999) efficient allotment of time, human skill and knowledge and financial resources in a programme can be enhanced by the recognition of factors affecting effectiveness of infrastructure projects. The authors therefore undertook a study to identify the factors affecting effectiveness of infrastructure projects and endeavor to understand if these factors vary for three different project objectives. Chua, Kog and Loh mentioned within cost, within schedule and stakeholders satisfaction as the three main project objectives. With regards to the factors affecting effectiveness, the researchers identified efficiently structured and assembled team to plan, design, build, run and manage the programme; a succession of contractual arrangements that allows and encourages the various specialists that acts as a team with no conflicts of interest and differing goals; experience in the management, planning, design of infrastructure project and valuable information from the owner, user, designer, contractor, and operator in the planning and design phases as a pre- requisite.

Generally, 15 factors were listed as critical factors affecting effectiveness of infrastructure projects and the ranking of these factors not depending on only the project objective but also on the role of the project participants. At the end of the study 10 factors were settled on to be essential by the project participants based on the overall project effectiveness. Despite giving different ranking to each of these factors by each of the participants, all participants decided that these factors constitute the major ones. Formal communication, contractual motivation/ incentives and economic risks, project

management competency, site inspections, project manager commitment and involvement, adequacy of plans and specifications, constructability, clear objectives and infrastructure control meetings were the essential factors adopted from Chua, et al., (1999).

The research work carried out by Kog and Loh (2012) was an extension of Chua et al's (1999) study. The respondents who participated in the project were selected from countries such as China, Malaysia, Indonesia, United Kingdom, Hong Kong, Australia, India, Singapore, Seychelles, Vietnam, Myanmar and Maldives (Kog & Loh, 2012). For all these projects, ten essential factors were recognized as the most important and significant. According to Kog & Loh, (2012), these critical factors include realistic obligation, adequacy of funding, contractual incentive, constructability, infrastructural control meetings, adequacy of plans and specifications, project manager competency, economic risks, technical approval authorities, Project Manager commitment and involvement.

As clearly seen, the above factors affecting effectiveness in the study reviewed so far were similar. The only differences were technical approval and adequacy of funding which was not considered in the study undertaken by Chua, et al. (1999). Hwang and Lim (2012) undertook a survey to determining the factors affecting effectiveness of infrastructure projects in Singapore with respect to project participants: consultant, contractor and client and intending to bring to date the findings and further the Chua et al's study. Despite that the work was based on Chua et al's research some alterations were made which includes a factor relating to frequent feedback from parent organisation, which

was not included in the research by Chua, et al (1999). Even though the participants weighted the factors differently, the adequacy of plans and specifications, realistic and clear objectives and constructability were recognised by all participants as the most crucial and significant irrespective of project objectives. Additionally, Hwang and Lim, (2012) added adequate planning and control techniques and participation and feedback from the parent organisation which were two new factors to the ten factors for each of the project participants. As evident from the above there were similarities in the factors in both studies but the amplification of the participation through regular feedback has come up as an importance factor affecting effectiveness. Although pioneering status was found as one of the ten factors by Kog and Loh (2012) study, it was not included in the factors considered as important and relevant by Chua, et al., (1999) study.

Hwang and Lim (2012) did study based on Chua et al's (1999) research and attempted to identify critical factors affecting infrastructure projects for project participants namely consultants, contractors and owners and three project objectives of cost, stakeholder satisfaction and schedule. At the conclusion of the study, three new factors were found to be critical in this study as owner's involvement and frequent feedback, owner's commitment to established schedules and budget and adequate planning and control techniques. Notwithstanding these additions, three factors found to be relevant and significant in affecting the effectiveness of infrastructure projects by Chua, et al. (1999), were eliminated from the list and include Project

Manager's experience, Project Manager's commitment and involvement, and adequate planning and control techniques.

From the review of these existing studies, eleven factors were identified as factors affecting effectiveness of infrastructure projects. These factors which would be used in this current study to be ranked by the District Assembly staff and the CEOs, Project Managers who were engaged on these infrastructure projects by the DAs are listed as follows:

1. Risk identification and management.
2. Adequacy of plans and specifications
3. Constructability
4. Adequacy of funding
5. Owner's involvement and frequent feedback
6. Budget updates
7. Project Manager competency/ experience.
8. Owner's commitment to established schedules and budget
9. Economic risks
10. Project Manager commitment and involvement
11. Realistic obligations/ clear objectives

CHAPTER THREE

RESEARCH METHODS

Introduction

This chapter discussed the philosophical foundations underpinning the study, research design adopted, study area, sampling techniques and sample size, pre testing of the instrument, sources of data, data collection methods, data processing and analysis. The study was undertaken in three Districts namely Tarkwa, Prestea Huni Valley and Obuasi.

Philosophical Foundation of the Study

The understanding of different evaluation methodologies, their interplay and reasons for selecting one approach or method over the other, it is imperative to recall the philosophical traditions which underpins the various methodologies and approaches. Three philosophical traditions underpin the broad approaches to evaluation used in socio-economic development programmes. These are positivism, realism and constructivism traditions. Positivism is a philosophical theory which recognised that certain positive knowledge has its foundation in natural phenomena, their properties and relations. Knowledge generated through the sensory organs is understood through reasoning and logic, becomes the main starting point of all definite knowledge. Posteriori knowledge is the only legitimate knowledge according to the positivist approach. The positivist approach is targeted at discovering regularities and laws utilizing natural science principles to social sciences. The summation of the individual parts, their actions and the interactions is the

basis for explaining a phenomenon. In other words, the whole is explained and understood by probing its constituents. This is the foundation for econometrics models and survey methods applied in programme evaluation. The application of these quantitative is able to reveal quantifiable confirmation of the relationship that exists between inputs and outputs (Jorge, 1979).

The limitations of the application of this philosophical tradition to the evaluation of socio-economic development programme stem from the challenge of adequately quantifying many of the results and effects which are of utmost importance to the evaluator, the convolution of interplay of the programme interventions and related factors. At present proper recognition is given to these challenges especially the difficulties posed by incomplete observation which needs to be explained within a context. The observation of the reality is always simplified, mediated, moderated and even modified by the apparatus and the methods employed in the data collection; the challenge prevalent in most human endeavor and settings to expect discovering regularities and laws which do not change over different local contexts; the difficulties which arise as conditions vary through an interaction of variables especially in random manner (Calhoun, 2002). Post-positivist schools have emerged to address most of the difficulties and limitations of the positivist tradition. The strongest in rebuffing a lot of the prepositions of the positivism tradition is the constructivism which rejects the existence of an objective knowledge and posits that it is only through the eyes and construction of the observer that the world can explained and understood.

According to House (1990), in the constructivism approach, the appraiser is most often probably to take on the role of responsive, interactive and coordinate bringing together different groups of stakeholders with different perspectives for communal assessment resulting in creating common understanding. In a social context in which exploration takes place, scientific knowledge is constructed rather than discovered. The particular research paradigm in which the research is situated determines the kind of knowledge construction.

Realism, emphasis and focus on creating common knowledge from various social contexts and attempt opening the black box of the intervention programme to reveal the structure and framework responsible for the casual relationship between the inputs utilized and the resultant output. In undertaking this due cognizance is given by this tradition to the fact that the programme intervention are implemented in multifaceted social and institutional procedures which requires proper accounting and mainstreaming of all the possible effects of these structures and the various contexts. An open system is envisaged and this focuses the appraiser's efforts in examining and revealing the casual relationship present and assigning reasons to the observed changes in different contexts (Pawson & Tilley, 1997).

Depending on the circumstances of the assessment, appraisers may lean towards one philosophical tradition than the other and may not see themselves as using exclusively one tradition. Generally, appraisal apparatus and mechanisms employed in the positivism philosophical traditions are relevant and needed for carrying out scientific enquiry whilst realism

philosophical tradition tools and procedures are helpful especially in a context where policy intervention programme development is undertaken to generate formative insights. Finally constructivist philosophical traditions are really relevant in situating the policy intervention programme in the right context but requires good amount of working cooperation and trust between the programme assessor and relevant stakeholders (Dudoskiy, 2016).

The ontological background of this thesis was a blend of both the positivist and constructivist philosophical traditions but with leaning more towards social constructivism. It is so because of the recognition that local government institutions and the mining affected communities which are the social actors in this case were constructing reality which was reflected in the Medium Term Development Plans, contract documents, programme and project documents of the various MMDAs. The influence exerted by the various social actors viewpoint can be teased out by reflecting on the data and information presented. Further understanding and insight into the effects and rational for placing more concentration in a certain direction is reveal when the data the regarded as subjective. When it comes to the quantitative perspective and viewpoints of programme effect, the interpretivist and social constructivist assumptions permit for explaining the results which are still relevant, instead of regarding the impact of the intervention as absolute. The subjective philosophical perspective was very important in all elements of this thesis as the research objectives entail looking at the effectiveness of these programmes which were socially constructed by the actors and very strongly entrenched in its social context.

Research Design

Berg (2004) describes research design as a process of research from conceptualizing a problem to writing the research question, data collection, data analysis, interpretation and report writing. Leedy and Ormrod (2004) defined a research design as a plan for research which guides the collection of data and the methods of analysis that were to be performed. Cooper and Schindler (2006) perceive that the research design is the blueprint for fulfilling research objectives and answering its questions. A research design therefore is a set of logical procedures that if followed permits evidence to be obtain to establish the degree of progression in an endeavor being undertaking. It is the basic strategy of the research and the logic behind it, which holds all the phases and parts of the enquiry together and makes it valid to draw conclusions and make generalization.

The study employed an ex- post facto quasi experimental design. It is an ex post facto in the sense that, the evaluation of the context and trend of funding, structure and process of MDF management, efficiency and effective utilization, effectiveness of the MDF infrastructure projects and impact of the Mineral Development Fund were carried out after the interventions were implemented. The selected Districts were regarded as naturally occurring samples and therefore the effect evaluation of the MDF looked at the short to medium term welfare or outcomes of the interventions on these naturally occurring samples. The research is a mixed method approach using survey, interviews and proxy pretest during focus group discussions on selected study units. With this method, teasing out what the outcomes might have been

without the intervention during analysis stage was possible. This made it easier for the researcher to deal with the challenge of attributing identified changes in outputs and outcomes to programme intervention and not to the influences of general economic development or other development projects in the area or at least identifying the contributions made by the MDF in enhancing the economic and socio cultural life of members of the affected communities.

The methodology employed for this work, suffers from some limitations, which implies that it was difficult to establish causality with certainty and credibly attribute any changes completely to the programmes done with the Mineral Development Fund. This was due to

1. The inability to fully control all study variables.
2. Inability to randomly assign participants to conditions
3. The study not having baseline data.
4. The study did not include a control group.
5. The projects undertaken with the Mineral Development Fund are part of a portfolio of programmes geared towards the development of the entire District.

The utility of recall was enhanced by triangulation of the independent information collated. The data received from the Districts were checked against those of the affected communities, Office of the Administrator of Stool Lands and other sources of data. Another way employed to improve reliability

and validity of data collected was by reviewing and analyzing historical data and other secondary data sources.

Study Area

The study was carried out in three districts namely Tarkwa, Prestea Huni Valley and Obuasi District Assemblies. The Tarkwa District is one of the 22 administrative Districts in the Western Region of Ghana. The District covers a total land area of 978.26 sq. km and shares borders with Mpohor District to the East, Prestea Huni Valley District to the north, Ahanta West District to the South and Nzema East District to the West (GSS, 2014).

The total population of the then Wassa West District according to the 2000 Population and Housing Census was 232,699 comprising of 49.2% females and 50.8% males. Later on the Wassa West District was divided into Tarkwa District and Prestea Huni Valley District. The population of Tarkwa District in 2000 was 105,608. The sex ratio accordingly was 106.5% while the population density was 159.9 persons /square km (GSS, 2014).

The proportion of economically active population in the Tarkwa Nsuaem District was 68% with 63% employed and 5% unemployed. Pensioners, persons too old or too young to work, homemakers, students and the disabled formed the remaining 32% who are economically inactive. According to the 2010 Census, agriculture is the highest employer of the labour force employing 31.5% followed by 24.8% in plant and machinery operation largely in mining. Those employed by the government are 3.9% with the rest being private sector workers (GSS, 2014). Tarkwa District

Assembly has 30 electoral areas with elected Assembly members and 13 members selected by the President in consultation with the traditional authorities and other stakeholders in the District. The District has five Zonal Councils and one Urban Council at Benso, Simpa Nsuta, Nsuaem, Dompim and Tarkwa respectively (GSS, 2014).

Ghana Water Company Limited treats 3,700 cubic meters of water from River Bonsa on daily basis but maintains that cost of treatment is very high due to frequent pollution by both mining and human activities in the Bonsa River. A good proportion of 16 percent depend on rain, stream, spring and rivers as their source of drinking water. Rivers and streams are polluted with contaminants from both big mining operations and illegal mining activities and debris from other human activities posing health hazards to rural dwellers. In most cases due to ignorance and lack of education or limited options, people fail to treat water and as a result some frequently suffer from water related diseases such as, cholera, diarrhea, rashes and other intestinal diseases. The place of Tarkwa in the history of mining in Ghana cannot be over emphasised. Even long before the Geological Survey Department was established in Ghana in 1913, there were underground gold mines operating in Tarkwa and Nsuaem (Kenyankaw mine). Before the Europeans from Portugal and Britain arrived in the Gold Coast between 1453 and 1633, there was alluvial gold mining and minerals extraction from deep pits. The Tarkwa District hosts a number of mining companies. Among them is AngloGold Ashanti Iduaprieum Limited which operates in the following communities: Teberebe, Adisakrom, Domeabra, Nkwantakrom, Acheampongkrom, Mile 7,

Adieyie, Mankessim, Wangarakrom, Badukrom, Timber Road, Akyempim, Charliekrom, Bankyim, Abonpuniso and New Techiman (Akabzaa, 2000).

The AngloGold Ashanti Iduapriem's asset comprises of the Iduapriem and Teberebe properties on a 110 km^2 concession and is located some 70 km north of the coastal city of Takoradi and 10 km southwest of the Tarkwa Mine. Gold Star Resources Limited has its operations in the following communities: Ningo, Benso and Subriso. Gold Fields Ghana Limited is also located in the Tarkwa District and has operations in New Atuabo, Akoon and Brahabebom communities. Ghana Manganese Company Limited (GMC) is based in the Tarkwa District and has operations in Esuoso, Bonsawire, Enyinase, Nsuta, Anomakokrom, Tamso, Senyakrom, Jerusalem, Akyem, Ahwitieso, Wassa Agona, Kwamenakrom, and Bonsa II (Akabzaa, 2000).

Carved out of the then Wassa West District Assembly, the Prestea Huni Valley District Assembly has its District capital at Bogoso, situated some 33 kilometers north of Tarkwa. Prestea Huni Valley District Assembly shares boundaries with Wassa Amenfi Central District to the North West, with Wassa East District to the south east, with Axim District Assembly to the south west, with Tarkwa District Assembly to the south and Wassa Amenfi East District Assembly to the north. The District covers an area of about 1376 km^2 (GSS, 2014).

Prestea Huni Valley enjoys a wet equatorial climate and has the highest amount of rainfall in March to July and the dry season from October to February. High temperatures are experience all year round with significant daily and seasonal variations. The annual average temperatures range between

26 and 30 degree Celsius in the major season with humidity of between 75-80 percent in the wet season and 70-80 percent in the dry season. The District has a double maxima rainfall pattern with a mean annual rainfall of 187.83mm. The District falls within the forest belt with the height of trees ranging between 15-40 meters high. Trees of immense economic value include sapele, odum, bamboo, mahogany, wawa among others.

The Prestea Huni Valley District generally has an undulating topography with few scarps ranging between 150 m to 300 m above sea level. The District falls within the forest dissected plateaus physiographic region with Precambrian rocks of mineral laden Birimian underlying the forest dissected plateau resulting in the existence of many gold mining companies operating in the District. The educational institutions in the district were evenly distributed as each of the settlements in the district has its share of basic schools facility. The Prestea Huni Valley District has 149 KG/Pre-schools, 148 Primary, 108 Junior High and 3 Senior High Schools. Also, the district has 43,315 pupils in basic schools out of which 51.46% are males and 48.58% female (GSS, 2014). However, poor classroom blocks, inadequate furniture, lack of teachers' accommodation, inadequate teaching and learning materials among others have had negative effects on the academic achievements.

The Prestea Huni Valley District is a hub for the mining of gold and at the moment has five major surface mining companies namely Gold Star Bogoso Prestea Ltd, Goldfields-Damang, AngloGold Iduapriem, Sankofa and Goldfields Tarkwa. Goldfields Ghana Limited (Damang Mine) operates an

open pit mine in Damang and its surrounding communities in the Bosomtwi traditional area. The Damang concession lies to the north and joins the Tarkwa concession, which is located near the town of Tarkwa. The Damang Gold Mine consists of two mining leases, namely the Damang mining lease and the Lima South mining lease, covering a combined total area of 8,111 hectares close to the towns of Damang, Huni Valley and Amoanda (GHEITI Report, 2014).

Goldfields Ghana Limited (Tarkwa Mine) operates an open pit mine in Tarkwa and its surrounding communities in the Apinto traditional area. The Tarkwa Mine operates under seven mining leases covering a total area of approximately 20,825 hectares of which three of these leases are close to the towns of Huniso, Abekoase, Samahu and Teberebe in the Apinto Traditional Area. The Bogoso and Prestea properties are adjoining mining concessions that together cover approximately 40 km of stretch along the southwest-trending Ashanti gold district. The Bogoso mine has two ore processing facilities; a refractory processing plant with a capacity of 2.7 million tons per annum which uses bio-oxidation technology and a conventional carbon-in leach processing plant with a capacity of 1.5 million tons per annum (Akabzaa, 2000).

The high presence of mining activities in the Prestea Huni Valley District has caused some parts of the District to suffer from environmental stress. A number of rivers and farmlands have been polluted and lost due to the spillage of cyanide by the mining companies. This has rendered the water,

fishes and plants in these affected parts unsafe for consumption for both man and animals. Most affected towns are Dumasi, Damang, Kyekyewere, Awudua, and Prestea among others. In addition, land used for agricultural purposes has now been taken over by the mining companies therefore making them prohibited areas for future farming activities (Akabzaa, 2000).

The Obuasi District is located between latitudes 5º 35'N and 5º 65'N and longitudes 6º 35'W and 6º 90'W. It covers a total land area of 162.4 km^2. It is located in the Southern part of the Ashanti Region 64 km from Kumasi, the regional capital. There are 62 communities in the District with 30 electoral areas, and five zonal councils. The District share borders with Upper Denkyira District to the south, with Adansi South to the East, with Amansie Central to the West, with Adansi North to the North and has its District Capital as Obuasi (GSS, 2014).

The Obuasi District has an undulating topography with more of the hills above 500 meters above sea level. The highest point is located on the Pompo range at 634 metres high. All areas in the District are above 100 metres and the highland ranges in the District include Dampaia in the east, Kusa in the north east, Pompo and Sanso near Obuasi. The major rivers and streams in the District include Akapori, Pompo, Kunka, and Nyame. All the above rivers and the perennial ones such as Subin, Menson, Kwabrafo, Hweaseamo, Kyeabo, Ankafo, Gyimi and Nyam are polluted by mining and other human activities. Rocks in the District are mostly of Pre-cambrian and Upper Birimian formation which are noted for their rich mineral bearing potentials making the District one of the major mining districts in Ghana. The Obuasi

mine (AngloGold Ashanti) which works on steeply dipping quartz veins over a strike length of 8km. has since 1898 produced over 600 tons (18 million ounces) of gold (Akabzaa 2000). Natural resources that can be identified in the District include rivers, rocks, forest, sand clay and gold. The rocky hills in the District ranging between 250 and 300 metres above sea level have immense potential for stone quarrying in the local economy. The natural environment of the District is degraded and takes the form of air, water pollution and land degradation due to mining activities and deforestation. So far about 5600 hectares of teak and mahogany have been planted as efforts to reclaim surface mining land sites (Akabzaa 2000).

The Assembly consists of 55 Assembly Members from 62 communities with the District Chief Executive and the Presiding Member as the heads of the Assembly. The District consists of two constituencies with two Members of Parliament. There are eight sub-committees which include development planning, works, justice and security, finance and administration, social services, environmental, education and agriculture. There are 78 Unit Committees and five Zonal Councils in the District.

Currently, the District has a total number of four hundred and thirty three educational facilities for both private and public comprising one hundred and forty Kindergartens, one hundred and sixty four Primary, one hundred and fourteen Junior High Schools, two Technical/ Vocational and five Senior High Schools (GSS, 2014). Agriculture and its related activities, ranks third in the order of economic activities in the Obuasi District employing about 25% of the working population.

According to the Population and Housing Census (2010), the total population of the District is 168,641 with males constituting 48% and females 52%. The largest percentage of the population lies within the age group 15-64 constituting 61% of the population followed by 0-14 year group with 36.6% and the least being the 65 years and above with 2.6%. The urban share of the District's population is 85.2% while that of the rural is 14.8%. The age dependency ratio of the urban population is 61.2 while that of the rural is 81.1. This means that for every 100 working persons in the urban areas there are 61 dependents on them and in the rural areas every 100 working persons there are 81 persons depending on them. The economically employed population constitutes 90% while 10% are unemployed. The 10% economically active but unemployed population raises concern for the District as it is far greater than the national rate of 5.3%. This situation further raises the level of economic dependency to 1:6 which has a negative effect on the local economic development (GSS, 2014). The District abounds in water resources such as streams, rivers and ponds. However these water sources are heavily polluted by the mining activities.

Study Population

A research population is any collection of elements that share some common traits which are of particular interest to the researcher. According to Parahoo, (2006) a research population can be defined as full set of items, institutions, parts, persons from which a sample for the study is chosen and measured. Irrespective of the kind of research which is being undertaken, data

collection and analysis methods employed, the researcher has a herculean challenge of attempting to study every item and every characteristic (Miles & Huberman, 1994). The population must be defined in clear language so as to select the members of the sample to consists of only those sampling units which poses the qualities of interest and relevant to the problem under consideration. From this understanding the research population of this study was the 11 Districts which host mining operations in Western and Ashanti regions of Ghana and therefore beneficiaries of the Mineral Development Fund.

Sampling Procedure and Sample Size

According to the Auditor General's Report (2013), there were 21 districts in seven regions of Ghana which host mining operations. Out of this number, five were in the Ashanti Region while six were in the Western Region. There were therefore a total of 11 mining affected and beneficiary districts in the study area.

The study utilized a purposive sampling to select three District Assemblies in the mining areas of the Western and Ashanti Regions. These three District Assemblies were Tarkwa District Assembly and PHV District Assembly in the Western Region and Obuasi District Assembly in the Ashanti Region. These three Districts were chosen because firstly, the Auditor General of Ghana carried out a performance audit in these District Assemblies on the utilization of the MDF which serves as a reference point and secondly the three Districts host some of the largest mining companies in Ghana. According

to the Auditor General's Report (2013), between 2004 and 2009, the three District Assemblies received a total amount of GHC 6.74 million representing 57% of total Mineral Development Fund of GHc11.9 million disbursed to 21 Metropolitan, Municipal and District Assemblies in seven regions of Ghana.

Purposive sampling was further employed to select three beneficiary communities and five people per a community. Twelfth District Assembly staffs and fourteen Contractors engaged on the projects were also selected. The District Assembly staffs were purposively selected based on their vast knowledge and the roles they played in the implementation of the projects. The selection of the CEOs and Project Managers of various contracting companies was based on their frequent engagement on Mineral Development Fund projects, an availability of verifiable and reachable physical address and an active telephone line. All completed projects within the beneficiary communities were included in the study. In all 211 projects were evaluated consisting of 73, 76, 62 from Tarkwa, Prestea Huni Valley and Obuasi District Assemblies respectively.

Instrumentation

In order to collect the relevant data for the study various data collection instrument were employed. First, structured questionnaire from the studies of Chua et al. (1999), Hwang and Lim (2012) and Kog and Loh (2012) was adapted to collect data from the District Assembly staff, and the CEOs and Project Managers of the contracting companies. The questionnaire covered factors that needed serious attention at the project inception, project planning,

project implementation and close out stages. The respondents were asked to rank, from one to twelve, the factors they considered most important in successful project delivery at the District Assembly level. A ranking of 12 means the most important and one means the least important factor. Second, a guide was developed for the Focus Group Discussions in the beneficiary communities. Areas covered under the instrument included context for the establishment of the MDF, the economic effect of mining, the socio-cultural effects of mining activities, the effect of mining on the environment, (soil, water, vegetation), and the impact of the Mineral Development Fund Projects on identified segment of the society and the community as a whole. The researcher and his trained assistants ensured face validity while content validity was checked by supervisors at the Department of Agricultural Economics and Extension, University of Cape Coast.

Third, the other research instruments used to collect data for the study depended mainly on secondary sources. A checklist was developed with the assistance from the supervisors and included only secondary data sources which contained vital information needed in answering the research questions.

Data Collection

The main data collection for the study took place between February and August, 2017 and a supplementary focus group discussion on the impact of the Mineral Development Fund data collection in August 2020. The data collection was done between the hours of 9 a.m. to 4 p.m. during the working days of the week by the researcher and two trained field assistants.

In order to examine the context of the Mineral Development Fund, data was collected using secondary data sources such as Medium Term Development Plan, historic records, District development reports, Ghana Extractive Industry Transparency Initiative reports, Auditor General's report and primary sources such as survey, focus group discussion, key informants and personal interview. In order to conduct the focus group discussion for the context, purposive sampling was used to select three Mineral Development Fund beneficiary communities in each District. Each focus group was made up of five people from various interest groups. The Assembly members of the various electoral areas assisted in the formation and selection of the focus groups which were composed of a woman, a youth, a man, a student and an educationist. The Assembly Member, Opinion Leaders and the Chiefs were therefore instrumental in the formation of the focus groups and also served as key informants in the selected communities. In the Tarkwa District, the communities selected were Akoon, Tarkwa, and Teberebe. In Prestea Huni Valley District Assembly, the focus groups were formed in Gambia, Bondai and Pepesou whilst in Obuasi District they were in Anyinamfie, Sanso and Anwiam. Purposive sampling was used to select these three communities given the constraints of time and cost factors. Upon entering into a community, the first point of call for the research team was the Assembly Members and then to the Chiefs. With the guidance from the research team, the Assembly Members and the Chiefs then suggested the individuals who should take part in the focus group discussions. When the research team was satisfied that the individual had stayed in the community long enough and

likely to have some vital information and also a likely beneficiary of the project in the community, the individual participant suggested was included. The Assembly Members with the help of the Chiefs and the five participants per focus group decided on a convenient date and venue for the discussion. A day before the focus group discussions were held, calls to the participants were carried out to make sure that they were present during the discussions. The research team arrived early in the community and with the help of the Assembly Member; the venue is put in order. Again the participants were called and reminded of the time. When the participants were all present the research team leader opens the discussions with a prayer and an explanation as to the reasons for the meeting. The research team moderated the focus group discussions and encouraged all to actively participate. Data was collected using audio recorder and taking notes.

In assessing trend of funding of the Mineral Development Fund programmes, data was collected on all Mineral Development Fund completed and handed over projects by each District Assembly namely Tarkwa, Prestea Huni Valley and Obuasi. These District Assemblies have completed and handed over 73, 76 and 62 projects respectively. The data collection instruments used included dedicated bank statements, Ghana Extractive Industry Transparency Initiative reports, Auditor General's report and Mineral Development Fund disbursement records from the Office of the Administrator of Stool Lands, project contract records and project progress reports. These data sources contained the required information and also complement each

other on disbursement, receipt and utilization of the Mineral Development Fund.

In examining the structure and the process of managing the Mineral Development Fund, data was collected on the structure involved in royalty collection and lodgment, disbursement through to utilization. After the collection and disbursement by Ghana Revenue Authority and the Office of the Administrator of Stool Lands, the actual management at the local level is done by the District Assemblies. Therefore secondary data was collected from the Local Government Act, Act 462 of 1988, which established and laid out the structure and functions of the District Assemblies. Primary data was also collected through personal interviews with the District Assembly six unit heads and their assistants on how management of the Mineral Development Fund is done at the local level. Primary data was also collected on the management of the Mineral Development Fund during focus group discussions in the local affected communities. The information received during the focus group discussion in the beneficiary communities was vital in confirming or refuting the position of the Assembly staffs on the management of the Mineral Development Fund in the affected communities.

In order to ascertain the efficient management of the Mineral Development Fund, data was collected using mainly secondary sources. The major secondary data sources include Medium Term Development Plans, contract documents, progress reports, bank statements, income and expenditure accounts among others.

In respect of the effectiveness of the Mineral Development Fund, primary data was collected through focus group discussion and key informants in the beneficiary communities. Secondary data sources such as Medium Term Development Plan, progress reports, contract documents provided vital information on the type of projects undertaken, the location of these projects and most importantly whether the projects were in consonance with the objectives of establishing the Mineral Development Fund or not.

In ranking the factors affecting the effectiveness of the Mineral Development Fund infrastructure projects, eleven factors compiled from the studies conducted by Chua et al (1999), Hwang and Lim (2012) and Kog and Loh (2012) and one other factor from the pre-testing were ranked in a survey. These factors run through all the stages of any infrastructure project and require serious attention if the project is to be effective. Twelfth District Assembly staffs and fourteen CEOs and Project Managers from the contracting companies were purposively selected to rank these factors in order of importance. The CEOs and the Project Officers were selected based on frequent engagement on Mineral Development Fund projects, availability of a verifiable and reachable physical address or location and an active telephone line. Data on the rankings of the factors they thought were most critical to the effectiveness of these infrastructure projects were collected using questionnaire.

The data to assess the impact of the Mineral Development Fund was derived mainly from the focus group discussion and key informants in the beneficiary communities. In order to conduct the focus group discussion,

purposive sampling was used to select three Mineral Development Fund beneficiary communities in each District given the constraints of time and cost. The Focus Group was made up of five people including a male, female, a student, youth, educationist which represented various interest groups. This is to enable the research team to include participants who have the information sought for in the focus group discussion. The Assembly members of the various electoral areas assisted in the formation of the focus group discussion and selection of the members. The Assembly Members, Opinion Leaders and the Chiefs were therefore instrumental in the formation of the focus groups and also served as key informants in the selected communities. In the Tarkwa District, the communities selected were Akoon, Tarkwa Banso, and Teberebe. In Prestea Huni Valley, the focus groups were formed in Gambia, Bondai and Pepesou whilst in Obuasi District they were in Anyinamfie, Sanso and Anwiam. Purposive sampling was used to select these three communities because of time and cost factors. Upon entering into a community, the first points of call for the research team were the Assembly Members and then the Chiefs. With the guidance from the research team, the Assembly Members and the Chiefs suggested the individuals who should take part in the focus group discussions. When the research team was satisfied that the individual had stayed in the community long enough and likely to have some vital information and also a likely beneficiary of the project in the community, the individual suggested was included. The Assembly Members with the help of the Chiefs and the five participants in the focus group decided on a convenient date and venue for the discussion. The research team moderated the focus

group discussions to enable all participants contribute and prevent some individuals from hijacking the process.

Data Analysis

The data collected in respect of the context for establishing the Mineral Development Fund was done using audio recorder and writing which was later transcribed and analysed into key thematic areas namely; economic, socio-cultural and environmental which is also made up of water, soil and the vegetation.

The data collected on the trend of MDF funding was analysed using SPSS. Totals, mean, minimum, maximum, standard deviation and percentage were statistics computed. Frontier Analyst software was used to perform Data Envelopment Approach (DEA) in order to carry out comparative efficiency analysis between the three Districts on efficient MDF utilization. Data Envelopment Analysis is a Linear Programming method which computes a single value for efficiency obtained by similar Decision Making Units (DMUs). These DMUs are institutions which have homogeneous organization structures, common functional units and above all utilize similar inputs and produce similar outputs through common operational objectives. The Data Envelopment Approach (DEA) method has the capability to accommodate numerous inputs resources and outputs simultaneously without placing relative importance and weighting on their contribution. Therefore it does not require parametrically driven input and output production functions. Data envelopment approach also has the capability to recognize and reveal

improvement targets for inefficient decision making units and indicate what enhancements can be undertaken to efficiency frontier. The peculiar challenge of utilizing the data envelopment approach is it is a deterministic approach in nature. The model therefore does not take into consideration measurement errors and other statistical noise when running the computations making any deviations from the frontier attributable to inefficiency production (Mkhabela, 2011). The Data Envelopment Approach has another limitation in that it does not provide a method for the best practice Decision Making Units operating on the frontier to improve performance.

Data envelopment approach utilizes an optimization algorithm in performing the analysis and generates efficiency scores for all Decision Making Units ranging between zero and 100%. Decision Making Units which obtained 100% or 1 efficiency score are referred to as efficient units. Hence, the technical efficiency ratio in general is $0 \leq$ Technical efficiency ≤ 1. Decision Making Units which obtained more than 0.9 but less than 1.0 are marginally inefficient units. The Decision Making Units which are clearly inefficient and having difficulty in making them efficient in the short term are those units which obtained efficiency score of less than 0.9 the Decision Making Units in this cluster are failing in their pursuit and answers must be provided as the effective management resources allocated to them. A Decision Making Unit which obtained a value of 1 indicates that the DMU is on the efficiency frontier and is therefore technically efficient (Farrell, 1957). Data envelopment approach model in comparing the Decision Making Units in the sample decides the best performing District Assemble the inefficient District

Assemblies can be benchmarked against rather than against an average performing District Assemble. The study adopted the output maximization in constant returns to scale using the CCR model (Charnes, Cooper & Rhodes, 1978). The following is the formulae for evaluating the DEA

$$\text{Efficiency of DMU } i = \frac{\sum_{i=0}^{n0} O_{ij} W_j}{\sum_{j=1}^{n1} I_{jV_j}} \quad (1)$$

$$\text{Efficiency of DMU } i = \frac{\text{Weighted sum of unit i's outputs}}{\text{Weighted sum of unit i's inputs}} \quad (2)$$

Where

O_{ij} represents the value of DMU i on output j;

I_{ij} represents the value of DMU i on input j;

W_j is the non-negative weight assigned to output j;

V_j is the non-negative weight assigned to input j;

n_1 is the number of input variables; and

n_0 is the number of output variables.

The MDF and 12 District staff served as inputs for the DEA analysis. Composite project numbers or costs for each District were the outputs. Statistics such as percentages, DEA efficiencies, DEA cost efficiencies and DEA super efficiencies, DEA super cost efficiencies were some of the statistics computed and cross district comparative analysis performed.

The Logistic regression was done to examine the influence of project input, project efficiency and project output on the binary dependent variable:

effective or ineffective. Logistic regression is a peculiar king of linear regression used when the outcome variable is categorical. The Logistic regression is a classification algorithm and calculates the probability of occurrence of an event by fitting data to a logit function. It is used to predict a binary outcome (1 / 0, Yes / No, True / False) given a set of independent variables. Dummy variables are used to represent binary/categorical outcome.

In logistic regression, the concerned is about the probability of outcome of the dependent variable (success or failure). The link function is established using two things: Probability of Success (p) and Probability of Failure (1-p). This means that p should meet the following criteria:

It must always be positive (since p is > or = 0)

It must always be less than or equals to 1 (since p is < or = 1)

The logit function = p = $\frac{e^y}{1+e^y}$ (3)

where p, is the probability of success. If p is the probability of success, then 1-p will be the probability of failure which is written as:

q = 1 - p = 1 – ($\frac{e^y}{1+e^y}$) (4)

where q is the probability of failure

On dividing, the two equations above, the result is

$\frac{p}{1-p} = e^y$ (5)

After taking log on both sides, the following is obtained

$$\log\left(\frac{p}{1-p}\right) \quad (6)$$

$\log\left(\frac{p}{1-p}\right)$ is the link function. Logarithmic transformation on the outcome variable allows modeling of a non-linear association in a linear way.

Substituting yin equation (5), the resultant equation becomes

$$\log\left(\frac{p}{1-p}\right) = \beta_o + \beta_i \quad (7)$$

This is the Logistic Regression equation. Here $\left(\frac{p}{1-p}\right)$ is the odd ratio. Whenever the log of odd ratio is found to be positive, the probability of success is always more than 50%.

The specific form of the regression model is as follows

$$Y(x) = \frac{e^{\beta_o+\beta_1 x}}{1+e^{\beta_o+\beta_1 x}} \quad (8)$$

The binary dependent variable (i.e. effective or ineffective) was re-coded '1'for effective and '0' for ineffective. The independent variables used in the computation are composite figures for project input; project output and efficiency which were measured on ratio scale for each District Assembly were used in the analysis. For the purposes of the current study efficiency was output divided by inputs.

In analysing the data to examine the differences between the District Assembly staff and the Contractors, in ranking the factors affecting effectiveness of MDF infrastructure projects, the Relative Importance Index (RII) was used. The formula is as follows: -

$$\text{RII}=\frac{\sum W}{A*N} \ (0 \leq RII \leq 1) \quad (9)$$

Brinkerhoff Six-Stage Evaluation Model W was the weight given to each factor by the respondents and ranges from 1 to 12 where 1 was the least important factor and 12 the most important factor. A was the highest weight (12 in this case) and N was the total number of respondents. Based on the Relative Importance Index computed, the factors affecting effectiveness of MDF infrastructure projects were ranked and Mann- Whitney U test used to ascertain if there was a significant difference between the District Assembly staff and the contractors in ranking these factors at 5% significance level.

Upon determining the sum of the ranks for both groups, the values are computed employing following equations

$$U_1=n_1n_2+\frac{n_1(n_{1+1})}{2}-R_1 \quad (10)$$

$$U_2=n_1n_2+\frac{n_2(n_{2+1})}{2}-R_2 \quad (11)$$

The samples were District Assembly staff, n_1=12 and the Contractors, n_2=14

The component parts of the formulae for evaluating the Mann-Whitney U test are $R_1 = \sum r_1/n_1$ and $R_2 = \sum r_2/n_2$. R_1, R_2 were the sample means of the two groups. In the current study, the groups were the District Assembly staff and the Contractors respectively. $\sum r_1$and $\sum r_2$were the sum of the rankings for the two groups and n_1, n_2 were the number of participants in each group. The decision rule is that, to be significant, the obtained value of U statistic must be equal to or less than the tabled critical value at the pre- specified level of significance.

CHAPTER FOUR

CONTEXT AND TREND IN MDF PROGRAMME FUNDING

Introduction

The study basically was aimed at evaluating the factors affecting the effective management of the Mineral Development Fund by Tarkwa, Prestea Huni Valley and Obuasi District Assemblies. The chapter presented the results and discussions on the genesis of mining in Ghana, the antecedents of the Economic Recovery Programme, the Structural Adjustment Programme and its effect on the socio-cultural, economic and environmental aspects of the host communities and the passing of an Executive Fiat by the Government to reverse the adverse effect of mining.

Context for Establishing the Mineral Development Fund

Gold was being extracted from beach and streams when the Europeans arrived in the Gold Coast. It was however in the 18th century that the method for extraction changed to alluvial mining and auriferous lodes. Gold production was difficult because of poor infrastructure despite the colonialists indicated their desire in mining activities.

The mining sector of Ghana has gone through an unstable history of development since it began some years ago. In the 1980s the Ghanaian economy experienced serious economic turn down that affected all areas of the economy including the mining sector. Four things were fingered as accountable for this situation:

1. Developmental policies were characterised by large budget deficits funded mainly by money creation.
2. The rising oil prices and falling prices of primary products such as gold, cocoa, manganese
3. The deportation of millions of Ghanaians from Nigeria in 1983.
4. The unprecedented severe droughts in the 1980s

In order to reverse the situation, the government of Ghana adopted the Structural Adjustment Programme to revive the ailing economy in April 1983. The main objective of the SAP was to offer enticement to the investors, resuscitate the infrastructure base, bring inflation down and enhance development and industrialization. The encouragement of foreign trade and private sector led investments were seen as the main propellers for economic development and job generation. In this general scheme of reviving the economy, the mining sector was given serious attention which resulted in crafting specific policies to make the sector stand on its feet again.

The mining sector restructuring during the Structural Adjustment Programme resulted in the coming into being of a new mineral and mining law PNDC Law 153 in 1986. Income tax and rate on mining operations, the royalty rate were all significantly revised downwards, individuals who invested in the mining companies excused from paying taxes on the earnings, duties were not paid on machinery imported for mining activities. Exemption from the payment of Customs Import Duties on plant, machinery equipment and accessories imported for mining were granted mining companies. Tax exemptions were

granted to employees of the mining companies in the form of income tax relieves on furnished housing at the mine site.

The general implication of these policies is the reduction in the initial capital cost of mining and thus increasing investments into the sector. But as can be seen clearly all these laws, policies and initiatives taken on mining sector did not take the harmful environmental issues into consideration during the 1980s and 1990s. The SAP policy implemented by the government of Ghana had a momentous persuasion in wooing a lot of investors into the mining sector of Ghana and within the study area in particular. This induced capital flight resulted in control of capital, employment and the income of the inhabitants in control of multinational mining corporations undertaking mining activities in Tarkwa, Prestea and Obuasi areas. The cultural values and social organisation of the hosting communities in Tarkwa, Prestea and Obuasi had serious effect because of the concentration of mining activities in the area. Concerns about inadequate housing, prostitution, youth unemployment, family dis-organisations, unacceptable level of children who are out of school and substance misuse have since being on the rise. Though these problems were not new to the Tarkwa, Prestea Huni Valley and Obuasi areas, but the level of increase is what the local communities considered as worrisome. Sexually transmitted diseases such as syphilis and HIV have also assumed an alarming proportion in the area.

According to the District's Planning Officers, mining operations have resulted in the huge number of immigrants moving into the communities. This phenomenon cause the growth rate in population to be far above the national

figure and if care is not taken it can be twice that of the national average. The problem of inadequate housing has been created by the movements of people into these areas. The rates charged by landlords have increased to a point that makes it extremely difficult for the ordinary citizen to afford thereby forcing people to live in severely overcrowded conditions which has the potential of generating other social problems.

The members the communities contacted showed their feelings openly that the operations of these mining companies have resulted in the displacement of many communities with several thousand inhabitants. Land for farming purposes has become so scarce forcing people to relocate to other communities miles away in search of farmlands whilst those who wish to stay were resettled by the mining companies. Direct employment opportunities by the mining companies is one of the effective channels for transmitting benefits to a local community, however employment opportunities are non-existence especially with regards to the local people as the companies claimed that the majority of the members of the hosting communities lack the experience , the managerial and technical knowhow relevant to the job. The Unit Committee Secretary for Anyinamfie in Obuasi, one of the communities in the catchment area of AngloGold Ashanti made the following comment:

> AngloGold Ashanti refused to offer jobs to residents of Anyinamfie and other communities in its catchment area despite a promise by the company to do so. In an attempt to show capability and secure jobs in the mining company, the residents of the community have decided to help apprehend thieves who used their villages as routes to steal from

> the company. The communities were successful on a number of occasions yet the mining company failed to offer any job to the residents (Unit Committee Secretary, in FGD, August 2nd, 2020).

Because most of the big mining companies undertake surface mining operations as is largely the case with post SAP where mining operations are capital intensive with relatively low labour requirements, the mining sector has a relatively limited capacity to generate job opportunities. These findings only go to confirm the position held by the World Bank (2011) that despite the exciting efforts made in attracting multinational investors and the huge mineral resource endowment, the continent of Africa remains the poorest and the least developed continent in the world as the overall mineral resources revenue streams have not been used for development and industrialization of the continent.

Fuelling the already precarious unemployment is the massive layoffs at some of the mines such as AngloGold Obuasi Mine due to operational challenges. This has widened the income and inequality gap. The ruthless living circumstances have drowned many school going age teenagers into doing all kinds of unskilled jobs. The unacceptably high rates of children working full time are common and pervasive in communities in the study area. The dissatisfaction and frustration associated with unemployment of the locals have pushed some of the youth into drugs and other social vices. In spite of this, the mining companies have engaged all kinds of workers from other districts and regions of the country. These have a significantly stress and strain local infrastructure and social services such as the provision of health and

educational facilities and pushed the price tag of non-tradable commodities such as accommodation beyond the reach of the ordinary citizen.

Basic necessities of life such as shelter, foodstuff, clean portable water, that makes life worth living is denied the ordinary citizen just because of the monetary consideration. The unexceptionally high cost of living in the study area can be blame on two variables. The first variable was the inequality in earning in favour of mining company staff. For instance, the monthly incomes of the indigenous staff in the mining companies were internationally based and index to the US dollar. This raised the salary received well above their colleagues in the public sector whose salaries are based on the minimum wage. Apart from this mine's staffs are paid internationally competitive salaries, which additional amplify the income inequality. These high wages earners to a large extent influenced the pricing of goods, services and other necessities of life. Secondly, the mining sector has taken a sizeable amount of labour man hours from agriculture and other industries by first and foremost depriving the locales of arable farmlands and then promising them of exciting job opportunities. The combination of decline food production due to unavailability of farmlands, in an already dense populated area with high unemployment is accountable for the high price tag on almost everything.

Members of the local communities visited confirm and blamed the high number of malaria cases in the area on the presence of mining activity. The promotion of environmental alterations that favour malaria vector multiplication and development are caused by the mining activities. The causes of these pervasive environmental changes were the open pits and

diverted water courses with its attendant consequence of stagnant water bodies supplement the spread of the female malarial vectors mosquito.

> Malaria was the primary cause of child mortality in Obuasi with an infant mortality rate as high as 85/1000 compared to the national average of 80/1000. The District also recorded the highest incidence of malaria in the country with an annual average of about 185/1000 as against the national average of about 40/1000. In the same vein, the increased incidence of diarrheal disease appears to be driven by poor sanitation among migrants who live near mining operations (Unit Head, Obuasi District Health in an interview, March 15th, 2017).

Giving details of the situation, the Unit Head, Obuasi District Health Directorate further posited that:

> At some point AngloGold Ashanti identified that malaria has become a grave issue as the town's hospital, which is operated by the company, was treating on average 6,800 malaria cases each month, of which 2,500 were cases from the company. This accounted for over 30% of the mine's workforce, resulting in almost 7,000 work days lost each month (Unit Head, Obuasi District Health Directorate in an interview, March 15th, 2017).

The negative environmental spillovers such as pollution and local wellbeing evils have dampened the output in general of the land and farmers, lowering the profitability of farm work. The effects were present not only among agricultural producers, but extend to other residents in these rural areas. In most parts of the study area, the environment has undergone and its

continued rapid degradation has a diminishing effect on its economic value into foreseeable future. The main cause is the heavy occurrence of mining activities in the area. The vegetation, the soil and aquatic life of the study has been negatively impacted by mining operations. It is becoming clear that the continued dependent on the ecosystem by the local communities as of now and into the foreseeable future cannot be guaranteed. A large hectare of tree plantations and land have been cleared in the Tarkwa and Prestea Huni Valley to make way for surface mining operations and in Obuasi considerable portions of lands have been used as mining waste dumping sites depriving the local communities of arable lands which could otherwise would have used for agriculture purposes. According to Akabzaa (2000) at the time when mining operations are brought to a close on a concession, a mining company would use 40-60% of its total land space allocation for roads, sitting of mines, tailing dump and open pits, mine camps, heap leach facilities and resettlement for local communities affected by mining operations. The long term effect of surface mining is the serious deforestation that has occurred in the study area and is likely to continue into the future after the close of mining operations and even when the soil has been replaced and trees planted. The destruction of the surface vegetation does not only result in erosion but also the deterioration in the vitality of the soil and the ecosystem for production of crops and animals and the survival of flora and fauna. The above effects have resulted in the annihilation of biodiversity, buoyant vegetation and water bodies and cultural sites. Pollution affects total factor productivity through three main ways. These were the reduction of labor productivity, which occurs if workers'

health deteriorates; degradation of water and soil for agriculture and deterioration of the health and yields of crops. These were the very things Acosta (2012) found and therefore made suggestion for the adoption of Papua New Guinea's framework that at least 20% of the receipt from mining revenue should be paid by the government to the local communities who are the land owners in the mining lease area.

Many of the mines have vigorous activities to reduce the water table or divert major water courses out from their operational areas. These programmes have dire consequences for presence and quality of surface and ground water. The incidence of water pollution has been prevalent in the study area. Surface and ground water in the study area are polluted by chemicals such as cyanide and mercury. The spread of gold ore-related heavy metals such as arsenic and sulphur dioxide causing environmental degradation was visible through water and land use. Air pollution has been linked to increase incidence of cough and tuberculosis around mines. The laboratories owned and operated by these multinational mining co-operations provide a range of services to other entities from other parts of the country. Fumes from these laboratories, ore sweltering, burning of fuel at Tarkwa, Prestea and Obuasi has become sources of supplementary airborne pollution in these mining Districts. The local communities suffer from stink from sulphide fumes and sulphur dioxide produced by the ore processing activities of the mining companies. The scorching of the vegetation and plantations are blamed on the emissions toxic substances from the laboratories and are fingered for being behind the poor output of agriculture ventures sited in close proximity. The effects of

some of these pollutants such as cyanide make themselves noticeable immediately but some such as mercury only become evident after a long period time.

The presence of such heavy metals above permitted threshold was injurious to the environment, especially human health and aquatic life. For instance, in Obuasi area, the mean arsenic concentration in drinking water was 50 times more than the World Health Organisation's recommended level. In Sanso, one of the communities in the catchment area of AngloGold Ashanti, the members in the FGD said the only borehole provided has an iron content of 2.0mg/litre. According to the ICMM (2015) the World Health Organisation recommended rate is 0.05-0.1mg/litre iron deposit. This therefore makes the water unsafe for drinking purposes according to the community members.

As a result of the negative environmental, social, economic and cultural impact of mining operations, in 1992 by an Executive Fiat the Government of Ghana established the Mineral Development Fund.

Trend of funding the MDF Programmes

Under the current fiscal regime in Ghana, mining companies were required to pay a five percent royalty on the value of the gold produced. The management of the Mineral Development Fund starts with the collection of mineral revenues from the mining companies. The Ghana Revenue Authority after the collection deposits 80% of this amount into the Consolidated Fund. The Office of the Administrator of Stool Lands receives 10% and the remaining 10% was deposited in a special account at the Bank of Ghana to be

appropriated to mining related government agencies such as Mineral Commission, Lands Commission, Water Resources Commission, Environmental Protection Agency, Geological Survey Department and University of Mines and Technology amongst others.

The Office of the Administrator of Stool Lands (OASL) retains 10% of the amount received to cover administrative expenses. The remaining 90% of the amount received by the OASL was repackaged as 100% and distributed to relevant beneficiaries. The District Assemblies, the Stools and the Traditional Councils in the operational areas of the mining companies were allocated 55%, 25% and 20% which was 4.95%, 2.25% and 1.80% of the total royalty collection by Ghana Revenue Authority (GRA) respectively.

Apart from the undue delay in the disbursement of the Mineral Development Fund from the Office Administrator of Stool Lands regional offices, there have been discrepancies in the amounts to be paid to government and the amount received by GRA and also the amount disbursed from the OASL Head Office and the amount which actually gets to the Districts. In 2007 the disbursements made to District Assemblies were not in tandem with releases from the OASL head office. It came out that whereas the OASL Head Office made only two releases in May and November 2007, Obuasi District Assembly received six (6) payments in the year from the Office of the Administrator of Stool Lands in Ashanti Region. This was caused by unnecessary bureaucracy and administrative bottlenecks. These findings were in line with ICCM (2015) which pointed out that there is no laid down legal background backing the operation and management of the Mineral

Development Fund, therefore it was not clear how the decision on allocation and management of funding is made. The Mineral Development Fund has in the past received allocation of less than the 10% of royalties from mining incomes. Payments into the Mineral Development Fund have been incoherent and there is no separate budget as well as auditing measures. The finding was also in line with Quarshie (2015) which found delays in the release of the Mineral Development Fund at Obuasi District Assembly.

In addition to the discrepancies the operational challenges at the AngloGold Ashanti Obuasi mine encountered in 2012 had a toll on gold production, reducing volumes from 2013 to 2016. This has seriously affected royalty payments and therefore Mineral Development Fund received by Obuasi District Assembly. The operational challenges had not been resolved as of 2017 when data collection was undertaken. AngloGold was granted some conditions under tax concession and development agreements which undoubtedly would affect Mineral Development Fund to the various District Assemblies in its catchment area. Table 1 shows the receipts of Mineral Development Fund by the three District Assemblies between 2003 and 2016 except Prestea Huni Valley District Assembly which was carved out of Wassa West District Assembly in 2008.

According to the Auditor General's report (2010), records at Minerals Commission show that a total of GH₵35,300,000.00 accrued to the Mineral Development Fund from 1998 to 2009. The three District Assemblies namely Tarkwa District, Prestea Huni Valley District and Obuasi District Assemblies received a total amount of GH₵6.74 million representing 57% of total Mineral

Development Fund of GH₵11.9 million disbursed to 21 beneficiary District Assemblies in seven regions between 2004 and 2009.

Table 1: Receipts of the Mineral Development Fund

Year	Tarkwa District	PHV District	Obuasi District
2016	5,137,273.00	7,305,287.00	790,913.40
2014	2,732,319.25	2,089,334.00	217,692.07
2012	2,741,956.00	4,585,180.00	570,787.21
2011	1,340,191.00	1,558,575.00	306,449.33
2010	952,091.00	1,528,865.00	563,915.88
2009	840,000.00	820,000.00	729,890.00
2008	1,150,000.00	390,000.00	1,227,000.00
2007	800,000.00	-	269,852.00
2006	700,000.00	-	712,290.00
2005	420,000.00	-	970,000.00
2004	860,000.00	-	2,281,700.00
2003	-	-	2,282,165.00
Total	GH₵17,673,830.25	GH₵18,277,241.00	GH₵10,922,654.89

Sources: Auditor General's report, 2010; GHEITI, 2014; Field Data, 2017.

The amount disbursed by the OASL between 2003 and 2016 and subsequently received by Tarkwa District, PHV District and Obuasi District Assemblies amounted to GH₵17,673,830.25, GH₵18,277,241.00 and GH₵10,922,654.89 respectively.

Figure 5 shows the percent share of the MDF receipts by the District Assemblies. Tarkwa District Assembly, Prestea Huni Valley District Assembly and Obuasi District Assembly received 39%, 38% and 23% respectively as percentage of the total disbursement of GH₵46,873,726.14

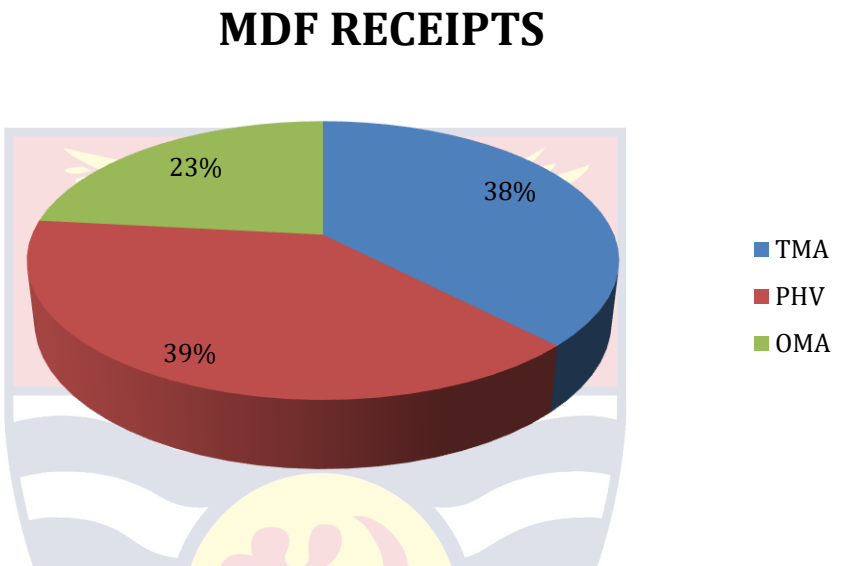

Figure 5: Percentage share of MDF Receipts

Sources: GHEITI Report, 2014; Field Data, 2017

Prestea Huni Valley started receiving the Mineral Development Fund after it was taken out of the then Wassa West District Assembly in 2008. Trend analysis conducted on receipts of the Mineral Development Fund by the respective Assemblies show different patterns as evident in Figure 6. It came out strongly that receipt from the Mineral Development Fund by Obuasi District Assembly shows no significant increment since 2005. Mineral Development Fund was higher in 2003 and 2004 compared to 2005.

A rise in Mineral Development Fund receipts for Obuasi District as the highest among its peers in 2008 could not be sustained but rather declined.

This condition continued into the current period and is not envisaged to improve any time soon because of the operational challenges facing AngloGold resulting in low royalty payment to Central Government.

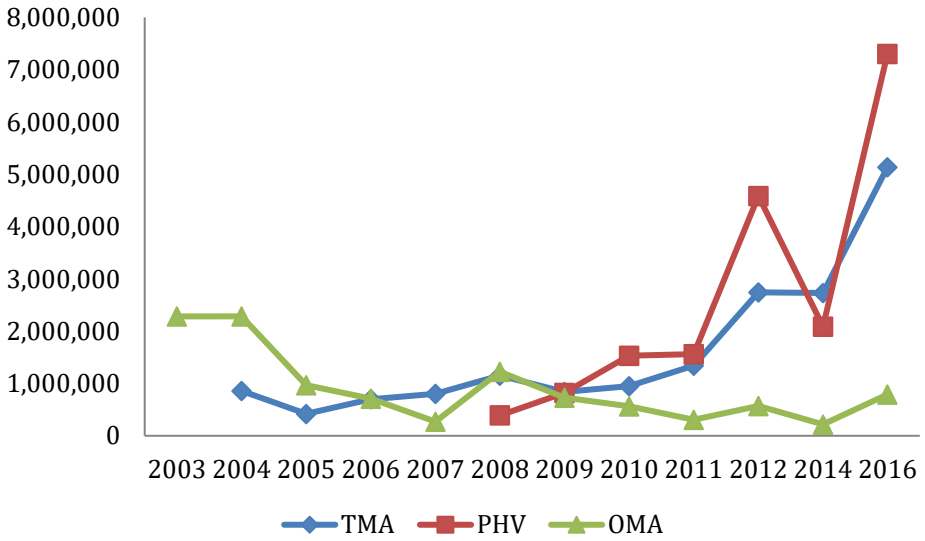

Figure 6: Trends in MDF Receipts

Sources: Auditor General's report, 2010; GHEITI, 2014; Field Data, 2017

The Tarkwa District Assembly shows a steady trend in the Mineral Development Fund receipts over the period. The Assembly received a Mineral Development Fund of GH₵860,000.00 in 2004 but which appreciated in value over the period to GH₵5,137,273.00 in 2016. The steady flow of Mineral Development Fund helped in making reliable projections in terms of receipts and expenditure by the Assembly.

The Prestea Huni Valley which was carved out of the Wassa West District Assembly in 2008 has the highest and most unstable Mineral Development Fund receipts especially between 2011 and 2016. The District

Assembly had Mineral Development Fund receipt of GH₵7,300,000.00 in 2016 from an initial amount of GH₵370,000.00 in 2008. This jump in receipts in Mineral Development Fund was due to big mining companies coming on stream in the District. The flow of the Mineral Development Fund was most unstable between 2011 and 2016 which accordingly affected projections and proper and accurate planning.

The unstable nature of Mineral Development Fund receipts is also caused by the undue delay in the disbursements by Office of the Administrator of Stool Lands at the Regional Level. In general the three Districts received almost the same amount of the fund in 2009. There were no MDF receipts by the Districts in 2013 and 2015. It was discovered that the 2015 disbursement was added to that of 2016 because of the late arrival of the fund at the Offices of the Administrator of Stool Lands at the regions. These findings were in consonance with Quarshie (2015) which found fluctuation and delays in the release of the Mineral Development Fund in Obuasi District.

CHAPTER FIVE

STRUCTURE, EFFICIENCY AND EFFECTIVE MANAGEMENT OF THE MINERAL DEVELOPMENT FUND

Introduction

The chapter presented the result and discussions on the structure and processes of MDF management. It also covered the efficiency and effective management of the MDF received by the respective District Assemblies.

Structure and Process for Managing the MDF

By structure, it means the frameworks within which processes unfold. The structure set limits as to who can participate. The organisational structure consists of role expectations and rules for who should or can do what and how each task should or can be done. The structure for the management of the MDF begins with the Domestic Tax Revenue Division of the Ghana Revenue Authority. A fraction of the mineral royalties collected from the mining companies was sent to the Head office of OASL as mandated by Article 267(2) of the 1992 constitution and the Office of the Administrator of Stool Lands Act 1994 (Act 481). The mineral royalties received were ceded to District Assemblies and communities affected by mining operations through the various regional offices of the Office of the Administrator of Stool Lands in regions where mining was undertaken. It has been discovered that, there exist discrepancies in the amount disbursed by the Head office of Office of the Administrator of Stool Lands and what actually gets to the Districts at local level. Sometimes the Head office of Office of the Administrator of Stool

Lands disburses royalties in two tranches for example but the regional offices sometimes make disbursements of this money in piece meal function in about six tranches. There was also the issue of undue delay between the time of disbursement of the Mineral Development Fund and receipt at the District level.

It came out that sometimes disbursement in the second quarter in a particular year gets to the beneficiary District Assemblies in the fourth quarter. It was also common that Mineral Development Fund disbursed in a particular year was received by the beneficiary District Assemblies in the following year. Some of the beneficiary Districts were even asked by the Regional Offices of the Office of the Administrator of Stool Lands to apply in order to have their allocation released. It was therefore not surprising that some of the District Assemblies wait for an entire year to receive their allocations of the Mineral Development Fund.

The Local Government structure which manages the Mineral Development Fund at the local level can be said to be set up under PNDC Law 207 as a four-tier Metropolitan and three-tier District Assembly system. At the apex was the Regional Co-ordinating Council followed by the District Assembly was made up of the DCEs and two-thirds of the members elected directly by the electorate and one-third nominated in consultation with the chiefs and recognised socio-economic groupings. A close look at the composition of the District Assembly revealed some basic problems. The one-third of the members which were to be nominated in consultation with chiefs and identifiable socio-economic groupings were mostly members of any

political party that was in power. No consultation with the chiefs and recognised grouping was done before their appointment. The one-third of the members in addition to the DCE who was the head and the representative of the President of the day were alleged to support initiatives and programmes that were not necessarily in the interest of the people but which would enable them win the next election. This finding was in tandem with position of Acosta (2012) who enumerated key features of a successful natural resource fund which includes effectual institutions, with autonomy to prevent unsustainable expenditures and the capture of revenues by the political elite.

In the District, the Assembly is the highest decision-making organ vested with performing legislative, deliberative and executive functions under the leadership of the Presiding Member. The district assembly worked through the subsidiary committees of social services, development planning, finance and administration, work, justice and security and the Executive Committee in accordance with the Local Government Act, Act 462 of 1988. The Act stipulates among other things that the District Assemblies were to prepare and submit to the Regional Co-ordinating Councils development plans and are responsible for the overall development of the District. The sub-committee of development planning performs the functions of overall planning of the District and undertakes the following duties:

(a) Spot potentials and financial resources inside the District,

(b) Create a data base of information on all resources,

(c) Spot openings and limitations in exploring and exploiting resources,

(d) Develop utilization and closing out modalities,

(e) Collaborate with other sub-committees on the repercussion of the projected District plans, and

(f) Present the plan to the Executive Committee for coordination (Nkrumah, 2000).

The task of ensuring dialogue and discussion of issue with the purpose of enhancing social welfare of the people is the responsibility of the Social Services Sub-committee of the District Assembly. The sub-committee is clothed with the responsibility to:

(a) Consider a holistic and long lasting view at areas of public improvement such as schooling, security, societal happiness, sports education, civilization and susceptibility in the District,

(b) Create an information database on identified societal growth areas,

(c) Recognize the strengths, weaknesses and opportunities in the delivery of in social services,

(d) Create a societal growth strategy,

(e) Evaluate identified consequences of societal growth plans on other subsectors and

(f) Present the plans to the Executive Committee for coordination.

The Works Sub-committee concentrates on offering and sustaining basic social amenities to the various communities. It scrutinizes and makes suitable proposal to the Executive Committee regarding basic social amenities requirement of various communities. The Works Sub-committee is responsible for roads, electricity, sanitation, water, schools and markets.

(a) It takes a holistic view of basic amenities required,

(b) Create information database on development activities and areas of concerned,

(c) Draw plans and commence activities for its design and delivery, (d) Scrutinize and evaluate the effect of activities on the proposals of other sub–committee, (e) Present the plans for coordination by the Executive Committee (Ahwoi, 2010).

The Sub-committee in charge of Finance and administration is ensuring accountability, fiscal lucidity and efficient administration of the financial resources of the District Assembly. It is mandated to:

(a) Scrutinize the fiscal inputs availability,

(b) Evaluate the income generation and spending levels over the years,

(c) Design and developed tactical plans to enhance income generation and make projections,

(d) Present to the Executive Committee the budgets for coordination,

(f) Design plans and modalities for the judicious utilization of resources.

Resolving intra and inter district conflicts and enforcement of bye laws are the responsibility of the Justice and Security sub-committee. It is to create and ensure favorable environment for conducting social and economic ventures. It does the above by

(a) Resolving intra and inter district conflicts,

(b) Enforcement of bye-laws,

(c) Availability of buildings for the tribunals, magistrates and courts,

(d) Providing logistics to the security agencies to protect life and property

(e) Study draft bye-laws of the District Assembly prior to their passage,

(f) Prosecuting offenders of the bye-laws and (g) Proposal presentation to the Executive Committee on the resolution of disagreement (Friedrich-Ebert-Stiftung, 2010).

The Executive Committee has an overall oversight responsibility over the District. It also performed coordination of planned activities and proposed programmes of sub-committees and produce an integrated master action plan for the District Assembly. It also oversees the management of the District and implement reached resolutions in partnership with the District Chief Executive's office. The Executive Committee also appraises, coordinates, supervises and directs development plans, programmes and activities (Ahwoi, 2010).

Tarkwa, PHV and Obuasi District Assemblies, during the development of the Medium Term Development Plans engage members of the local communities and other stakeholders in discussions and dialogue in a meeting to get their opinions on their developmental needs. The identified needs by the stakeholders in the various communities and localities were put together and arranged in order of importance by the Planning Units. The provision of place of convenience, pipe borne water, construction of roads, libraries, computer laboratories, market stores, acquisition of vehicles, building of car stations, waste collection and disposal and employment were some of the things identified in the needs assessment carried out. The Planning Units at the various District Assemblies then design appropriate intervention programmes in an effort to resolve the developmental needs identified by the members of the local communities. This intervention was in the form of projects or

programmes to minimize or to some extent reverse the harmful effects of mining activities. The planning and the economic development units make presentations to the general assembly for approval.

In an interaction with beneficiary communities during focus group discussions, this elaborate process of engagement has not been corroborated. The communities intimated that the need assessment was mostly done at the District level with little participation of the communities concerned. Mostly the level of engagement was the presence of their representative, the Assembly Member and through him or her information gets to the chiefs and the communities. Programmes and projects that were identified, appraised, prioritized and selected during the planning stage were not based on environmental risk analysis either done by the Assembly or the mining companies. Therefore, projects selected for implementation were not tailored to mitigate the harmful effect of mining on the communities. This finding confirm the positing of Gelb et al. (2014) who pointed out that an autonomous board, expert staff, sovereign audit and producing reports that are crystal are preconditions for the efficient and effective functioning of Sovereign Wealth Funds.

When funds were available, tender documents were prepared and advertisement of the projects was carried out in the National Daily Papers to prospective contractors. By this, the District Assemblies were inviting interested individuals or contractors to buy tender document at the Assembly. The Contractors after acquiring and filling the tender document, specifying quantities, cost and schedule of the various units of the project, submit it to the

District Assembly for opening and evaluation. The tender committee reviews the tender documents submitted by the participating Contractors and select the best Contractor based on experience and past performance on similar projects; capabilities with respect to personnel, equipment, and construction facilities; required licensing and professional registrations; and commercial and financial resources. The contract was awarded to the least cost evaluated bidder and not necessarily least cost bidder. Sometimes depending on the type and king of the project being undertaken, contingencies were built into the project to take care of some unique variations. In a situation where variation was required but it was outside the contingency, then it must be approved by the tender committee.

During the implementation stage, a site meeting was held on the first day on which the Contractor, Works Engineer, Planning Officer, Budget Officer, Environmental Officer, Town and Country Planning, Assembly Member, Unit Committee Members, Opinion leaders, Chiefs, elders and other interested stakeholders meet at the project site. The Contractor was introduced to all stakeholders present and the project was deemed to be officially started. Discussions were held which centre on the deliverables and milestones expected at various stages of the implementation period.

During monitoring of the project, the works committee which includes the District Engineer, the Planning Officer, Assembly Members and other members of the Assembly undertake regular and routine visits to project sites. This was done to assess the progress of the ongoing project and also to determine whether project specifications and quality standards were being

followed. The District Assemblies beside these routine inspections of project sites also visit project sites when the Contractor presents work certificates. This was done prior to any payment to the Contractor for work completed. The members in the host community and other stakeholders were also encouraged to report any deviations and defects noticed to the District Assembly for the needed action to be taken. The regular and routine project site visits continue until the project was completed.

The situation on the grounds was different from the Assembly's assertion. The members of the beneficiary communities claimed, they do not perform any such planning and monitoring roles during the implementation of projects in their communities. According to the communities members they lack locus due to no involvement in contract negotiations, lack of information and knowledge on such projects.

During the project close-out stage, the Assemblies in consultation with the Chiefs and people of the host community, the Consultant, the Contractor and other stakeholders organize a durbar or a ceremony during which the project was officially handed over to the beneficiary community for use. However, the period between the start and handing over, any defect on the project was rectified by the Contractor at his or her own cost. This defect correction if any was done before the project was handed over and put to the purpose for which it was acquired. This process by the District Assemblies ensures that all projects implemented meet the basic technical specifications, quality requirements and satisfaction of all stakeholders.

In focus group discussions, the affected communities claimed they only know of the existence of projects mostly during its implementation and therefore similar to the planning stage, stakeholders play very limited roles. When land was needed for any project, the Chiefs and Opinion Leaders were contacted sometimes through the Assembly Member but during commissioning of the project majority of stakeholders were involved.

It has been observed that the District Assembly structure is designed for the entire development of the District which was clearly stated in the Act establishing it and therefore not suitable when used to target only specific localities in terms of project allocation. Besides this deficiency, the needs assessment to identify projects to reduce the effect of mining was just a catalogue of needs because it was not done based on any scientific risk analysis by the Assemblies or through the environmental impact assessments done by the mining companies. As it were, sometimes the political consideration overrides every interest resulting in selection of projects to be financed with the Mineral Development Fund which has nothing to do with the issue of mitigating harmful effects of mining operations on the host community. According to Quarshie (2015) institutional weakness in the local government system is accountable for the problems in the effective utilization of the Mineral Development Fund. Yucesoy (2013) also posits that lack of autonomy of natural resource funds from the government officials and the absence of dialogue, discussion and involvement of stakeholders such as civil society groups resulted in the fund being less responsible and accountable to the citizens. In addition, the inept organizational framework and structure of

the local governance system is blamed for the misapplication, mis-targeting mismanagement and embezzlement of the Mineral Development Fund. This situation made the achievement of financial sustainability, economic diversification and general development extremely challenging.

Efficient Management of the Mineral Development Fund

Efficiency is given by dividing the number or the value of output produced by the number or the value of inputs utilized. The outputs in this case were the various programme and projects undertaken by the Districts and the inputs were the composite amounts of Mineral Development Fund received by these Districts. Table 5 shows the result of efficiency for the three District Assemblies that participated in the study. As can be seen from table 2, Tarkwa District Assembly had an efficiency value of 0.3884 and that for Prestea Huni Valley was 0.4877.

Table 2: Efficiency Score of the three District Assemblies

Districts	Tarkwa District	PHV District	Obuasi District
Outputs	6,865,252.38	8,914,700.57	8,624,994.49
Inputs	17,673,830.25	18,277,241.00	10,922,654.89
Efficiency	0.3884	0.4877	0.7896

Source: Field Data, 2017

The implication of these results was that Tarkwa and Prestea Huni Valley District Assemblies could not produce outputs that were equal to even half of the inputs received, which was the Mineral Development Fund. It was

only Obuasi District Assembly that obtained a value of 0.7896 which was almost 80% of the inputs received.

According to Koopmans, (1951) the standard score for classifying a Decision Making Unit as efficient is 1 or 100% which none of the Assemblies was able to obtain. These low efficiency results can be attributed to two major factors. First, generally the Assemblies were unable to account for almost half of their receipt from the allocation of the Mineral Development Fund. The Assemblies classified the Mineral Development Fund receipts under internally generated funds (IGF) and therefore used it on recurrent and other expenditure items the Assemblies deemed fit. The Assemblies also group some of the expenditure items under miscellaneous expenses and therefore have no proper records covering them. These findings were in tandem with Quarshie (2015) which found lack of focus, institutional weakness, poor accountability and absence of clear guidelines regarding the utilization of the Mineral Development Fund. This finding was completely contrary to the position held by Oxfam (2009) that a good policy on expenditure demands at least management oversight over two essential and significant variables. These are how incomes are expended and the expenditure item.

Apart from the mis-application and the inability of the Assemblies to properly account for the use of the Mineral Development Fund, the second issue has to do with the difficulty of measuring efficiency in the public sector. This was principally caused by the difficulty in quantifying accurately the outputs produced because there were direct and indirect costs and benefits due to the externalities which they generated. In other words, efficiency of public

programme depicts a relationship between the social and economic benefits resulting from the implementation of programmes and the financial input expended on the said programme. This situation was made worse as a result of lack of market price of these public programmes or investments to adequately reflect the value in monetary terms. Unlike the private sector, these difficulties usually occur because government sector expenditures most often have multiplicity of objectives. Again, the outputs of the government sector expenditure are not usually sold on the open market. This implied market price information was not captured and therefore not available making it extremely difficult to quantified output properly especially in monetary terms. Another impediment which is come across when assessing efficiency was the recognition and classification of inputs and outputs. This phenomenon is very common when an output of one public sector institution were employed by another public sector institution as inputs.

Frontier Analyst software was used to perform Data Envelopment Approach (DEA) in order to carry out comparative efficiency analysis between the three Districts on efficient MDF utilization. The study adopted the output maximization in constant returned to scale, Charnes, Cooper and Rhodes (CCR) model. The MDF and 12 District staff in each District were inputs for the DEA analysis. Composite Project numbers or costs for each District were the outputs.

Table 3 shows the result of the DEA analysis for the three Assemblies using the four programme area frequencies as outputs. The four programme areas of the Assemblies were water, sanitation and health (WASH), education,

economic and administration. All the three Districts obtained 100% in respect of input contribution to their efficiency scores. This means that the Mineral Development Fund received and the personnel as inputs for the programmes were adequate with respect to the output produced. Prestea Huni Valley had outputs in water, sanitation and health programmes contributing 100% to its efficiency score.

Table 3: DEA Using the Four Programme Category Outputs Frequencies

	Variables	Tarkwa Dist	PHV Dist.	Obuasi Dist.
Efficiency		100%	100%	100%
Input contribution	MDF	100%	100%	100%
	WASH	0.00%	100%	0.00%
Output contribution:	Education	0.00%	0.00%	100%
	Economic	0.00%	0.00%	0.00%
	Admin	100%	0.00%	0.00%

Source: Field Data, 2017

Tarkwa and Obuasi District Assemblies however had efficiency score of 100% in the output areas of administration and education programmes respectively. From these results, it came out strongly that Prestea Huni Valley outperformed its peers since it is a known fact that the real effects of mining on the communities were in the areas of water, sanitation and health. It was also evident from Table 3 that economic programmes contributed nothing to the efficiency score of the three District Assemblies. This means that the three

assemblies did not carry out enough projects that would create an opportunity for economic activities to thrive.

Table 4 shows the DEA efficiency result of the District Assemblies' programmes related to mitigating the effects of mining and programmes that were unrelated. Based on this classification, water, sanitation, health, education and economic programmes were considered as MDF related.

Tarkwa and Obuasi District Assemblies had 100% overall efficiency scores whereas Prestea Huni Valley had 80.45%. On the surface, looking at this result would mean that Prestea Huni valley was less efficient amongst its peers but the story was different when the underlying contributors to the overall efficiency were examined.

Table 4: MDF related and unrelated DEA Analysis

	Variable	Tarkwa Dist.	PHV Dist.	Obuasi Dist.
Efficiency		100%	80.45%	100%
Input cont.	MDF	100%	100%	100%
Output	MDF related	36.12%	100%	0.00%
contribution:	None MDF	63.88%	0.00%	100%
Potential	MDF related		39.44%	
improvement	None MDF		24.31%	

Source: Field Data, 2017

Apart from the 100% contribution from the inputs to all the District Assemblies, Tarkwa had 36.12% and 63.88% contributions to its overall efficiency score coming from Mineral Development Fund related and

unrelated outputs respectively whereas Obuasi had 0.00% and 100% from MDF related and unrelated programmes. It was only Prestea Huni Valley which had 100% contribution to its overall efficiency score coming from MDF related programme outputs.

The unrelated programmes have nothing to do directly with the issue of mitigating the harmful effects of mining operations on host communities but rather to help in the general administration and functioning of the District Assembly. In other words, the MDF was used to take care of the administrators of the fund rather than affected communities. Pedro (2006) made the point that inadequate or lack of an effective legislative instrument on the utilization of the natural resource revenue funds has been the cause of its misapplication. In addition inadequate legal framework to ensure accountability and transparency and indeed low interest and involvement of stakeholders in mineral governance structure were also identified as significant factors causing mis-use of the Mineral Development Fund in Ghana.

It was however clear on the basis of the result in Table 4 that, for Prestea Huni Valley to reach the efficiency rate of its peers it needs an improvement of 39.44% and 24.31% in MDF related and unrelated programme categories respectively.

From Table 5 the result of comparative Data Envelopment Approach analysis using the four programme area cost values is displayed. The three District Assemblies had 100% overall efficiency score and all of them also had 100% contribution from their respective inputs. In addition, Tarkwa and

Prestea Huni Valley had contributions of 100% to overall efficiency score coming from economic and administration programmes respectively. Obuasi District Assembly however had contributions to its overall efficiency score coming from two areas namely WASH and admin with 27.24% and 72.76% in that order. This result was inconsistent with the results obtained when programme frequencies were used. Whilst Tarkwa and Prestea Huni Valley had output contributions coming from admin and WASH programmes using frequencies, in this cost efficiency analysis the output contributions came from economic and admin programmes respectively.

Table 5: Comparative Cost DEA Analysis

	Variable	Tarkwa Dist.	PHV Dist.	Obuasi Dist.
Efficiency	Overall	100%	100%	100%
Input	MDF	100%	100%	100%
	WASH	0.00%	0.00%	27.24%
Output	Education	0.00%	0.00%	100%
contribution	Economic	100%	0.00%	0.00%
	Admin	0.00%	100%	72.76%

Source: Field Data, 2017

Unlike when output in education contributed 100% to overall efficiency score using programme area frequencies, Obuasi had output contributions of 27.24% and 72.76% from WASH and administration programmes in that order using cost variables. What it means was that although Tarkwa, Prestea Huni Valley and Obuasi District Assemblies undertook more programmes in admin, WASH and education, their

efficiencies were in economic, administration and education programme areas as far as cost DEA efficiency analysis was concerned. The only tenable explanation for the shift in area of output contribution to overall efficiency for Prestea Huni Valley might be the building of a mega assembly office complex and a guest house which were all administration programmes.

Table 6 shows the result of the DEA cost efficient analysis with the categorization of the programmes into Mineral Development Fund related and unrelated. The Mineral Development Fund related programmes categorization was made up of WASH, education and economic programmes.

Table 6: MDF related and unrelated programme comparative cost DEA

	Variable	Tarkwa D.	PHV Dist.	Obuasi D.
Efficiency	Overall	90.8%	100%	100%
Input cont.	MDF	100%	100%	100%
Output	MDF related	0.00%	39.14%	100%
contribution	None MDF related	100%	60.86%	0.00%
Improvement	MDF related	30.77%		
	None MDF related	10.16%		

Source: Field Data, 2017

The unrelated category was made up of all other programmes not included in the MDF related. The result shows 100% overall efficiency rate for PHV and Obuasi District Assemblies and a weak efficiency rate of 90.8% for Tarkwa. The MDF related programmes contributed 39.14% and 100% to the overall efficiency score of PHV and Obuasi DA respectively. The unrelated programmes contributed 100% and 60.86% to the overall efficiency

score of Tarkwa and PHV District Assemblies respectively. With this result Tarkwa has potential improvement of 30.77% and 10.16% in both MDF related and unrelated programme categories.

Table 7 shows the DEA super-efficiency analysis for the three District Assemblies. The super-efficiency analyses offer us the opportunity to see the full extent of efficiency of the decision making units being compared. Tarkwa had a super-efficiency value of 157.69% in a comparative analysis with PHV and Obuasi District Assemblies. Tarkwa District Assembly has exceeded the targeted number of projects in the admin and WASH categories and also under performed in economic and education programmes. For Tarkwa to be super efficient, it needs to cut down on programmes in admin and WASH and carry out more programmes in economic by 53.40% and for education as much as 243.85%. However, it would be unwise for Tarkwa District Assembly to reduce WASH programmes from the current number of 21 to 13 because it is these programmes that address the harmful effects of mining on the host communities. The Prestea Huni Valley scored a value of 157.36% in the super-efficiency analysis. It had actual programme numbers falling short of the targeted in the admin and economic areas but has outperformed the targeted number of projects in education and WASH. PHV therefore needs to undertake an improvement of 106.21% in admin programmes but this would be contrary to the intent and purpose of the Mineral Development Fund since these programmes have nothing to do with the issue of addressing the harmful effects of mining. It therefore came out strongly that the PHV District performed very well in programme areas which deal directly and effectively

with issues of addressing the untold hardships of mining on the people of the host communities.

Table 7: DEA Super-Efficiency Analysis

Tarkwa	Actual	Target	Improvement
Admin	22	13.95	-36.58%
Economic	18	27.61	53.40%
Education	12	41.26	243.85%
WASH	21	13.32	-36.58%
PHV			
Admin	11	22.68	106.21%
Economic	11	18.73	70.28%
Education	20	12.71	-36.43%
WASH	34	21.61	-36.42%
Obuasi			
Admin	9	7.99	-11.24%
Economic	19	7.49	-60.58%
Education	28	11.04	-60.58%
WASH	6	18.84	214.00%

Source: Field Data, 2017

The Obuasi District had 253.66% in the DEA super-efficiency analysis. With this result, there was no doubt that it was the most efficient among its peers. It had outperformed the targeted number of projects in admin,

economic and education categories and underperformed in the WASH programmes. It is to cut admin, economic and education by 11.24%, 60.58% and 60.58% respectively and carry out more WASH programmes by 214%. It would however be extremely out of place for Obuasi District Assembly to reduce economic and education programmes by 60.58% each because these programmes ameliorate the harmful effects of mining operations.

Table 8 shows the result of the DEA cost super-efficiency of the three District Assemblies. The DEA cost super-efficiency Frontier Analyst output values obtained by Tarkwa, PHV and Obuasi District Assemblies were 109.94%, 119.46% and 316.65% respectively.

The actual expenditure made by Tarkwa District Assembly on educational and WASH programmes were lower than the targeted and would need an improvement of 107.64% and 57.57% to be super-efficient as its peers. These improvements would place the District on the right footing achieving the vision and objectives of establishing the MDF.

Prestea Huni Valley had actual expenditures in admin, education and WASH programmes higher than the targeted values. It therefore needs to undertake an improvement drive by reducing its expenditure in these three areas but this would be technically incorrect except for admin programmes because education and WASH programmes directly impact the harmful effects of mining operations on the people.

Those who were unemployed and cannot also undertake farming as a livelihood because their farm lands have been taken by the mining companies can through education secure other jobs or get themselves in self-employment.

Table 8: DEA Cost Super-Efficiency Analysis

Tarkwa	Actual	Target	Improvement
Admin	1,734,769.00	1,911,025.00	10.16%
Economic	2,821,776.00	2,566,563.00	-9.04%
Education	1,008,731.00	2,094,488.00	107.64%
WASH	1,299,974.00	2,048,307.00	57.57%
PHV			
Admin	1,976,271.00	1,654,336.00	-16.29%
Economic	2,654,190.00	2,685,497.00	1.81%
Education	2,165,997.00	1,813,756.00	-16.29%
WASH	2,118,240.00	1,917,524.00	-9.48%
Obuasi			
Admin	441,735.00	1,181,038.00	167.76%
Economic	693,940.00	1,586,169.00	128.57%
Education	4,098,846.00	1,294,420.00	-68.42%
WASH	3,390,472.00	1265880.00	-62.66%

Source: Field Data, 2017

The water, sanitation and health (WASH) programmes also handle the water needs of the people as most of their water bodies and lands were polluted. Disease prevention and cure for those who get sick were taken care of by the sanitation and health projects and therefore a reduction in investment in that area would compound the already precarious situation.

Obuasi District Assembly had DEA cost super-efficiency of 316.65% as compared to its peers. With this result, Obuasi District Assembly was the

most efficient in terms of DEA cost super-efficiency. Its performance in respect of actual expenditure on admin and economic programmes falls short of the targeted and that on education and WASH exceeds the targeted value.

In order to be more efficient, Obuasi District needs to undertake an improvement drive by increasing its investment in admin and economic programmes and reduce its investment in education and WASH programmes. As said before, because of the contribution of the education and WASH programmes to the vision and objectives of the MDF, it would not be wise technically to reduce investment by 68.42% and 62.66% respectively.

Effective management of the Mineral Development Fund

Effective management of the Mineral Development Fund was judged in terms of an expenditure item achieving the objective for establishing the Fund. This was in providing solutions to the negative impact of mining on the social, economic, cultural, soil, air and water of inhabitants in the host communities. There exist so many adverse impacts of mining operations manifesting in various level and phases but the real danger is that these negative effects are interrelated and re-enforce each other with the possibility of affecting not only the current generation but also those yet unborn. Mining waste disposal, solid suspension and mercury, tailings into water bodies such as rivers and streams was identified to be the major cause of pollution. In the words of Dzigbodi-Adjimah (1996) there were no fishes in some parts of the river Offin and Ankobra which were blamed to large extent on the disposal of mining waste and environmental contamination as a result of dredging and

sluicing operations. The impact of all these on the streams and rivers, which serves as sources of drinking water for many mining communities was siltation and coloration. Aryee, Ntibery and Atorkui, (2003) found out that digging and excavation of large portions lands at the Tarkwa mining enclave has resulted in the recorded low yields hand dug wells, streams and boreholes and also affecting their ability to revitalize. These environmental problems resulted in loss of livelihood, diseases, conflicts, economic hardships and many other social vices. For these problems to be resolved through the MDF, then effective management should be in line with the purpose of the Fund. This depended on the following:

a. Type of infrastructure projects undertaken by the Assemblies with the Mineral Development Fund.
b. The number and expenditure on the various categories of projects undertaken by the Assemblies.
c. Cost and time variations in project delivery
d. Location of MDF infrastructure projects.

The three District Assemblies themselves identified land degradation, air and water pollution, unemployment among others as consequences of mining activities in their Medium Term Development plans. Accordingly, they have indicated that people living in these mining areas were affected by diseases of the respiratory tract and high incidence of malaria. Also, high costs of food due to loss of farm lands and lack of potable water resulting from pollution of drinking water sources. Consequently, the mandate of the Mineral

Development Fund requires them to initiate developmental projects to mitigate harmful effects of mining in their areas. To achieve this goal, the District Assemblies must identify the effects of mining and develop and implement strategies to mitigate them.

The four project classifications adopted by the DAs were:

1. Water, sanitation and health projects (WASH).
2. Economic projects.
3. Educational and training projects.
4. Administration projects.

The water, health and sanitation (WASH) projects were projects undertaken to provide portable drinking water to the community. They also include health and sanitation projects such as building clinics, hospitals, CHPS compound, hospital machines, beds, toilets, haulage trucks, dustbins and taking care of refuse dumps among others. These projects were carried out with the sole aim of preventing sicknesses and taking care of people who eventually fall sick. This therefore helps the members of the community to be healthy in order to go about their economic activities as expected.

The second group, were projects undertaken in the communities to enhance economic activities. When members of a particular community undertake their economic activities such as farming, trading, transportation, business etc.; they require some basic infrastructure to successfully do this without being hindered. The District Assemblies therefore use part of their allocations from the MDF to implement projects in order to enhance economic

activities in the various communities. These economic infrastructure projects include market projects, road projects, bridges and culverts among others.

Education and training projects were projects undertaken to build the intellectual and economic capacity of the targeted members of the community especially women and the youth. The educational projects were mostly targeted at young children of school going age. Provision of classroom blocks, desk, tables and chairs, library complex and other projects aimed at providing a congenial environment for the development of the future leaders of the community. The training projects were done to equip those individuals who were out of school with employable skills such as technical knowledge and vocational skills. These skills enable this group of people to be self-employed or gain employment with businesses and companies where vacancies exist.

Administration projects were those projects which help the implementing organisation and in this case the Metropolitan, District and District Assemblies to efficiently and effectively carryout their administrative functions. Without these projects District Assemblies face a lot of difficulties in performing its mandate. Some examples of administration projects were van and motor bikes for monitoring and bungalows, office accommodation, laptops for assembly's staff.

The three District Assemblies used their allocation from the Mineral Development Fund to implement projects in their respective communities. Out of 223 projects undertaken by the three District Assemblies a total of 211 projects met the criteria to be included in the analysis. Any project to be included in the analysis needed to be completed and handed over to the

community for management. It was only in this way that its usefulness could be determined with certainty to the members of the host community.

As shown in Table 9, Tarkwa District completed a total of 73 projects. This was made up 21 WASH projects, 12 education and training projects, 18 economic projects and 22 administration projects. Among the 18 economic projects carried out by Tarkwa District Assembly 8 were construction and rehabilitation of market sheds. In the area of education projects, 7 out of the 12 were building of classroom blocks in communities such as Amantim, Essuoso and Bonsawire among others. Among the 21 WASH projects completed, 7 were in the area of refuse collection and construction of refuse bay at New Atoabo, Kwabedu, Teberebe, Tanso, Cynaide and Akoon; 5 projects were in the area of extension of portable water and construction of both manual and mechanized boreholes; 3 projects concerned the provision of a 16 seater WC toilet at Kwabedu. The Assembly also did a construction of a CHPS compound with 2 bedrooms and a toilet at Mile 2. Eight of the 22 administration projects were geared towards the provision of an office complex, furniture and equipment to accommodate and enhance the work of the Assembly. There was also a construction of a two (2) bedroom residential accommodation at Tarkwa. This situation of using more natural resource fund on administrative expenses was evident in Ushie (2012). In that work it was discovered that between 2008 and 2012 Bayelsa State made an expenditure of 14% on average of its capital budget as administration expenses. This figure was higher than the percentage expenditure on the environment, water, education and healthcare put together.

The Prestea Huni Valley District Assembly completed 20 educational projects. Out of this number, 4 were provision of furniture and dual desks whilst 16 were construction and rehabilitation of classroom blocks. Among the 16 educational projects, six were renovation of a 3 unit classroom block for Aboso R.C JHS, a 5 unit classroom block for Arabic school, a 2 storey at St. Augustine SHS and Amoada Basic School.

Table 9: Programmes Completed by the three District Assemblies

Projects	Tarkwa District	Prestea Huni Valley	Obuasi District	Total
WASH	21	34	6	61
Education	12	20	28	60
Economic	18	11	19	48
Administration	22	11	9	42
Total	73	76	62	211

Source: Field Data, 2017

The remaining educational projects completed by Prestea Huni Valley District Assembly were the construction of 3 unit classroom blocks at Wassa Akuapim, Fantefokrom, Petepom, Obengkrom, Bogoso Anglican JHS, Prestea Presbyterian, Aboso R.C JHS and construction of a 4 unit Kindergarten classroom block at St Michael Catholic School. PHV also completed 34 WASH projects which were more than the WASH projects completed by Tarkwa and Obuasi Districts put together. As part of the WASH projects completed, the PHV District Assembly constructed nine, 12 seater aqua toilets

or water closet toilets for communities such as Nyamebekyere, Ntiakokrom, Afamase, Ndadieso, Akokobediabro, Koduakrom, Achiase, Adjeikrom, DC experimental JHS and a nine seater water closet and urinal at Bogoso market. In an effort to enhance health delivery and increase access to health facilities in the District, the Prestea Huni Valley District Assembly built 2 CHPS compounds situated at Broni Nkwanta and Wassa Esikuma. Sanitation projects also featured strongly in the Assembly's programmes as a total of 12 projects were completed. Seven of these projects involve the clearing of disposal sites and the actual evacuation of refuse. In order for a successful sanitation programme execution, the Prestea Huni Valley District Assembly implemented five projects in the area of procuring and repairing refuse containers. The assembly in providing a lasting solution to the persistent water problem in the area undertook drilling and construction of boreholes in 8 communities in the Prestea zone and another 8 communities in the Bogoso zone. Included in the water projects were the drilling and construction of 4 boreholes at Gordon, Huniso, Adadekrom, Head of Departments' resident and rehabilitation of 19 boreholes, 6 hand dug wells, one overhead water reservoir at Bogoso Health Center and drilling and construction of one small town water system at Prestea Huni Valley District Assembly office complex and residential accommodation. The other WASH projects included the procurement and supply of 20 mattresses, 20 beds and bed lockers for Aboso Health Center, sanitary materials and tools and repair of Prestea Government Hospital vehicle. This finding was in line with Pedro (2006) who made the point that mineral revenue can contribute to local economic development

through the provision of basic infrastructure like roads, power grids, and dedicated ports; public goods and social services such as water, health and education.

As a new assembly carved out of Wassa West District in 2008, the Prestea Huni Valley implemented projects which relates to both office and residential accommodation. In this direction the assembly built a mega District Assembly office complex at Bogoso, purchased and supplies office furniture and office facilities to the new Assembly block and purchased of household items for Assembly staff accommodation. The Assembly produced cadastral and topographic maps for 600 acres of land for infrastructure development at Bogoso, purchased of 7 laptops, 3 motorbikes for monitoring purposes.

The Prestea Huni Valley District Assembly carried out a number of projects to encourage and enhance economic activities in the area. In this regard the Assembly re- constructed 7 broken down bridges at Tintinmu, Attakrom, Bonsaso, Aboso, Bobkrom, Gyimakrom and rehabilitated 8 wooden bridges at Bonpieso, Damang, Old Kyekyere, Peterkrom and Gordon among others. The Assembly also undertook the construction of 1 pipe culvert at Nzemakrom, 1 box culvert at Kesse, 1 4-cell box culvert at Fantefokrom-Petepom and construction of 1 un-partitioned market shed at Gordon. The Assembly constructed a 6 unit Guest House for Prestea Huni District Assembly and rehabilitated the internal road network and pavement at the Assembly complex.

The Obuasi District Assembly completed 6 WASH projects of which four were in waste management. It constructed a 16 seater vault latrine at

Dompoase and procured an anesthetic machine for Obuasi Government Hospital. The Assembly also carried out 9 administration projects. Notable amongst them were the building of the District Chief Executive's residential bungalow and building of an Entrance Arc at Obuasi. Financial allocations were made from the Mineral Development Fund in 2008, 2010 and 2012 for the building of the District Chief Executive's residence whilst building of the entrance arc received funding from the Mineral Development Fund in 2008 and 2009.

A total of 19 economic projects were completed by Obuasi District Assembly. Amongst them were the extension of street light from Obuasi to Anyinam, installation and maintenance of street lights in Obuasi township and 3 projects aimed at re-shaping the road network in the District. A bridge and culvert were also constructed at Kwabrafoso and on river Abaamu respectively. The Assembly also purchased a mobilization bus and a motorbike for the building inspectorate unit to help in the performance of the assigned duties. In addition to these projects, other projects were also undertaken to get a suitable place for the market women to do business. In this direction, the Obuasi District Assembly undertook a construction of market drainage system at Fomena, a 10 unit store building at Brahabebone, rehabilitation of market stall, pavement of central lorry park and plantain market at Obuasi central market phase I and phase II. In terms of educational projects, the District Assembly extended a number of scholarships to the pupils and students in 2003, 2004, 2005, 2008, 2009, 2011 and 2012 academic year.

The Obuasi District Assembly did not only extend scholarships to pupils and students but also provided an excellent learning environment in many communities in the District. The Assembly constructed 3 unit classroom blocks in Mprekyire, Adomanu RC Primary, Annorkrom, Adamso, Sanso, Mensonso, Kunka, Kwabenakwa and a 3 unit kindergarten block at Ayease. There was a construction of a 6 unit classroom block at Dompaose Demonstration Primary School and 8-unit classroom at Kokoteasua and Boete. The Assembly also did some rehabilitation and renovation works at Kwabenafori M/A, Kwabrafoso M/A and fencing, Awuradebasa St. Joseph's Catholic Primary school and rehabilitation of 6-unit classroom block at Estate Presbyterian JHS and another one at Boete.

Second cycle schools also have their fair share of these educational projects undertaken by the Obuasi District Assembly. The District Assembly constructed a 7 unit staff quarters at T. I. Ahmadiyya Senior High at Fomena, a girl's hostel at Akrofuom Secondary Technical School and a fence wall at Obuasi Secondary Technical School. The Assembly purchased cooking utensils and dinning furniture for school feeding programme and in 2010 procured and supplied furniture to schools in the District out of its allocation from the Mineral Development Fund. In all, Obuasi District Assembly completed the least projects of 6 and 9 in WASH and Administration respectively. This finding was contrary to the result in Quarshie (2015) which claimed that, out of the projects done by Obuasi District with the MDF, 34% were in waste management. It can also be seen that Tarkwa, Prestea Huni Valley and Obuasi District Assemblies completed a total of 73, 76 and 62

projects respectively. This means that Prestea Huni Valley has the highest number of completed Mineral Development Fund projects.

Aggregating the figures, revealed that 61 WASH and 60 education projects were completed by the three District Assemblies. On the other hand, a lower figure of 48 and 42 projects were successfully completed for economic and administration in that order by the District Assemblies. Apart from the educational projects, the variation in terms of project numbers was minimal for projects done in other categories.

Table 10 shows the cost statistics for Tarkwa District Assembly. The District Assembly over the period spent a total of GH₵1,299,974.95 of its Mineral Development Fund receipts on the 18 completed economic projects. This amount was the second highest among its four expenditure categories. The economic projects have a mean and standard deviation value of GH₵72,220.83 and GH₵72,297.13 respectively. The Assembly's total investment in education projects stands at GH₵1,008,731.32 which was lower than its investment in economic projects. The mean and standard deviation value of GH₵84,060.94 and GH₵121,087.41 respectively were obtained for the education project. The variability in the education project was more than that of economic projects.

The Tarkwa District made a total investment of GH₵2,821,776.92 on WASH projects. This amount was more than investment on economic and education projects put together and was 41.10% of total MDF projects expenditure by the Assembly. The total cost of administration projects was

GH₵1,734,769.19 with mean and standard deviation values of GH₵78,853.14 and GH₵77,044.97 in that order.

Table 10: MDF Programmes Cost Statistics for Tarkwa District

Statistics	Economic projects	Education projects	WASH projects	Administration projects
Mean	72,220.83	84,060.94	134,370.32	78,853.14
Sum	1,299,974.95	1,008,731.32	2,821,776.9	1,734,769.19
Minimum	2,621.40	1,800.00	1,694.00	380.00
maximum	223,983.01	439,916.39	575, 750.00	224,586.33
Std deviation	72,297.13	121,087.41	155,054.94	77,044.97

Source: Field Data, 2017

The smallest amount spent by the Assembly was GH₵380.00 to purchase office furniture which was an administration expenditure item. The biggest amount ever spent on a project was GH₵575, 750.00. This was spent by the Assembly for the purchase of one skip refuse truck which was a WASH project under sanitation and health.

Table 11 shows the cost statistics for the Prestea Huni Valley District Assembly. The Assembly spent a total of GH₵2,118,240.81, GH₵2,165,997.79, GH₵2,654,190.89, GH₵1,976,271.08 of their Mineral Development Fund receipt on economic, education, WASH and administration projects respectively. In percentage terms, these figures represent 23.76%, 24.29%, 29.77% and 22.16% in that order. The result is fully consistent with the assertion of Oxfam (2009) when it was stressed that to sustain and meet

globally accepted quality benchmarks and quantity of essential basic social amenities and services for education health, water, and sanitation, A minimum of 20 percent of the government's financial plan should be allocated to education and 15 percent assigned to health.

The variation in the total sum spent on these four categories of projects namely economic, education, WASH and administration was small. This means that the Mineral Development Fund received by the Assembly was evenly spread among the four programme categories. The mean and standard deviation of the economic and education projects were GH₵192,567.34, GH₵430,218.42, and GH₵108,299.88, GH₵78,214.60 and that for WASH and administration were GH₵78064.43, GH₵66,613.94 and GH₵179,661.00, GH₵414,429.95 respectively.

Table 11: MDF Programme Cost Statistics for PHV District Assembly

Statistics	Economic projects	Education projects	WASH projects	Administration projects
Mean	192,567.34	108,299.88	78064.43	179,661.00
Sum	2,118,240.81	2,165,997.79	2,654,190.89	1,976,271.08
Minimum	16,624.80	5000.00	2000.00	14,785.00
Maximum	1,484,133.00	224,586.33	248,418.64	1,422,294.00
Std deviation	430,218.42	78,214.60	66,613.94	414,429.95

Field Data, 2017

The smallest and the biggest expenditure projects were the repair of Prestea government hospital vehicle and the construction of Prestea Huni

Valley District Assembly office complex at Bogoso with values of GH₵2000.00 and GH₵1,422,294.00 which were in the WASH and administration project categories in that order.

Table 12 shows Mineral Development Fund cost statistics for Obuasi District Assembly. The Assembly made huge investments in all programme categories but what was worth noting was that education projects received the largest share. The Assembly made a total expenditure of GH₵4,098,846.00 and GH₵3,390,472.78 on education and economic projects. The mean values for these two project categories were GH₵146,387.35 and GH₵178,445.93 with their corresponding standard deviations of GH₵71,322.57 and GH₵23,675.57.

Table 12: MDF Projects cost statistics for Obuasi District Assembly

Statistics	Economic projects	Education projects	WASH projects	Administration projects
Mean	178,445.93	146,387.35	115,656.75	49,081.68
Sum	3,390,472.78	4,098,846.00	693,940.54	441,735.17
Minimum	20,000.00	12,175.00	58,138.00	3,925.00
Maximum	1,120,610.00	668,650.00	261,337.36	98708.91
Std deviation	23,675.57	171,322.57	74,917.49	31,726.85

Source: Field Data, 2017

In percentage terms, the educational project was 47.52% whilst that on economic project was also 39.30% of the total Mineral Development Fund

projects expenditure. Put together educational and economic project categories accounted for 86.83% of total amount spent. As it were, WASH projects which have direct relationship or impact on the harmful effects of mining operations which was a major problem in the District received a disappointing amount of GH₵693,940.54 representing only 8.04% of total expenditure by Obuasi District Assembly over the period. Again in terms of amount spent, this was contrary to the finding of Quarshie (2015) which made the point that out of the projects undertaken by Obuasi District Assembly, 34% were in waste management. The above result in education was consistent but the health aspect was inconsistent with the assertion of Oxfam (2009), when it was stressed that to sustain and meet globally accepted quality benchmarks and quantity of essential basic social amenities and services for education health, water, and sanitation, A minimum of 20 percent of the government's financial plan should be allocated to education and minimum of 15 percent assigned to health.

Table 13 shows the MDF total cost statistics for the three District Assemblies put together. The Assemblies together made a total spending of GH₵6,808,688.54 on projects in the economic category and spent an amount of GH₵7,273,575.11 on educational projects over the period. The three District Assemblies spent a total amount of GH₵24,404,947.44 out of the GH₵46,873,726.14 Mineral Development Fund received, on all the projects implemented between 2003 and 2016. It is worth to note that, the total spending of GH₵24,404,947.44 includes an amount of GH₵4,152,775.44 which was an expenditure on administration projects. What was evidently

clear from the analysis was that, an amount to the tune of GH₵22,468,777.70 has been spent on recurrent expenditure.

Table 13: MDF programmes total costs of the three District Assemblies

Projects\ DAs	Tarkwa	Prestea	Obuasi	Grand Total
Economic	1,299,974.95	2,118,240.81	3,390,472.78	6,808,688.54
Education	1,008,731.32	2,165,997.79	4,098,846.00	7,273,575.11
WASH	2,821,776.92	2,654,190.89	693,940.54	6,169,908.35
Administration	1,734,769.19	1,976,271.08	441,735.17	4,152,775.44
Grand Total	6,865,252.38	8,914,700.57	8,624,994.49	24,404,947.44

Source: Field Data, 2017

The issue of project cost variation and project delay in mining affected communities realizing the full benefits of these projects is of grave concern. For the purpose of this research cost variation was defined as the difference between the final or actual cost of a project at completion and the contract amount, agreed by and between the client (the project owner) and the contractor during signing of the contract. Table 14 shows the result of projects cost variations for the three District Assemblies. The table also revealed the cost variations for the various programme classification or categories. As can be seen, the cost variations for the Tarkwa District Assembly occurred mainly in the economic and administration programmes. The cost variations for the economic and administration programmes were 12.25% and 12.40% respectively. The education programme category was the least varied with a cost variation of 0.39%.

Table 14: Programme Cost Variations

D/A	Economic	Education	WASH	admin	Overall
Tarkwa	12.25%	0.39%	2.31%	12.4%	6.20%
PHV	0.00%	1.73%	1.74%	1.00%	1.44%
Obuasi	17.7%	1.94%	0.00%	1.92%	7.4%

Source: Field Data, 2017

There was no cost variation for the economic programmes undertaken by the Prestea Huni Valley District Assembly. The cost variations for WASH, education and administration projects were very minimal or negligible. The over expenditures were 1.73%, 1.74% and 1.00% for education, WASH, and administration projects. There was also no cost variation for WASH projects implemented by the Obuasi District Assembly. The highest cost variations for the Assembly occurred in the economic category with a value of 17.7%.

According to Avotos (1983) it is normally expected that the actual final spending on a project at completion would far exceed the initially agreed cost by 10-20 percent. However, after summarizing forty reports on different kinds of programmes cost variations Morris and Hough (1987) concluded that approximately about half of infrastructure programme's and project's actual final spending were well and above the initially agreed sum when making the contract. He found out that these project cost variation were varied between the range of 40 and 200 percent. The position held by Morris and Hough was agreed upon by Nevan (1997 but quick to add that an excellent strategy to resolving the challenge dealing with programme cost variations is adjusting up

every initial estimated amount by half and adjusting up every final estimated amount of the project by half. Flyvbjerg, Holm and Buhl (2002) also showed that the final project expenditures on completion are usually higher than the initial estimated costs by 28%.

The findings in the current research were to a large extent consistent with the study of Avotos (1983) because the over expenditures for the economic and administration project categories for the Tarkwa District Assembly and the economic project category of Obuasi District fall within that range. However, the overall cost variations were 6.20%, 1.44% and 7.4% for Tarkwa District, Prestea Huni Valley and Obuasi District Assemblies respectively. These values were lower than the project cost variation figures in all the studies reviewed. In many developing countries research studies found that as of the date an infrastructure project is completed, the final actual cost obtained are far higher than the initial contract amount by about 30 % (Odeck, 2004). The implication is that, the three District Assemblies performed a lot better in this respect. It was found that, for all the Mineral Development Fund programmes, the Assemblies always have the full complement of the contract amount required before commencing implementation and therefore minimising the incidence of delay in paying contractors which also has a domino effect on cost variations.

It was found during the engagement with the District Assemblies staff that, some of the reasons for project cost variations and delay were the design changes incorporated during the implementation stages. For instance, during the rehabilitation of a Magistrate's bungalow by the PHV District Assembly,

cost and time variations occurred because the Magistrate requested for an additional toilet, bathroom and kitchen. Again during the construction of a CHPS compound at Broni Nkwanta, the District Health Management Team (DHMT) requested for an additional residential facility and store room.

The problem of programme delay is one of worldwide phenomenon. Odeyinka and Yusif (1997) showed that a study carried out in Nigeria have 70% of building projects studied were completed behind schedule during the time of implementation. In Australia, according to Chan and Kumaraswamy (1996) it was found that seven out of every eight infrastructure project studied experience schedule delays in the late 1960s. A similar study in Hong Kong revealed that 70% of all infrastructure projects were completed behind the time of completion originally agreed upon by the parties. Al-Khalil and Al-Ghafly (1999b) undertook a second study which confirmed the first one which found that contractors were in agreement that 37% of all infrastructure projects under their supervision experienced schedule delays while consultants on the other hand confirmed that 84% of all infrastructure projects consulted on experienced schedule delays. The conclusion of another study done by them on all public projects was that seven out of ten public projects in the same jurisdiction were completed after the agreed time of completion. These research studies have brought to the fore the level and extent of the problem worldwide and therefore attracting attention from practitioners, academia and other stakeholders in looking for an appropriate mechanism in resolving the challenge (Kumaraswamy & Chan, 1999).

The Tarkwa District Assembly completed 73 projects with the Mineral Development Fund. Out of this number, 20 projects, representing 27.39%, had over expenditures and completed behind schedule. These project cost variations were mostly prevalent in administration and economic programmes categories. The Obuasi District Assembly undertook 63 projects over the period with the Mineral Development Fund and had 13 projects, representing 20.63%, experiencing delay and over expenditure. The Prestea Huni Valley District Assembly had only 3 projects out of a total of 76 projects funded with the Mineral Development Fund received experiencing delay and over expenditure.

According to Gansler (1989), cost variations and schedule extensions are interrelated and reinforce each other. This was because often programme schedule extension was the only way to fit the higher costs into the budget. The results in this research were consistent with the findings in the study conducted by Gansler (1989). Le-Hoai, Lee and Lee, (2008) intimated that variables such as the size of the project, the type of project and the location of the project may or may not result in the variation or adjustment of the initial project amount. It can be teased out upon a careful look at the amount spent on these projects that, the projects undertaken by these District Assemblies were relatively small projects in nature. These projects therefore take short periods to complete. The District Assemblies projects implementation time/schedule ranges between two weeks and a year. This position was held and looked at by Frimpong, Oluwoye, and Crawford, (2003) who pointed out that project completion behind schedule and upward cost adjustments were mostly

frequent and significant in large projects than small projects. Gkritza and Labi (2008) was in agreement with this position but said that in addition these phenomenon are a common sight in long range projects.

Figure 7 shows the amount of MDF received from the Administrator of Stool Lands and the fraction which has been spent by the three District Assemblies on projects related to mitigating the effects of mining and those projects that were unrelated to mitigating the effects of mining in the affected communities. The three District Assemblies together received a total amount of GH₵46,873,726.14 disbursed by the OASL and spent GH₵24,404,947.74 on projects implemented. Out of this expenditure amount, GH₵7,312,922.17 was spent on projects which were not related either directly or indirectly to mitigating the harmful effects of mining.

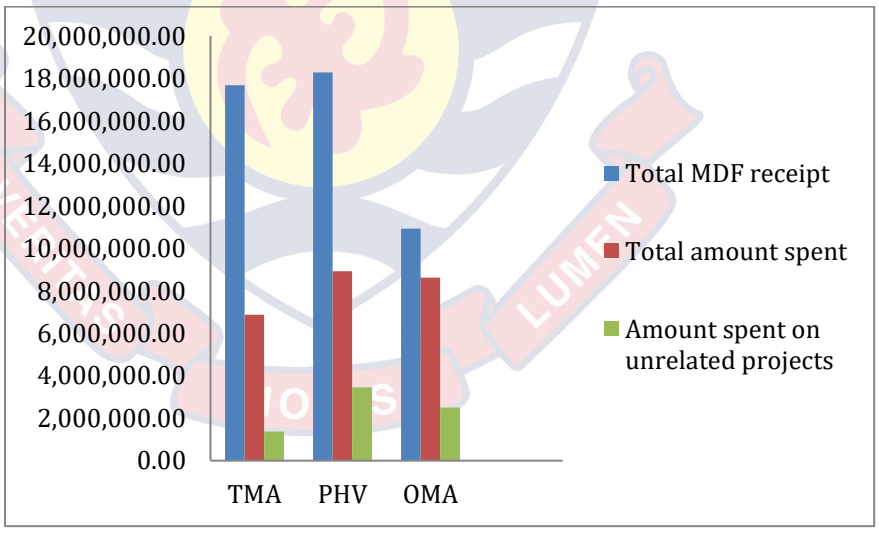

Figure 7: MDF receipt, amount spent and amount on unrelated projects

Source: Field Data, 2017

The implication is that, GH₵22,468,778.40 was not used on any project. This amount unaccounted for when added to the GH₵7,312,922.17

which was used on unrelated projects gives us ₵29,781,700.57. This means that ₵29,781,700.57 out of the GH₵46,873,726.14 was lost to the communities in helping to alleviate the problems created by mining activities.

Table 15 shows the projects implemented by the Tarkwa District Assembly which were unrelated to the type of projects envisaged whilst establishing the Mineral Development Fund. Notable among these projects were the construction and rehabilitation of the Assembly office complex, purchase of Toyota pick-up and Mazda pick-up vehicles, construction of staff accommodation among others.

Table 15: Programmes unrelated to MDF by Tarkwa District Assembly

Programmes unrelated to MDF objectives	
Construction and rehabilitation of office building	387,090.18
Purchase of office furniture	18,631.00
Purchase of office equipment	51,706.69
Consultancy	99,194.00
Data collection/ creating of the database	76,798.00
Construction of 2 bedroom residential accommodation	197,617.68
Purchase of Toyota pick-up vehicle	151,892.20
Purchase of Mazda pick-up vehicle	135,730.30
Compensation	8,170.00
International Labor Organisation	3,100.00
Contingency 2011 and 2012	237,028.13
Total amount	1,366,958.18

Source: Field Data, 2017

Meanwhile in the midst of this hug wastage and misapplication as shown in Table 15, the Centre for Remote Sensing and Geographic Information Services at University of Ghana, found that while in 1986 most of the Tarkwa area was a hale and hearty ecology, over 60% of the land was polluted to the extent that no economic venture can be sustained and that additional 87,500 acres of land has been degraded by 2001. The Tarkwa District Assembly spent an amount of GH₵237,028.13 on contingency for 2011 and 2012 and spent an amount of GH₵1,366,958.18 on unrelated projects representing 20.01% of the total amount spent on projects and 7.73% of the total MDF received over the period respectively.

Table 16 shows a list of some of the projects undertaken by the PHV District Assembly with a portion of the MDF received which were unrelated to the harmful effects of open pit mining in the District. The construction of a six (6) unit Guest House for Prestea Huni Valley District Assembly, production of cadastral and topographic map on 600 acres for assembly building, construction of Prestea Huni Valley District Assembly office complex, construction of community centre at Nsuaem, Palace for Petepom Divisional Stool, procurement of household items for District Assembly phase I & II and purchase of 7 laptops were some of the projects undertaken by the PHV District Assembly which were not related to the issue of mitigating the harmful effects of mining.

This finding was consistent with Human Rights Watch (2007) when it was argued that sub national fiscal sovereignty at decentralized local governance system have rather enhanced misapplication of income from

natural resources which otherwise could have been utilize to resolve the deepening deprivation in the affected local communities.

Table 16: Programmes unrelated to MDF by PHV District Assembly

Programmes unrelated to MDF objectives	
Production of cadastral and topographic map on 600 acres	46,896.16
Purchase of 7 laptops	14,785.00
Purchase of 3 motorbikes	25,351.71
Construction of PHV district assembly complex, Bogoso	1,422,294.00
Supply of office furniture, new assembly block, Bogoso	28,544.00
Supply of office facilities	36,035.53
Procurement of household items for DA phase 1& 11	45,809.10
Construction of community centre at Nsuaem	121,555.58
Purchase of household items for staff accommodations	95,000.00
Rehabilitation of road network at PHDA (internal road)	1,484,133.00
Construction of 6 unit Guest House for PHDA	123,951.59
Total amount	3,444,355.67

Source: Field Data, 2017

The District Assembly spent an amount to the tune of GH₵1,422,294.00 on putting up an office building complex for the assembly. The PHV District Assembly spent a whooping amount of GH₵3,444,355.67 on unrelated projects. This amount was 38.63% of the total amount spent on all projects and 18.84% of the total Mineral Development Fund received over the period. Meanwhile available data from the District Assembly shows that

about 60% of population still lacks potable water and heavily relied on polluted streams or rivers. Some of the projects unrelated to mitigating the harmful effects of mining were the construction of the District Chief Executive's two storey bungalow, construction of entrance arc, other miscellaneous commitments and giving a grant to Adansi East District Assembly for development.

Table 17: Programmes unrelated to MDF by Obuasi District Assembly

Programmes unrelated to MDF objectives	
Construction of MCE's two storey bungalow 2008, 2010, 2012	156,528.50
Other miscellaneous commitments in 2008, 2009, 2010	107,673.37
Construction of Entrance Arc in 2008, 2009	89,858.36
Purchase of mobilization van	200,000.00
Pavement of central lorry park Obuasi	1,120,610.00
Pavement of plantain market at Obuasi central market 1	649,710.00
Grant to Adansi east district assembly for development	150,000.00
Purchase of 1 motorbike for building inspectorate unit	27,228.00
Total amount	2,501,608.32

Source: Field Data, 2017

The Assembly spent a huge amount of GH₵1,120,610.00 on pavement of Obuasi central lorry park. The Assembly made a total expenditure of GH₵2,501,608.32 to carry out these unrelated projects. This amount as a percentage of total project expenditure and total disbursement of Mineral Development Fund received from the Administrator of Stool Lands were 29%

and 22.9% respectively. According to Tsidzi and Adofo (1993) the level and intensity of noise in these mining enclaves does not only obstruct speech, sleep and hearing of the members of the local communities but also increases anxiety associated illnesses such as high blood pressure. While the evidence in Obuasi area shows a precarious situation, the Assembly misapplied and wasted its share of the Mineral Development Fund as shown in Table 17. This result was consistent with study done in Nigeria (Ushie, 2012) which revealed that this pattern of natural resource revenue allocation indicates misplaced priorities. These resources could have been utilized in funding projects in pro-poor sectors that will create a favorable setting for inclusive and sustainable transformation.

One of the most challenging difficulties in Ghana is the issue of unemployment but the situation prevalent in the mining communities is of high intensity. The most important economic activity in the rural areas is agriculture so when mining activities especially surface mining deprive the members of the local communities off their lands it would definitely result in higher unemployment. This was especially so in a situation where the structures to support and enhance a move away from agriculture activities to other income generating ventures using medium such as Alternative Livelihood Programme were not well developed and implemented. This situation was confirmed by Aragon and Rud (2015) when the claim was made that agricultural output has drastically diminished in the local host communities by over 40% compared to communities far off mining concessions since the rise in mining operations between the late 1990s and

2005. This has occurred principally as a consequence of loss of lands for agriculture which has an impact on availability of jobs and poverty which is said to increase by 18% over the period.

In Focus Group Discussions, the inhabitants in the host communities said the mining companies always refuse them employment on the grounds of lack of employable skill. This was why they were of the opinion that it would be laudable if the District Assemblies use part of its allocation of the Mineral Development Fund to implement projects that would empower them in alternative livelihood programmes. This opinion expressed by the members of the host communities was in direct relationship to that of Oxfam (2009) which said that the ideal solution to offer members of the affected local communities such as native people whose inherited natural resources were annexed is via appropriate structures and mechanisms to enhance the availability of new job opportunities and capabilities to venture into other enriching and sustainable economic activities.

The situation where lack of basic social amenities for mining communities as a consequence of neglect by the Districts Assemblies were pervasive and not difficult to notice in all the areas visited. Most of the members of these local communities were not in the least pleased with the kind and nature of social infrastructure that they have such as markets, electricity, roads, schools, hospitals, portable water, toilet facilities provided them. The community members made the claim that even though the government holds the resource in trust for the people of Ghana, they were the real owners of the resources and therefore should benefit more.

The list of communities hosting mining operations and therefore classified as affected communities by Tarkwa District Assembly in the District is shown in Table 18.

Table 18: Host Communities in Tarkwa District

AngloGold	Ghana Manganese	Goldfields	Golden Star
Teberebe, Adieyie, Mile 7 Domeabra, Nkwantakrom New Techiman, Bankyim, Badukrom, Abonpuniso, Acheampongkrom, Adisakrom, Charliekrom, Wangarakrom, Akyempim, Mankiessim	Esuoso, Kwamenakrom Bonsawire, Senyakrom, Anomakokrom Enyinase,Tarkwa Banso Jerusalem, Ahwitieso, Nsuta, Tamso, Akyem Ahwitieso, Bonsa II, Wassa Agona	New Atuabo Akoon Brahabebom	Ningo Benso Subriso

Source: Field Data, 2017

It came out clearly after a careful examination of the list and visits to some of these communities showed that most of them have not benefited from the Mineral Development Funds received by the Assembly. The community members especially the leaders who participated in the focused group discussions said that persistent plea and request for projects yielded no positive response from their respective District Assemblies. The communities in this difficult situation in most cases turn to the mining companies for the provision of some amenities. As part of the requirements for getting the social license to work in the community, the mining companies normally respond to

the request from the host communities for the provision of some social amenities.

The list of the communities that were affected by the operations of the mining companies in the Prestea Huni Valley District as obtained from the Assembly includes the Ankobra community, Prestea area, Dumasey, Himine, Gambia, Bondai and Pepouse and a host of other communities along the stretch. The fact was that most of these communities did not benefit much from projects carried out by the Assembly with the Mineral Development Fund that comes to the Assembly despite persistent request coming from the affected communities. Just as in the case of the affected communities in the Tarkwa District, the mining companies here too as part of their social corporate responsibility and requirements for getting the social license to work in the communities have provided some notable projects to communities in their catchment areas

The list of communities that were in the operations areas of AngloGold Ashanti, the oldest mining company in Ghana and the only mining company in Obuasi District includes Obuasi township, Anyinam, Tutuka, Jimiso, Anyinamfie, Sanso, Anwiam. From the data collected and analysed, it became evident that apart from Obuasi Township which benefited from the Mineral Development Fund in terms of some projects, most if not all of these communities have not benefited at all. There was a construction of a 3 unit classroom block and extension of street light from Obuasi to Anyinam. All what Sanso could get from the Assembly was a construction of a 3 unit classroom block and a borehole which has an iron content of 2.0mg/litre.

According to ICMM (2015), the World Health Organisation recommended rate is 0.05-0.1mg/litre iron deposit and therefore this water was unsafe for drinking purposes. Meanwhile this was a community within the catchment area of AngloGold Ashanti which was used as a dumping site for the mine's waste depriving them of its arable land. Anyinamfie, another community with a population close to 8,000 where AngloGold sited its Akwesi Mensah shaft and therefore bare the harmful effects of chemical pollution, fume, vibration, noise and cracks in buildings caused by blasting of rocks during the mine's operations and vehicular traffic movements to and from the mining site, did not benefit from a single project from the Mineral Development Fund received by the Obuasi District Assembly.

Another badly affected community called Anwiam with a population of over 600 has everything of theirs destroyed by the operations of AngloGold Ashanti mine but surprisingly did not benefit from even a single project; not even an access road. It was in this light that it was difficult to understand how a community such as Kwabenakwa, which is far away and not one of the affected communities as per the Assembly's own list, qualify for a 3 unit classroom block financed with the Mineral Development Fund as recent as 2016. This issue of communities badly hit by the operations of mines but denied the benefits of programmes undertaken with the MDF was pervasive not only in Obuasi DA. Communities such as Akoon, Teberebe, Ankobra, Bondai, Anyinamfie, Sanso, Gambia, among others can be cited as vivid examples having similar fate befalling them. These outcomes were totally in contravention of the ten key recommendations for designing and

implementing effective, efficient, fair and stable resource revenue management systems (Bauer, 2013).

Using SPSS Logistic Regression, the MDF projects undertaken by the three District Assemblies were analysed. The dichotomous dependent variable was effective or ineffective and the independent variables were project input, project efficiency and project output. The computations were in thousand of Ghana Cedi. Table 19, shows the logistic regression performed Tarkwa DA to assess the influence of project input, project efficiency and project output on a binary dependent variable: effective or ineffective.

The full model was statistically insignificant, $\chi 2$ (3, N = 73) = 2.810, $p > .05$. The model as a whole explained between 3.8% (Cox and Snell R square) and 5.3% (Nagelkerke R squared) of the variance in effectiveness. As shown in Table 19 the three independent variables were unable to make unique statistically significant contribution to the model for Tarkwa DA.

Table 19: Logistic Regression for Tarkwa District Projects

Independent variables	B	S.E	Wald	df	p-values	Odd ratio	95% C.I Low	Odd High
Input	.033	.027	1.47	1	.226	1.03	.980	1.09
Output	-.029	.026	1.24	1	.266	.971	.922	1.02
Efficiency	.020	.028	.503	1	.478	1.02	.966	1.08
Constant	-1.39	2.85	.240	1	.624	.248		

Source: Field Data, 2017

Prediction equation, $Y_{TK} = \frac{e^{\beta_0 + \beta_1 INP + \beta_2 OUT + \beta_3 EFFIC}}{1 + e^{\beta_0 + \beta_1 INP + \beta_2 OUT + \beta_3 EFFIC}}$

$$Y_{TK} = \frac{e^{-1.396+.033INP-.029OUT+.020EFFIC}}{1+e^{-1.396+.033INP-.029OUT+.020EFFIC}}$$

Table 20, shows the logistic regression performed PHV DA to assess the influence of project input, project efficiency and project output on dependent variable; effective or ineffective. The full model was statistically insignificant, $\chi 2$ (3, N = 76) = 1.408, $p > .05$. The model as a whole explained between 4.1% (Cox and Snell R square) and 5.8% (Nagelkerke R squared) of the variance in effectiveness. As shown in Table 20 the independent variables could not make statistically significant contribution to the model for PHV DA.

Table 20: Logistic regression for PHV District Assembly projects

Independent variables	B	S.E	Wald	df	P-values	Odd ratio	95% C.I Odd Low	High
Input	.004	.003	1.49	1	.221	1.01	.998	1.09
Output	-.003	.003	1.29	1	.255	.997	.991	1.02
Efficiency	.021	.030	.521	1	.470	1.02	.964	1.08
Constant	-1.54	3.06	.252	1	.615	.215		

Source: Field Data, 2017

Prediction equation, $Y_{PHV} = \frac{e^{\beta_0+\beta_1 INP+\beta_2 OUT+\beta_3 EFFIC}}{1+e^{\beta_0+\beta_1 INP+\beta_2 OUT+\beta_3 EFFIC}}$

$$Y_{PHV} = \frac{e^{-1.536+.004INP-.003OUT+.021EFFIC}}{1+e^{-1.536+.004INP-.003OUT+.021EFFIC}}$$

Table 21, shows the logistic regression performed Obuasi DA to assess the influence of project input, project efficiency and project output on dependent variable; effective or ineffective. The full model was statistically

significant, $\chi 2$ (3, N =62) = 9.60, $p < .05$ (p =.022). The model explained between 14.3% (Cox and Snell R square) and 25.5% (Nagelkerke R squared) of the variance in effectiveness. As shown in Table 21, project input and project output made unique statistically significant contribution to the model with significance values of .050 and .035 as well as odd ratios of 1.01 and 0.99 respectively.

Table 21: Logistic regression for Obuasi District Assembly programmes

Independent variables	B	S.E	Wald	df	p-value	Odd ratio	95% C.I Low	Odd High
Input	-.049	.026	3.564	1	.050	1.01	.995	1.025
Output	.001	.001	4.300	1	.035	.999	.996	1.001
Efficiency	.060	.073	.085	1	.994	1.08	.907	1.289
Constant	1.27	7.27	.033	1	.855	.001		

Source: Field Data, 2017

Prediction equation, $Y_{OB} = \frac{e^{\beta_0 + \beta_1 INP + \beta_2 OUT + \beta_3 EFFIC}}{1 + e^{\beta_0 + \beta_1 INP + \beta_2 OUT + \beta_3 EFFIC}}$

$Y_{OB} = \frac{e^{1.237 - .049 INP + .001 OUT - .060 EFFIC}}{1 + e^{1.237 - .049 INP + .001 OUT\ .060 EFFIC}}$

Hosmer and Lemeshow test of goodness of fit, is a substitute for residual analysis. It is goodness-of fit chi-square test with a null hypothesis that the data fit the model adequately. A significance value larger than 0.05 suggests an adequate model fit, while a value less than 0.05 indicates some problem with the model. In the current study, the significance value of 0.309 obtained indicates a model fit. The analysis showed that 69.9%, 85.5% and

88.7% of the projects completed by Tarkwa, Prestea Huni Valley and Obuasi District Assemblies respectively were classified as effective projects. Obuasi District Assembly has outperformed its peers as far as projects which decrease the harmful effects of mining on the host communities were concerned. The result is also in line with theory which says that whenever the log of odd ratio is found to be positive, the probability of success is always more than 50%.

CHAPTER SIX

FACTORS AFFECTING EFFECTIVENESS AND IMPACT OF MDF INFRASTRUCTURE PROJECTS

Introduction

The chapter presented the result and discussions on factors affecting the effectiveness of the MDF infrastructure projects. Also covered under this chapter was the result and discussions on the impact of the Mineral Development Fund on the inhabitants of the host communities.

Factors Affecting Effectiveness of MDF Infrastructure Projects

According to Pinto and Prescott (1988) the reasons behind infrastructure programmes not having the desired effect are the lack or inadequate attention paid to some important factors during the planning and execution stages. There have been many studies regarding the factors and issues that have an influence on effectiveness. Bullen and Rockart (1981) defined these factors as those few key areas of activities in which favorable attention and results are absolutely necessary for a particular manager to reach his or her goals whiles according to Wideman, (1996) these are factors in which success is necessary in order that each of the major participants in a project or activity has the maximum chance of achieving its goals.

The selection of the Districts Assembly staffs and CEOs and Project Managers of various contracting companies was based on their frequency engagement on MDF projects, an availability of verifiable and reachable physical address and an active telephone line. Apart from the comparative

analysis between the District Assembly staff and the Contractors rankings were also compared to the results of rankings in the studies of Chua, et al. (1999), Hwang and Lim (2012), Kog and Loh (2012). Table 22 shows the result of the analysis of the Relative Importance Index (RII) of the factors affecting the effectiveness of MDF infrastructure projects.

Table 22: Relative Importance Index (RII)

Factors	DA Staff RII	CEO & PM RII
Owner's commitment to established schedules and budget	0.788	0.769
Budget updates	0.819	0.773
Proj. Manager competency/ experience	0.865	0.800
Risk identification and management.	0.842	0.835
Adequacy of plans and specifications	0.877	0.885
Constructability	0.850	0.792
Adequacy of funding	0.927	0.923
Owner's involvement and feedback	0.756	0.790
Economic risks	0.758	0.781
PM commitment and involvement	0.823	0.777
Realistic obligations/clear objectives	0.800	0.842
Political influence	0.864	0.850

Source: Field Data, 2017

Adequate funding received a relative importance index (RII) of 0.927 and 0.923 from the DA Staff and CEO, Project Managers respectively. This

means that the ranking for adequate funding was 1 by both the District Assemblies and the Contractors. This result was consistent with the results in Chua et al, Hwang and Lim and Kog and Loh, 1999, 2012 and 2012 respectively. This was an indication of the importance of adequate funding in the effectiveness of any programmes so as to have the desired effect.

A successful execution of any infrastructure project, without cost overruns and without schedule overruns fundamentally is dependent on the existence of efficient and adequate sources of funding. Adequate funding is the life blood of every successful programme execution. Without adequate financial resources, there is the probability of the programme not meeting the expectation of key stakeholders. Any programme lacking adequate funding in most cases is likely to experience high cost, extend beyond its time of completion and ultimately not meet objectives for which the project is being undertaken. The District Assemblies provides the financing out of their portion of the Mineral Development Fund disbursements from the Office of the Administrator of Stool Lands.

The result shows that adequate planning and specifications received relative importance index (RII) of 0.877 and 0.885 from the DA Staff and CEO, Project Managers respectively. This means that the ranking for adequate planning and specification was 2 by both the District Assemblies and the Contractors. This result was consistent with the results in Chua et al, (1999) Hwang and Lim, (2012) and Kog and Loh (2012).

Planning is the process of setting goals, developing strategies and tasks and schedules to realise the goals. Planning stage is the phase of the project

during which all comprehensive stipulation, schematics and other plans are developed. The various work components are broken up, work is assigned to individual persons and the process for execution obviously outline. According to Dessler, (2004) planning is that part of management function that provides guidance and direction. It involves establishing objectives, systematic plans for accomplishing them and courses of action prior to taking action.

The result shows that political influence received relative importance index of 0.864 and 0.850 which means it was ranked 4 and 3 by both the District Assemblies staff and CEO, Project Managers respectively. This was in accordance with and reflected the suggestion made by participant that political influence was an important factor in project effectiveness at the local government level in a pre-testing of the data collection instrument.

Political influence is when a person or a group of persons has the capacity to influence the official policy decision creation and execution by public office holders in government institutions. The person or group of persons may shape, manipulate, condition and direct the choice and procedures of people having the official lawful power (Aplin & Hegarty, 1980). Therefore persons influencing the choice and procedures of political office holders do not in most cases hold any official authority and so lack the lawful power to take formal decisions. These persons or organizations have their own interest and demands so by influencing the official office holders, their interest and requirements are taken into consideration before any conclusions are made on public policy. This factor affecting the effectiveness

of infrastructure projects was not in the Chua et al, (1999), Hwang and Lim, (2012) and Kog and Loh, (2012) studies reviewed.

Budget updates received a relative importance index of 0.819 and 0.773 therefore ranked 8 and 11 by the District Assemblies staff and the Contractors as shown in table 23. This result was inconsistent with the 3, 4 and 3 rankings by Chua et al, Hwang and Lim and Kog and Loh in 1999, 2012 and 2012 respectively. This was not surprising since most of the projects undertaken by the Districts which were the focus of this current study were relatively small and takes very short periods to complete making budget reviews and updates not a strong prerequisite to project effectiveness.

Every programme implementation whatever the size deals with costing of activities and therefore detailed preparation of budget. Programme budgets were rarely fixed and it often necessary for project management and cost estimators to update the budget as the project progresses and when the real costs of the activities or units become apparent. The budget updates were therefore necessary to accommodate changes and any variations in the project scope and duration. This way some amount of flexibility is built into the implementation process over the project life span. All things being equal, the longer the project implementation period, the more it is that it would be necessary to carryout budget updates to adjust estimates accordingly to absorb changes and variations in accordance with the terms in the contract.

Table 23: Ranking factors affecting effectiveness of MDF projects

Factors Affecting Effectiveness of infrastructure projects	Chua, et al. (1999)	Hwang & Lim (2012)	Kog & Loh (2012)	Ranking by DA Staffs	Ranking by CEO and PM
Adequacy of funding	1	1	1	1	1
Adequacy of plans and specifications	2	2	2	2	2
Political influence				4	3
Budget updates	3	4	3	8	11
Constructability	4	5	4	5	7
Economic risks	6	6	5	11	9
Owner's involvement and frequent feedback		7		12	8
Owner's commitment to established schedules and budget		8		10	12
PM commitment and involvement	7		6	7	10
PM experience/ competence	8		7	3	6
Realistic and clear objectives	9	9	8	9	4
Risk identification and management	10	10	9	6	5

Source: Field Data, 2017

The result shows that Constructability received relative importance index (RII) of 0.877 and 0.885 from the DA Staff and CEO, Project Managers respectively. This means that the ranking for this factor was ranked 5 by the District Assemblies and 7 by the Contractors. This factor was ranked 4 by Chua et al (1999) and Kog and Loh, (2012) and also ranked 5 in a study conducted by Hwang and Lim (2012). The result in this study was fairly consistent with the results obtained in the earlier studies reviewed.

Constructability is a measure and evidence of easiness and competence with which the project can be built. It is the extent to which the designs of the project make easy construction subject to the overall requirement placed on it by key stakeholders. To achieve more cost-effective in building an infrastructure project then the designs of the structure must be more constructible. Constructability is to a large extent an indication and a pointer to the effort put into developing and preparing the work and therefore high quality of the design document. The most desirable technique for achieving high quality design is the evaluation of the processes in the construction starting from the beginning to the end before starting the execution phase. When this is performed properly, it assists in the identification of impediments prior to the actual building to decrease or prevent mistakes, completion behind schedule and the probability of upward cost variations.

The result shows that economic risk was weighted by the District Assembly staff and CEO, Project Managers in relative importance index as 0.758 and 0.781 therefore ranked 11 and 9 respectively as shown in Table 23. This result was inconsistent with that of Chua et al (1999) and Kog and Loh, (2012) because it was ranked 6, 6 and 5 respectively. This does not come as a surprise because these projects are relatively small and completed within a short period and therefore carrying little or no economic risk.

Generally economic risk is defined as the likelihood of an investment being vulnerable to the effects of overall economic circumstances such as investment and trade laws, political instability, interest rates, exchange rates among others usually occurring outside the home country. If there is an

existence of a probability that the resultant outcome of an investment decision is not likely to generate enough cash inflows to cover operating cost and paying back credit facilities, then it can be said with certainty that such an investment has an element of an economic risk exposure. Therefore, in a nutshell economic risk is the risk that a venture will be economically unstable due to various reasons such as modification in economic development and deceptive activities which ruin a project's outcome.

As can be seen from the result owner's involvement and frequent feedback received relative importance index of 0.756 and 0.790. This factor was not included in the Chua et al, (1999) and Kog and Loh, (2012) but ranked 7 in the study done by Hwang and Lim, (2012). The owner's involvement and frequent feedback was ranked 12 and 8 by the District Assemblies and the CEO, Project Managers respectively. The ranking by the CEO, Project Managers was to a large extent consistent with the result obtained in the study conducted by Hwang and Lim, (2012).

The act of managing project's outcome with owner's involvement and frequent feedback is the most significant function performed by the owner of the project. At the beginning of any project it is the owner who is responsible for the entire initial project risks. It is the owner who takes the initiative and the decision to undertake the project and therefore has the responsibility to identify, analyse, prevent and control all risks inherent in a project. The owner manages any risk inherent in a project by accepting, modifying or terminating it. It is this deep involvement that requires effective and timely feedback. Feedback can emanate from management, owners, supervisors and

measurement systems. An effective feedback is one that is built into the performance management programme and so improves the individuals, teams and programmes in general.

The owners' commitment to establish schedules and budget factor was not included in the studies conducted by Chua et al, (1999) and Kog and Loh (2012). The result shows that the owners' commitment to establish schedules and budget received a relative importance index of 0.788 and 0.769 from the District Assembly staff and the CEO, Project Managers respectively. It was therefore ranked 10 and 12 by the DA staff and the CEO, Project Managers respectively as compared to the ranking of 8 in Hwang and Lim (2012). The District Assemblies were the owners or the implementing organisation and did the needs assessment and through their tender committee prepared the tender documents which were purchased by the potential contractors. The contractors in return then submit their bids which upon a successful evaluation by the tender committee, the contract is awarded to the most desirable contractor. The District Assemblies provide the financial resources for the project implementation from their allocation of the Mineral Development Fund. The District Assemblies performed these tasks in conjunction with and on behalf of the recipient communities.

The result shows that Project Manager's competency and experience received relative importance index of 0.865 and 0.800 and therefore ranked 3 and 6 by the District Assemblies and the CEO, Project Managers in that order. The Project Manager's competency and experience was not part of the list in the Hwang and Lim, (2012) study but ranked 3 and 6 in the Chua et al, (1999)

and Kog and Loh (2012) studies respectively. The stakeholders in the current study placed much more premium on the Project Manager's qualification and experience than the earlier studies reviewed. Even though projects are non-repetitive activity, the processes and steps in their implementation if not the same, are similar. It is in this light that the Project Manager's experience and competence is very significant in respect of the effectiveness of the project.

Effective Managers in project management are mostly those who have the agility to establish the cooperation between their project teams and themselves. This is crucial because it highlights the importance that Project Managers depend on the teams they assemble to achieve goals and objectives. The Project Manager is likely to perform a wide range of duties which includes anything from direct supervision of individuals and the team as a whole to managing the practical and technical details. This involves developing detailed plans, budgets, building the team, directing and motivating them, organizing and acquiring the requisite and necessary financial and material resources in achieving the goals, objectives and aspiration of the project being undertaken.

Realistic/clear objectives as one of the factors was ranked 9, 9 and 8 in the studies conducted by Chua et al, (1999), Hwang and Lim, (2012) and Kog and Loh, (2012) in that order. The result in the current study shows that it was weighted in relative importance index analysis as 0.800 and 0.842. This means it was ranked 9 and 4 by the District Assemblies and the Contractors respectively. The ranking by the District Assemblies were consistent to a large extent with the results obtained in Chua et al, (1999), Hwang and Lim, (2012)

and Kog and Loh, (2012) but it appears the contractors placed much more weight on clear objectives with regards to effectiveness of MDF projects.

An objective is the end result that the organisation is attempting to reach. Therefore objectives are the results expected at the end of the project implementation which includes the question of why the programme is carried out. The objectives provide the foundation to be able to plan, organize, motivate and control activities, resources and work in general. The results of the study by Pinto and Prescott (1988) point to the fact that to achieve success, then the District Assemblies should always understand the project goals and objectives. In addition to the above, they should on timely basis and constantly keep the members of their team informed on any modifications of the project objectives and goals. Behavior in the project team can stray in almost any direction without communicating clear objectives to team members.

In the current study, the result shows relative importance index of 0.842 and 0.835 for risk identification and management and therefore ranked 6 and 5 by the District Assemblies and the contractors respectively. It again came out strongly that much more weight was given to this factor affecting effectiveness by the stakeholders in the current study. Risk identification and management was ranked 10, 10 and 9 in the studies conducted by Chua et al, (1999), Hwang and Lim, (2012) and Kog and Loh, (2012) in that order.

According to Teague and Eilon (1973) project risks can be defined as variables causing variability in costs, duration and stakeholders acceptance of the project. Project risk identification and management is both an art and a science which involves the identification, investigation and responding to risk

factors through the entire life cycle of the project and taking recognition of the best interest of its objectives. all project have an element of inherent risk and therefore the difference between a failed and a successful project implementation has no relationship with the fact that one project have risks and the other project lacks risks. The significant issue however is inherent in the adequacy and relevance of management plans initiated and developed to anticipate and resolve the problems before they arise and appropriately deal with it when they even arise.

Test of Hypothesis

The Mann-Whitney test of significance was used to ascertain if the District Assembly staff and the CEO, Project Managers (Contractors) differ in their ranking of factors affecting effectiveness of the MDF projects. The test was computed upon determining the sum of the ranks for both groups, the values were computed employing following equations

$U_1 = n_1 n_2 + \frac{n_1(n_{1+1})}{2} - R_1$

$U_2 = n_1 n_2 + \frac{n_2(n_{2+1})}{2} - R_2$

The sample means $R_1 = \sum r_1/n_1$ and $R_2 = \sum r_2/n_2$.

Samples: District Assembly staff, n_1=12 and Contractors, n_2=14

$R_1 = \sum r_1/n_1$= 2801/12 = 233.42 and $R_2 = \sum r_2/n_2$= 3258/14 =232.72

U_1= 12(14) + $\frac{12(12+1)}{2}$ −233.42

168 + 78 – 233.42
246 – 233.42 = 12.58

U_2= 12(14) + $\frac{14(14+1)}{2}$ −232.72

168 + 105 – 232.72
273 – 232.72 = 40.28

The results from the analysis to ascertain if the District Assembly staff and the CEO, Project Managers (Contractors) differ in their ranking of factors affecting effectiveness of the MDF projects showed that a Mann-Whitney *U* value of U_1 =12.58 was obtained for the District Assembly Staff. The value obtained for the CEOs, Project Managers was U_2 =40.28. This therefore means, the obtained value of *U* was 12.58. From the two-tailed Mann-Whitney table, $n_1 = 12\ and\ n_2$=14 at 5% significance level was 45. Since the obtained *U* value of 12.58 was less than the tabled critical value of 45 at 5% significance level, the null hypothesis of no difference between the District Assembly staff and the CEO, Project Managers (Contractors) in ranking the factors affecting effectiveness of MDF infrastructure projects was rejected. Indeed, the two key stakeholders differ in their ranking of these factors.

Impact of the Mineral Development Fund Projects

The main goal of the Mineral Development Fund (MDF) as stated in its Medium-Term Development Plan (2012-2016) was to use the fund to undertake programmes that will improve the standard of living of the people by reducing poverty and income inequalities. This section of the thesis assessed the impact of the MDF programmes in the affected communities through Focus Group Discussions (FGDs). These were, facilitation of economic activities; improvement in sanitation; improved access to education

and students' performance; improved access to portable water and reduction in water-borne disease; and improved access to healthcare. These are presented in details in the following sections.

Facilitation of Economic Activities

One key impact of the Mineral Development Fund programmes in the affected communities is the facilitation of economic activities in the communities. Major programmes including the construction of 20 market sheds for Simpa and Dompim, construction of a 10-unit market shed with facilities at Essouso, the construction of 30 market stores in Tarkwa, construction of a 10-unit store building at Brahabebone, pavement of Obuasi central lorry park, and pavement of plantain market at Obuasi central market have facilitated economic activities in the areas. The beneficiaries are now more able to engage in alternative livelihood activities which are generating additional income for the families. This has enhanced living standard of the members of the beneficiary communities. The following statement by a key informant on the impact of the projects partly explains the findings.

> My parents were farmers but after our lands were taken from us, we were left with no choice than to get into other jobs. These projects facilitated the easy movement of persons, goods and farm produce to the marketing centres and also provided a convenient place for us to transact business. Through this, members of our communities which host mining operations have engaged in alternative livelihood ventures

from which they earn a living in order to take care of their children and families (Key-informant 1, at Sanso, FGD, August 12th, 2020).

Another key programmes that have facilitated economic activities in the areas included reconstruction of 13 broken down bridges at Tintinmu, Attakrom, Aboso, Bobkrom, Gyimakrom, Bonsaso and rehabilitation 8 wooden bridges at Bonpieso, Damang, Old Kyekyere, Peterkrom and Gordon; construction of 1 pipe culvert at Nzemakrom, 1 box culvert at Aboso, one 4-cell box culvert at Fantefokrom-Petepom and rehabilitation of road network at Prestea Huni District Assembly. These reconstructed culverts and roads have opened up the communities, which hitherto were rendered inaccessible due to rivers and lakes. As a result, the inhabitant farmers are able to attend their farms and also send their produce to the marketing centres easier than before. This goes to confirm the assertion by Rosen and Vincent (1999) that there is a causal and positive relationship between ease of transportation and access to education, health, factor markets, economic and social empowering opportunities.

Improvement in sanitation

One of the most important impacts of the Mineral Development programmes was in the area of improvement in sanitation situation in the area. Programmes targeting improvement in sanitation featured prominently in the activities of the District Assemblies. Among these projects were the evacuation of refuse at Prestea Islamic school, rehabilitation of 7 damaged refuse containers, procurement and distribution of 15 refuse containers on

District wide basis and evacuation of refuse at Prestea, Bogoso, Petepom and Akotom to final disposal site. Other equally important projects in this direction were the construction of 12-seater aqua toilet at Nyamebekyere and Ntiakokrom, 8 seater aqua toilet at Aframase and a 6-seater aqua toilet at DC experimental Junior High School.

The Assemblies through the utilization of the Mineral Development undertook construction of 12- seater Water Closet (WC) toilets at Achiase, Adjeikrom, Ndadieso, Akokobediabro, Koduakrom which serves in excess of 2,000 people. It also built a 9-seater WC and urinal at Bogoso market, rehabilitation of a 16-seater aqua toilet at Prestea market and construction of a 16-seater vault latrine for the people of Dompoase. There were seven refuse bays out of which six of them constructed at new Atoabo, Kwabedu, Tebrebe, Tanso, Cynaide and Akoon financed solely with the Mineral Development Fund. The District Assemblies also undertook clearing and conveying refuse from the communities and disposing at these refuse bays.

In responding to the impact of the projects on the improvement in the sanitation situation, these comments by the Assembly Member of Teberebe explains the findings in the study

> Before the provision of the refuse containers, our area was littered with filth but now we have the bins to dispose our waste but timely evacuation and disposal by the District Assembly has been the problem for some time now. The toilet facility has reduced open defecation and its attendant effects on the environment and water bodies (Key-informant 2 Teberebe, in FGD, August 15th, 2020).

These programmes helped in collection and disposal of waste in a timely manner, ensuring cleaner environment, less incidence of diseases which has ensured a healthier and productive society.

Improved access to education and students' performance

In addition to the impacts of the Mineral Development Fund programmes already enumerated, another prominent impact was improved access to education and students' performance. In order to achieve this, the District Assemblies invested heavily in programmes such as the renovation of a 2 storey at St. Augustine Senior High Senior, construction of a 4-unit class for Prestea Senior High School, a 4 unit KG block at St. Michael Catholic School, a 3 unit classroom at Fantefokrom Petepom, a 3 unit classroom at Obengkrom, a 3 unit classroom at Bogoso Anglican Junior High School, a 2 unit kindergarten classroom at Aboso, re-construction of 5 unit Arabic school classroom block, a 3 unit classroom at Wassa Akuapim and rehabilitation of a 3 unit classroom for Aboso Roman Catholic Junior High School, construction of a 3 unit classroom at Kunka, a 6 unit classroom at Dompaose Demonstration Primary School, a 3 unit classroom at Mensonso, a 3 unit classroom at Sanso, a 3 unit classroom at Annorkrom, a 3 unit classroom at Adomanu RC Primary, a 3 unit classroom at Mprekyire, a 3 unit classroom at Adamso, girls hostel at Akrofuom Secondary Technical, a 7 unit staff quarters at T. I. AMASS at Fomena and built a fence wall at Obuasi Secondary Technical School.

There were also the provisions of skill training for women groups and people with Disability and support for five girls in skills development in male dominated jobs. As a result of these projects, members of the beneficiary communities have acquired relevant knowledge and skills, to become enlightened, capable and functional in society.

With regards to the impact of the improved access and students' performance, a member of the Unit Committee in Gambia community commented as follows:

> Our young children are in school because of the facilities provided. The effect of these programmes on effective teaching and learning is a positive one as both pupils and their teachers were catered for. This effort and many others can be said to contribute significantly to the District producing the National Best Teacher and also scoring 62.25% pass out of the 3,009 candidates presented for the Basic Education Certificate Examination in 2013 (Key-informant 3 in Gambia, in a FGD August 21st, 2020).

This was an attestation to the fact that, the inhabitants have acknowledged the contributions made by these projects to the overall success of the educational programmes in the study area. However, the situation was different in the case of the Anwiam community which was captured vividly in the following statement by a resident

> There is no school in the community for our children making them trek long distances to school because the short route was closed by the mining company. The situation is pathetic during

> the raining season and making the children stay away from school. The Anwiam community is inaccessible because of lack of access road to the community. The community did not benefit from any project from the Assembly (Key-informant 4 in Anwiam in FGD August 8th, 2020).

Improved access to portable water and reduction in water-borne disease

Among the Mineral Development Fund programmes impacting the lives of the mining affected communities were projects aimed at improving access to portable water and reduction in water-borne diseases. In providing solutions to the scarcity of portable water as a result of mining activities in the area, the Assemblies applied part of their share of the Mineral Development Fund for the drilling and construction of one small town water system at Nsuaem, Prestea Huni Valley office complex, drilling and construction of boreholes in 8 communities in Prestea zone and another 8 communities in Bogoso zone, drilling and construction of 4 boreholes at Gordon, Huniso, Head of Department's resident and Adadekrom, one overhead at Bogoso Health Centre, rehabilitation of 19 boreholes, 6 hand dug wells. These projects have enabled members of the beneficiary communities to access clean drinking water, reduced the time spent getting water for the home, reduced water borne diseases culminating in healthier society.

The position of the Assembly Member for Tarkwa Banso on the improved access to portable water partly confirms the findings

> With the supply of portable water to the Nsuaem community, the prevalent rate of water-borne diseases has declined and loss of time due to ill health and resources wasted on treatment has significantly improved. The leaving standard and welfare of women and girls have also improved since higher proportions of women and girls compared to males were responsible for fetching water for their households and also take care of the sick in most cases (Key-informant 5 in Tarkwa Banso in FGD, August 12th, 2020).

This means that, the impact of these water systems on the various segment of the society would have been huge if most of these projects were carried out in the mining affected communities where water pollution is a major problem and repair of these boreholes.

Improved access to healthcare

One of the impacts of the MDF programmes on the mining host communities was improved access to healthcare. In an effort to provide good service to clients needing medical care, there were rehabilitation of the Prestea Government Hospital vehicle, supply of sanitary tools and cleaning materials, procurement and supply of 20 beds and bed lockers and 20 mattresses to Aboso Health Centre. Many communities in the study area were without health facilities and therefore have to travel long distances to access medical care and attention especially in cases of pregnancy and child birth, but through the Mineral Development Fund two CHPS compounds were provided.

The improvement and provision of these facilities helped in giving prompt attention to patients, provision of both ante and post natal care to women and reduction in general mortality. The impact is felt in the areas of savings in finances and good family health which was captured clearly in the following sentiment expressed by a resident of Bondai as follows:

> Unlike, in previous times when some of the health cases were referred to other Hospitals especially the in-patient ones because of no bed at the Hospital; the situation has improved especially for pregnant mothers with the rehabilitation and supply of the beds and bed lockers to the Prestea Government Hospital. These efforts by the Assemblies contributed to a reduction in unnecessary death of women during child birth because these women were attended to promptly and quickly in the CHPS compounds built in some of the remote areas (key-informant 6 in Bondai, FGD August 21st, 2020).

CHAPTER SEVEN

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The chapter presented the summary, conclusions and recommendations of the study. These recommendations would add to knowledge, assist policy makers at the policy formulation stages and the Assemblies in the implementation stages. The ultimate beneficiaries of these recommendations were the affected communities who suffer the negative socio-economic, cultural and environmental effects of mining operations. The chapter also presents suggested areas for further studies.

The Government of Ghana by an Executive Fiat established the Mineral Development Fund in 1992 to enable the District Assemblies which are homes for mining operations to implement appropriate developmental projects to lessen the socio-culture, economic and environmental impacts of mining activities on the members of the affected communities in order to raise their socio-economic living standards. The rationale for the study was to carry out an evaluation of the programme since its inception to examine the factors affecting the effective management of the Mineral Development Fund. The study utilized data from both primary and secondary sources. This study used an ex-post, quasi experimental design employing proxy pretest and focus group discussions as primary data collection methodologies. The secondary data sources include progress reports, contract documents, bank statements and revenue reconciliation statements among others.

Summary

1. The context for establishing the Mineral Development Fund

As a result of the economic decline in the 1970s which became severe and intense in the 1980s couple with the extensive drought, the government of Ghana in an effort to revive the ailing economy adopted the Structural Adjustment Programme. The mining sector restructuring during the Structural Adjustment Programme resulted in the coming into being of a new mineral and mining law PNDC Law 153 in 1986. Income tax and rate on mining operations, the royalty rate were all significantly revised downwards, individuals who invested in the mining companies excused from paying taxes on the earnings, duties were not paid on machinery imported for mining activities. Exemption from the payment of Customs Import Duties on plant, machinery equipment and accessories imported for mining were granted mining companies. Tax exemptions were granted to employees of the mining companies in the form of income tax relieves on furnished housing at the mine site.

The general implication of these policies is the reduction in the initial capital cost of mining and thus increasing investments into the sector. But as can be seen clearly all these laws, policies and initiatives taken on mining sector did not take the harmful environmental issues into consideration during the 1980s and 1990s. The Structural Adjustment Programme policy implemented by the government of Ghana had a momentous persuasion in wooing a lot of investors into the mining sector of Ghana and within the study area in particular.

The previously practiced underground mining by large scale State owned mining companies was basically substituted with surface mining by the new mining companies. This surface mining needs large tracts for mining activities depriving the local communities of their lands. Concerns about inadequate housing, prostitution, youth unemployment, family destabilization, unacceptable level of children who are out of school and substance misuse have are since on the rise. The problem of inadequate housing has been created by the movements of people into these areas. The rates charged by landlords have increased to a point that makes it extremely difficult for the ordinary citizen to afford thereby forcing people to live in severely overcrowded conditions which has the potential of generating other social problems.

Basic necessities of life such as shelter, foodstuff, clean portable water, that makes life worth living is denied the ordinary citizen just because of the monetary consideration. The combination of decline food production due to unavailability of farmlands, in an already dense populated area with high unemployment is accountable for the high price tag on almost everything. The negative environmental spillovers such as pollution and local wellbeing evils have dampened the output in general of the land and farmers, lowering the profitability of farm work. Surface and ground water in the study area are polluted by chemicals such as cyanide and mercury. The spread of gold ore-related heavy metals such as arsenic and sulphur dioxide causing environmental degradation was visible through water and land use. Air pollution has been linked to increase incidence of cough and tuberculosis

around mines. The scorching of the vegetation and plantations are blamed on the emissions toxic substances from the laboratories and are fingered for being behind the poor output of agriculture ventures sited in close proximity.

This state of affairs led to the continuous complains by the members of the local communities living in close proximity to mining operations about the negative environmental, economic, cultural and social impacts of mining on their lives. In response to this, the Government of Ghana in 1992 by an Executive Fiat established the Mineral Development Fund to help the District Assemblies to undertake programme to reverse the negative impact of mining activities on the people of the host communities. Despite all these initiatives the negative environmental, economic, cultural and social impacts of mining operations on the lives of the members of the affected communities have worsened over the period.

2. Trend of funding of the Mineral Development Fund programmes

The administration of the Mineral Development Fund starts with the collection of royalties from mining companies by the Ghana Revenue Authority. The Ghana Revenue Authority after the collection deposits 80% of this amount into the Consolidated Fund. The Office of the Administrator of Stool Lands receives 10% and the remaining 10% is put into a special account at the Bank of Ghana to be appropriated to mining related government agencies. The Office of the Administrator of Stool Lands retains 10% for administrative purposes and repackages the remaining as 100% of which 55% goes to the Districts, 25% to Stools and 20% to Traditional Councils. In term

of the original amounts collected by Ghana Revenue Authority, this represents 4.95%, 2.25% and 1.80% to Districts, Stools and Traditional Councils respectively.

The amount disbursed by the Administrator of Stool Lands between 2003 and 2016 and subsequently received by Tarkwa District, Prestea Huni Valley District and Obuasi District Assembly amounted to GH₵17,673,830.25, GH₵18,277,241.00 and GH₵10,922,654.89 respectively. The trend generally increased over the period however, there still exist discrepancies in the amount of royalties due government and what it actually received and also between the amount disbursed by the Office of the Administrator of Stool Lands and what was actually received by the District Assemblies. In the coming years the State is likely to lose royalties because some of the mining companies were extended some tax and development concessions by the Government.

3. Structure and process for managing the Mineral Development Fund

The structure for the management of the Mineral Development Fund begins with the Domestic Tax Revenue Division of the Ghana Revenue Authority. A fraction of the mineral royalties collected from the mining companies was sent to the Head office of Office of the Administrator of Stool Lands as mandated by Article 267(2) of the 1992 constitution and the Office of the Administrator of Stool Lands Act 1994 (Act 481). The mineral royalties received were ceded to District Assemblies and communities affected by

mining operations through the various regional offices of the Office of the Administrator of Stool Lands in regions where mining was undertaken.

The Local Government structure which manages the Mineral Development Fund are the District assemblies made up of the District Chief Executives and two-thirds of the members elected directly by the electorate and one-third nominated in consultation with the chiefs and recognised socio-economic groupings. A close look at the composition of the District Assembly revealed some basic problems. No consultation with chiefs and identifiable socio-economic groupings in nominating the one-third which were mostly members of any political party that was in power.

In the District, the Assembly is the highest decision-making organ and worked through the subsidiary committees of social services, development planning, finance and administration, work, justice and security and the Executive Committee in accordance with the Local Government Act, Act 462 of 1988. Tarkwa, Prestea Huni Valley and Obuasi District Assemblies, during the development of the Medium Term Development Plans engage members of the local communities and other stakeholders in discussions and dialogue seeking their opinions on their developmental needs which when collected were arranged in order of importance for redress. In an interaction with beneficiary communities during focus group discussions, this elaborate process of engagement has not been corroborated. Programmes and projects that were identified, appraised, prioritized and selected during the planning stage were not based on environmental risk analysis either done by the Assembly or the mining companies.

When funds were available, tender documents were prepared and the District Assemblies after that carry an advertisement of the projects in the National Daily Papers to prospective contractors. The contractors after acquiring and filling the tender document, specifying quantities, cost and time of the various units of the project, submit it to the assembly for opening and evaluation. The tender committee reviews the tender documents submitted by the participating contractors and award the contract based on required licensing and professional registrations; capabilities with respect to personnel, equipment, and construction facilities; past performance and experience on similar contracts and also commercial and financial resources. At this stage of the planning process, the District Assemblies do not involve other stakeholders especially the affected communities as discovered.

At the start of the implementation stage, a site meeting was held on the first day on which the Contractor, Works Engineer, Planning Officer, Budget Officer, Environmental Officer, Town and Country Planning, Assembly Member, Unit Committee Members, Opinion leaders, Chiefs, elders and other interested stakeholders meet at the project site. The Contractor was introduced to all stakeholders present and the project was deemed to be officially started. The works committee which includes the District Engineer, the Planning Officer, Assembly Members and other members of the Assembly undertake regular and routine visits to project sites. The District Assemblies besides these routine inspections of project sites also visit project sites when the Contractor presents works certificate. This was done prior to any payment to the Contractor for work completed. The members in the host community and

other stakeholders were also encouraged to report any deviations and defects noticed to the District Assembly for the needed action to be taken.

Regular and routine project site visits continued until the project was completed. The District Assemblies in consultation with the chiefs and people of the host community, the Consultant, the Contractor and other stakeholders organize a durbar or a ceremony during which the project was officially handed over to the beneficiary community for use. It was however observed that the District Assembly structure was designed for the entire development of the district and therefore not suitable when mining operations do not affect the totality of the District. Besides this deficiency, the needs assessment to identify projects to reduce the effect of mining was not done through rigorous risk analysis by the assemblies themselves or through the dependence on risk analysis done by the mining companies. Again, despite the existence of the District Assembly structures, sometimes the will of the government in power overrides that of the community in selecting which project to implement.

4. Efficient and effective management of the Mineral Development Fund

Efficiency is given by dividing the number or the value of the output produced by the number or value of input utilized. The outputs in this case were the various programmes and projects undertaken by the Districts and the inputs were the amounts of Mineral Development Fund received by these Districts. Tarkwa District Assembly had an efficiency value of 0.3884 and that of Prestea Huni Valley was 0.4877. Tarkwa and Prestea Huni Valley District Assemblies could not produce outputs that were equal to half the value of

Mineral Development Fund received. It was only Obuasi District Assembly that obtained a value of 0.7896 which was almost 80% of the Mineral Development Fund received.

Frontier Analyst software DEA was conducted using the Mineral Development Fund and the six Assembly Units heads and their assistants as inputs. The outputs were the project numbers or costs undertaken by the participating District Assemblies. The DEA analysis using programme output frequencies revealed that Prestea Huni Valley had outputs in WASH programmes contributing 100% to its efficiency score. Tarkwa and Obuasi District Assemblies however had its efficiency score of 100% in the output areas of administration and education programmes respectively. Prestea Huni Valley outperformed its peers as it is a well acceptable fact that the real effects of mining operations on the host communities is in the area of water, sanitation and health.

The DEA efficiency was conducted on the District Assemblies' programmes which were related to mitigating the effects of mining and those unrelated. Tarkwa and Obuasi District Assemblies had 100% overall efficiency scores whereas Prestea Huni Valley had 80.45% coming from unrelated programmes. It was only Prestea Huni Valley which had 100% contribution to its overall efficiency score coming from MDF related programme outputs. Cost DEA analysis shows that Obuasi District Assembly had contributions to its overall efficiency score coming from two areas namely WASH and admin with 27.24% and 72.76% in that order whilst Tarkwa and Prestea Huni Valley had output contributions coming from admin and WASH

programmes. Tarkwa, PHV and Obuasi District Assemblies had a super-efficiency value of 157.69%, 157.36% and 253.66% respectively. In SPSS Logistic regression analysis between 69.9%, to 88.7% projects of the participating District Assemblies were classified as effective programmes.

Effective management of the Mineral Development Fund was judged in terms of a project achieving the object of establishing the Fund. This was in providing solutions to the negative effects of mining operations on inhabitance in host communities. Out of all the 223 projects undertaken with the Mineral Development Fund by the three District Assemblies a total of 211 projects met the criteria to be included in the analysis.

Tarkwa District Assembly completed a total of 73 projects. This was made up 21 WASH projects, 12 education and training projects, 18 economic projects and 22 administration projects. The Prestea Huni Valley completed 76 consisting of 20 educational projects, 34 WASH projects, 11 economic and 11 admin projects. Obuasi District Assembly completed 6 WASH projects, 28 education, 19 economic projects and 9 admin projects. In all, Obuasi District Assembly completed the least projects of 6 and 9 in WASH and Administration respectively. It can also be seen that Tarkwa and Obuasi District Assemblies completed 73 and 62 projects respectively. This means that Prestea Huni Valley has the highest number of completed Mineral Development Fund projects. Aggregating the figures, revealed that 61 WASH and 60 education projects were completed by the three District Assemblies. On the other hand, a lower figure of 48 and 42 projects were successfully completed by the District Assemblies in economic and administration

categories. Apart from the educational projects, the variation in the number of projects undertaken by the District Assemblies in other project areas was minimal.

The total expenditure of Tarkwa District on economic, education, WASH and admin projects were GH₵1,299,974.95, GH₵1,008,731.32, GH₵2,821,776.92, GH₵1,734,769.19 respectively. The Prestea Huni Valley assembly spent a total amount of GH₵2,118,240.81, GH₵2,165,997.79, GH₵2,654,190.89 and GH₵1,976,271.08 on Mineral Development Fund economic, education, WASH and administration projects respectively. The Obuasi District Assembly made huge investments in all four programme categories but it is worth to note that education projects received the largest share. The Obuasi District Assembly made a total expenditure of GH₵4,098,846.00 and GH₵3,390,472.78 on education and economic projects. The Assemblies together made a total spending of GH₵6,808,688.54 on projects in the economic category and spent an amount of GH₵7,273,575.11 on educational projects over the period. The three District Assemblies spent a total amount to the tune of GH₵24,404,947.44 out of the GH₵46,873,726.14 Mineral Development Fund received.

Some of unrelated expenditure items made by Tarkwa District Assembly included construction and rehabilitation of assembly office, Purchase of Mazda pick-up and Toyota vehicles and contingency. Some of the unrelated projects undertaken by Prestea Huni Valley District include Assembly office complex, construction of a 6 unit Guest House for Prestea Huni Valley District Assembly, construction of community centre at Nsuaem,

Palace for Petepom Divisional Stool, procurement of household items for District Assembly phase I & II. Some of the projects unrelated to mitigating the harmful effects of mining implemented by Obuasi District Assembly were the construction of the District Chief Executive's two storey bungalow, construction of entrance arc, other miscellaneous commitments and giving a grant to Adansi East District Assembly.

A list of communities hosting mining operations and therefore classified as affected communities in the respective Districts were obtained from all the three District Assemblies upon request. A close examination of the list and comparing it with communities in which the various Mineral Development Fund projects were done revealed that most of these communities have not benefitted from any Mineral Development Fund project undertaken by these Assemblies. It rather came out that communities far away from the operational areas of the mines and therefore not affected at least directly were the main beneficiaries of the Mineral Development Fund projects. The finding was consistent with Fasano (2000) who found that frequent changes in fiscal regimes and departure from intended objectives especially those relating to spending have resulted in some funds being less effective.

Direct logistic regression was performed to assess the influence of a project input, project output and project efficiency on the dependent variable; effective or ineffective. The full model was statistically insignificant for Tarkwa District Assembly, $\chi 2$ (3, N = 73) = 2.810, p > .05.

Direct Logistic Regression was employed to assess the effects of project input, project output and project efficiency on the dependent variable; effective or ineffective. The full model was statistically insignificant for Prestea Huni Valley, $\chi 2$ (3, N = 76) = 1.408, p > .05.

Direct Logistic Regression was also performed to assess the effect of project input, project output and project efficiency on the dependent variable; effective or ineffective. The full model was statistically significant for Obuasi District Assembly, $\chi 2$ (3, N =62) = 9.60, p< .05 (p=.022).

5. Factors affecting effectiveness of infrastructure projects

These factors were those that have an influence on the achievement of the objectives of the project. The unit heads and their assistants ranked the factors affecting Mineral Development Fund infrastructure projects in order of importance as adequacy of funding, adequacy of plans and specifications, project manager competency/experience, political influence, constructability, risk identification and management, project manager commitment and involvement, budget updates, realistic obligations/ clear objectives, owner's commitment to established schedules, economic risks, and owner's involvement and frequent feedback.

The CEOs, Project Managers on the other hand ranked the factors affecting Mineral Development Fund infrastructure projects in order of importance as adequacy of funding, adequacy of plans and specifications, political influence, realistic obligations/ clear objectives, risk identification and management, project manager competency/ experience, constructability,

owner's involvement and frequent feedback, economic risks, project manager commitment and involvement, budget updates, and owner's commitment to established schedules and budget.

The unit heads and their assistants ranked political influence fourth and included Project Managers competence in the first five factors whilst the CEOs and the Project Managers ranked political influence third and did not include project manager's competence in the first five. The factors ranked by both participants were important at the initiation and planning stages of the project (early stages) life cycle.

6. Impact of the Mineral Development Fund programmes

One key impact of the Mineral Development Fund programmes in the affected communities is the facilitation of economic activities in the communities. Major programmes including the construction of 20 market sheds, the construction of 30 market stores, the construction of a 10-unit store building, pavement of lorry parks, and pavement of markets have facilitated economic activities in the study area. The beneficiaries are now more able to engage in alternative livelihood activities which are generating additional income for the families. This has enhanced living standard of the members of the beneficiary communities. One of the most important impacts of the Mineral Development programmes was in the area of improvement in sanitation situation in the area. Programmes targeting improvement in sanitation featured prominently in the activities of the District Assemblies. Among these projects were the evacuation of refuse, rehabilitation of 7

damaged refuse containers, procurement and distribution of refuse containers on District wide basis and evacuation of refuse to final disposal site. Another prominent impact of the Mineral Development Fund was improved access to education and students' performance. The District Assemblies invested heavily in programmes such as the renovation of a 2 storey, construction of a 4-unit classroom, a 4 unit KG block, 3 unit classrooms in several communities, a 2 unit kindergarten, re-construction of 5 unit classroom block, and rehabilitation of a 3 unit classroom, a 6 unit classroom and skill training for women groups and people with Disability and support for five girls in skills development in male dominated jobs. As a result of these projects, members of the beneficiary communities have acquired relevant knowledge and skills, to become enlightened, capable and functional in society. Among the Mineral Development Fund programmes impacting the lives of the mining affected communities were projects aimed at improving access to portable water and reduction in water-borne diseases. In providing solutions to the scarcity of portable water as a consequence of mining activities in the community, the Assemblies applied part of their share of the Mineral Development Fund for the drilling and construction of small town water systems, drilling and construction of boreholes in 8 communities, drilling and construction of 4 boreholes, one overhead water facility, rehabilitation of 19 boreholes, 6 hand dug wells. These projects have enabled members of the beneficiary communities to access clean drinking water, reduced the time spent getting water for the home and reduced water borne diseases culminating in healthier society. One of the impacts of the Mineral

Development Fund programmes on the mining host communities was improved access to healthcare. In an effort to provide good service to clients needing medical care, there were rehabilitation of hospital vehicle, supply of sanitary tools and cleaning materials, procurement and supply of 20 beds and bed lockers and 20 mattresses for Health Centres. Many communities in the study area were without health facilities and therefore have to travel long distances to access medical care and attention especially in cases of pregnancy and child birth, but through the Mineral Development Fund two CHPS compounds were provided. The improvement and provision of these facilities helped in giving prompt attention to patients, provision of both ante and post natal care to women and reduction in general mortality.

As to the issue of the real impact of the Mineral Development Fund programmes, the situation is mixed feelings and reactions from the members of the affected and beneficiary communities. At one extreme were people who do not know of the existence of the Mineral Development Fund and at the other extreme were people in the affected communities, were affected themselves and knew of the existence of the Mineral Development Fund but do not benefit from even a single project carried out with the Mineral Development Fund. The Mineral Development Fund programmes have impacted the lives of some communities whiles in some communities the impact was minimal. The impact of the projects could have be felt more if these projects were concentrated in the communities hosting mining operations and if more WASH and economic projects were implemented. A reduction in the number of administration projects would have freed more

resources going into the WASH and into the affected communities rather than in the unaffected communities.

Conclusions

The following conclusions were drawn from the study:

1. The negative socio-cultural, economic and environmental of mining which created the context that led to the establishment of the Mineral Development Fund in the mining districts of Ghana still exist and thus makes the relevance of the Fund even more crucial to the development of the affected local communities.
2. The trend of funding have increased since the establishment of the Mineral Development Fund but government has recently granted some mining companies development and tax concessions which is likely to affect Mineral Development Fund to the District Assemblies.
3. The District Assemblies add the Mineral Development Fund to internally generated fund (IGF) and using it for anything the Assembly deemed fit.
4. Apart from the delays in the disbursement of the Mineral Development Fund, the beneficiary Districts sometimes actually received less Mineral Development Fund in some periods than the disbursement from the Office of the Administrator of Stool Lands.
5. Many of the decisions on the collection, disbursement and management of the Mineral Development Fund were at the

discretion of the officers at the government agencies concerned especially those at the District Assemblies.

6. The Mineral Development Fund was managed through the District Assembly structure for the administration and development of the entire District and not just the affected communities. The District Assembly structure is prone to political manipulation and poor involvement of communities in the analysis, selection and implementation of Mineral Development Fund projects.
7. The District Assemblies do not have effective structures for identifying the effects of mining on the host communities and as such do not depend on any environmental impact assessment studies to inform and guide their Mineral Development Fund project activities.
8. The Mineral Development Fund projects undertaken by the District were classified as effective with respect to water, health, sanitation, education and economic projects which are relevant in achieving the objectives of setting up the Mineral Development Fund.
9. The efficiency in the use of the Mineral Development Fund was however generally low due to misappropriation of the Fund on programmes having nothing to do with mitigating the harmful effects of mining on affected communities, and carrying out projects in communities not affected by mining activities at the neglect of heavily affected communities.

10. The key factors identified as affecting effectiveness of Mineral Development Fund infrastructure projects in the Districts in order of importance by the participants were adequacy of funding, adequacy of plans and specifications, project manager competency/ experience, political influence, constructability, risk identification and management.
11. The factors ranked by both participants were important and relevant mostly at the initiation and planning stages of the project (early stages) life cycle.
12. The Mineral Development Fund projects undertaken by the Districts Assemblies made some level of impact on the beneficiaries especially with regards to WASH, education and economic programmes on host communities.
13. The likely effects of the Mineral Development Fund can be improved if the Districts minimize misappropriation of the Mineral Development Fund on frivolous and unrelated projects such as mega office buildings, community centres, residential accommodations, guesthouses, chief's palace and welcoming arc.

Recommendations

From the findings and conclusions, the following recommendations were made:

1. The Government of Ghana should maintain the Mineral Development Fund and strengthen it with appropriate and effective policies to reverse the negative socio-economic, cultural and environmental effects of mining in affected communities in Ghana.
2. A legal instrument should be promulgated by Parliament laying out clear guidelines on collection, disbursement and management of the Mineral Development Fund.
3. The Ghana Revenue Authority tax assessment and revenue collection division should strengthen its monitoring system to ensure that the mining companies pay the right royalties on time to improve revenue collection.
4. Measures should be adopted by the Ministry of Mines and Natural Resources to ensure that the Mineral Development Fund receipts at the District Assemblies are in tandem with disbursements from the Office of the Administrator of Stool Lands.
5. The Government should ensure that terms under the development and tax concession agreements granted to mining companies is strictly adhered to.
6. To deal with the deficiency of the District Assembly structure in managing the Mineral Development Fund, the Government of Ghana should set up a separate statutory agency to be solely responsible for the management of the Mineral Development Fund at the District level.

7. The District Assemblies in mining areas should collaborate with appropriate agencies such as the Environmental Protection Agency for regular risk assessment of the effects of mining on local communities and develop appropriate strategies to mitigate them.
8. The District Assemblies should involve key stakeholders especially the affected communities in all stages of the project planning development, execution and close out cycles to enhance the process and quality of projects appropriate and relevant to the Mineral Development Fund.
9. To be efficient and effective, the District Assemblies should increase their outputs especially in water, health, sanitation, education and economic projects.
10. The Ministry of Local Government and Rural Development should apply the appropriate legal sanctions on officials of the District Assemblies who collaborate to misappropriate and waste the Mineral Development Fund.
11. To sustain the effectiveness of the Mineral Development Fund in the mining districts, the affected Districts should give particular attention to adequacy of funding, adequacy of plans and specifications, political influence, clear objectives, constructability, risk identification and management, project manager competency/ experience.
12. The Districts should put in measures to minimize the influence of politics on projects especially during the selection of contractors.

13. To increase the effect of the Mineral Development Fund, the District Assemblies should concentrate more of the projects in education, WASH and economic areas and in the affected communities.

Suggestions for Further Studies

1. Undertake a study on factors affecting the effective management of other sources of funding to the District Assemblies for example the District Assembly Common Fund.

2. Do a study to compare Mineral Development Fund beneficiary District and non beneficiary in terms of number and quantum of projects implemented within a specific period.

3. Carry out a study to access the management of the 10% of the mineral royalties which is shared among mining related public institutions.

4. Undertake a study to find out whether the mining companies are paying the correct amount of royalties to the Government of Ghana.

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APPENDICES

A. In order to examine the context for establishing the Mineral Development Fund, focus group discussions, personal interview, historic accounts and research records were used to collect relevant data. The checklist for the focus group discussions, personal interview for DA Staff, historic accounts and research records include:

a. The existence and intensity of mining activities in the area
b. What is the effect of the mining activities on the land/ soil?
c. What is the effect of the mining on the water bodies?
d. What is the effect of the mining on the air and vegetation?
e. What is the result of the above effects of mining on the health economic and socio-cultural life of the people?

B. In assessing the trend of funding of the Mineral Development Fund programmes, a performance audit report on the management of the MDF was collected from the Auditor General's Department (2013), reconciliation report (2007- 2015) from GHEITI, records of royalty disbursements from the OASL at the regional level to the respect Districts, At the DA dedicated bank account records, Procurement and contract documents, MTDP were examined. These documents served as a check on each other and therefore enhancing the validity and quality of the final data collected and analysed.

C. In order to examine both the structure and process of effective MDF management, the study made use of personal interview, FGD, organogram of

the DA and the Local Government Act, 1993 (Act 462). The interview guides for DA staff and for affected communities FGDs are as follows:

a. Knowledge of the existence of MDF in the District Assembly.
b. Awareness of projects done in the community with the MDF.
c. Processes involved in project initiation stage
d. Processes involved in the project planning stage: (i) Stakeholders involved in identification the problem (ii) Stakeholders brainstorming to develop alternative solutions. (iii) Stakeholders appraisal and selection of the best alternative. (iv) Implement and monitoring with stakeholders' participation. (v) Deviations and corrective actions.
e. Processes during the project execution and monitoring stage.
f. Processes undertaken during project closure and handing over to beneficiary communities.

D. To ascertain the efficient and effective management of the MDF, the study depended on MTDP, MDF bank account records, contract documents, procurement documents and project progress reports. These records were obtained from the District Assemblies.

E. In order to examine factors affecting effectiveness of the MDF infrastructure projects, the study used a validated questionnaire adapted from research work done by Chua, et al. (1999), Hwang and Lim (2012), Kog and Loh (2012). The items cover all aspects of a project such as project initiation phase, project planning phase, project implementation and close-out stages.

Questionnaire

This study is part of the requirements for the award of PhD degree in NGO Management and Community Development Studies at the Department of Agric Economics and Extension of the University of Cape Coast.

The research is about the Factors Affecting Effective Management of the Mineral Development Fund in three selected Districts in Ghana. The result of the study would help make appropriate recommendations to management of Districts and other stakeholders during the conceptual, planning, implementation, monitoring and evaluation stages of the projects and programmes in order to achieve the objectives for establishing the MDF.

I would like to assure you that confidentiality of your responses is guaranteed.

Please rank the following factors affecting effectiveness of infrastructure projects in order of importance with 1 representing the LEAST important and 12 the MOST important. Please write your preferred number against each factor in the box provided.

1.	Owner's commitment to established schedules and budget	
2.	Budget updates	
3.	Project Manager competency/experience	
4.	Risk identification and management.	
5.	Adequacy of plans and specifications	
6.	Constructability	
7.	Adequacy of funding	

8.	Owner's involvement and frequent feedback	
9.	Economic risks	
10.	Project Manager commitment and involvement	
11	Realistic obligations/clear objectives	
12	Political influence	

F. In order to assess the impact of the MDF on the mining affected communities, the data collection tools used were key informants interview and Focus Group Discussions, The checklist to guide the FGD includes the following questions:

a. Did the community benefit from any project from the DA?
b. What was the situation before the intervention of the MDF project?
c. What is the impact of the project on water supply in the community?
d. What is the impact of the project on sanitation in the community?
e. What is the impact of the project on the health people?
f. What is the impact of the project on education of the youth?
g. What is the impact of the project on economic activity?
h. Were the community members involved in all stages of the project?
i. If yes, are you satisfied with the level of involvement?
j. If no, how would you want to be involved?
k. What is the impact of the MDF projects on the standard of living?

G. In order to collect relevant secondary data which contained useful information in answering the research questions the following checklist was used.

1. Auditor Generals performance audit report
2. GHEITTI reports
3. Medium Term Development Plans
4. Population and Housing Census
5. Contract documents
6. Project progress reports
7. Procurement documents
8. Contract documents
9. Local Government Act, 1993 (Act 462)
10. Income and expenditure accounts

H. A checklist of collecting relevant primary data for the study includes

1. Focus Group Discussion
2. Survey of DA Assembly staff and CEOs, Project Managers
3. Interview with DA Assembly Staff
4. Key informant interview