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ASSESSING LIVELIHOOD OUTCOMES AND IMPLICATIONS OF THE OIL AND GAS INDUSTRY IN THE ELLEMBELLE DISTRICT, WESTERN REGION OF GHANA

BY

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DECLARATION

I, Angela Korkor Apperkon, do hereby declare that except for the references cited, which have been duly acknowledged, this thesis titled "**Assessing Livelihood Outcomes and Implications of the Oil and Gas Industry in the Ellembelle District, Western Region of Ghana**" is the product of my own research work in the Institute for Environment and Sanitation Studies, University of Ghana, Legon. This thesis has never been published or submitted either in part or whole for another degree in this institution or elsewhere.

---------- JANUARY 31, 2023

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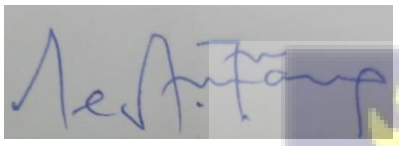
CERTIFICATION

I hereby certify that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on the supervision of the dissertation laid by the University of Ghana, Legon.



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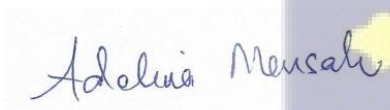

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DEDICATION

I dedicate this thesis to my parents; my father, Mr. Benjamin Kwami Apperkon; my mother, Mrs. Faith Adjoa Adonu-Apperkon; and to my lovely siblings, Priscilla, Keziah, and Michael Apperkon.

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LIST OF ABBREVIATIONS AND ACRONYMS

AU: African Union

CARE: Cooperative for Assistance and Relief Everywhere

CO: Carbon Monoxide

DFID: Department for International Development

EKC: Environmental Kuznets Curve

EPA: Environmental Protection Agency

FAO: Food and Agricultural Organization

GGCL: Ghana Gas Company Limited

GHGs: Green House Gases

LC: Local Content

LCPs: Local Content Policies

LF: Livelihood Framework

LMIC: Lower Middle-Income Country

NGO: Non-Governmental Organization

OG: Oil and Gas

OPEC: Organization of Petroleum Exporting Countries

PHH: Pollution Haven Hypothesis

PM: Particulate Matter

SDG's: Sustainable Development Goals

SIDS: Small Island Developing States

SLA: Sustainable Livelihood Approach

SLF: Sustainable Livelihood Framework

SPSS: Statistical Package for Social Sciences

SRQs: Self Report Questionnaires

SSA: Sub Saharan Africa

UNCED: United Nations Conference on Environment and Development

UNFCCC: United Nations Framework Convention on Climate Change

UNDP: United Nations Development Programme

WECD: World Commission on Environment and Development

WHO: World Health Organization

ABSTRACT

This research assessed the impact of the Oil and Gas industry on livelihood outcomes of people in the Ellembelle District in the western end of Ghana. Specifically, it assessed the current livelihood outcome such as food security, job security, health and determined respondent's perception on the impact of oil and gas industry and its activities on their livelihood outcomes. Data was collected from 400 respondents within 10 communities in the study district using survey questionnaires and interview guides from focussed group discussions and key informants within the Baku, Ngalekpole, Atuabo, Ngalekyi, Krisan, Anokyi, Sanzule, Bakanta, Eikwe, and Asem Nda communities. The data generated was analysed using Statistical Package for Social Sciences (SPSS) and presented by use of descriptive statistics such as tables, charts, graphs, and diagrams. Interviews were transcribed and analysed into thematic areas. The study revealed that 53% of the participants perceived the oil and gas industry to have generally impacted the locals in the communities positively. The study further revealed that the intention to migrate was a significant predictor of livelihood outcome as the respondents migrated in search of greener pastures. The study observed a significant relationship between the impact of the oil and gas industry activities on respondents, their intention to migrate, their level of education, occupation and their livelihood outcomes.

For instance, respondents with a negative livelihood outcome are more likely to have reported a negative impact from the oil and gas industry. The study recommends that the 1994 EPA Act (Act 490) be amended in order to effectively monitor and regulate heavy-polluting oil industries.

Key words: Oil and gas industry, livelihood, livelihood outcomes, economic impact, Ellembelle District, intention to migrate.

CHAPTER ONE

1.0 INTRODUCTION

This chapter presents the general overview of the study. It consists of subsections on the problem statement and rationale of the study. It also includes the research objectives and their corresponding research questions and highlights the organization of the study.

1.1 Background of Study

The oil and gas industry is one of the most important sectors in the global economy, providing energy, income, and employment for millions of people. The oil and gas industry has also created employment opportunities for the local people, both directly and indirectly. The upstream oil sector in Ghana employs around 7,000 Ghanaians, as reported by McQuinn and Sallah (2022). The industry also supported about 114,000 jobs in other sectors, such as construction, transportation, and services (Ministry of Finance, 2020). The industry has also stimulated the development of local content and local participation, through policies and regulations that require the use of local goods and services, the employment and training of local workers, and the transfer of technology and know-how (International Trade Administration, 2022). However, the industry also has significant environmental and social impacts, especially for the communities living near the extraction sites. The industry can affect the livelihoods of these communities in various ways, such as by creating or destroying jobs, changing land use and access, polluting water and air, causing health problems, and influencing local governance and institutions (Statista, 2023).

Livelihood Outcomes

Livelihood outcomes are the achievements or outputs of livelihood strategies, such as levels of food security, income security, health, well-being, asset accumulation and high status in the

community (FAO, 2008). Unsuccessful outcomes include food and income insecurity, high vulnerability to shocks, loss of assets and impoverishment. Livelihood outcomes are influenced by the vulnerability context, the livelihood assets, the institutions, and the policies that shape the livelihood opportunities and constraints of the people (ADB, 2017). Livelihood outcomes are influenced by various factors, such as the vulnerability context, the livelihood assets, the institutions, and the livelihood strategies of the households. The vulnerability context refers to the unpredictable events and trends that can affect the livelihoods of the households, such as shocks, seasonality, and critical trends. The livelihood assets refer to the resources and capabilities that the households have or can access, such as human, social, natural, physical, and financial capital. The institutions refer to the formal and informal rules and organizations that shape the livelihood opportunities and constraints of the households, such as laws, policies, cultures, and markets. The livelihood strategies refer to the activities and choices that the households make to achieve their livelihood outcomes, such as diversification, migration, and adaptation (Peter Sherwin Cole, 2020).

Implications of the Oil and Gas Industry on Livelihood Outcomes

The oil and gas industry can have both positive and negative implications on the livelihood outcomes of the households living near the extraction sites. The positive implications include the creation of jobs, income, and infrastructure, the provision of social services and corporate social responsibility, and the generation of government revenue and foreign exchange (International Energy Agency (IEA), 2020). The negative implications include the loss of land, livelihoods, and environment, the pollution of water, air, and soil, the health problems and diseases, and social conflicts and violence (Independent Newspaper, 2023; Mahmood et al., 2023; Naimoli & Ladislaw, 2019).

The implications of the oil and gas industry on livelihood outcomes depend on various factors, such as the scale, location, and duration of the extraction activities, the type and quality of the resources and technology used, the governance and management of the industry and the revenues, the participation and consultation of the affected communities, and the compensation and mitigation measures adopted (Mahmood et al., 2023). The implications also vary across different groups, households, and individuals, depending on their assets, institutions, strategies, and outcomes (Mahmood et al., 2023; Nkem et al., 2022). Some groups may benefit more than others, while some may bear more costs than others. Some groups may also have more voice and power than others, influencing the distribution and allocation of the benefits and costs (KPMG International, 2022).

The Ghanaian Context

The case of Ghana is an interesting and relevant example of the oil and gas industry and its implications for the livelihood outcomes of the people. Ghana is one of the fastest-growing economies in Africa, with an average annual GDP growth rate of 6.8% between 2010 and 2019 (International Trade Administration, 2022). The country is also one of the most stable and democratic countries in the region, with peaceful transitions of power since 1992 (Wikipedia, 2023a). The country has made significant progress in reducing poverty and improving human development, achieving the Millennium Development Goal of halving extreme poverty by 2015 (Ghana Statistical Service-GSS, 2020). The oil and gas industry has played a key role in Ghana's economic growth and development since the discovery of the Jubilee Oil Field in 2007. The Jubilee Oil Field is the largest oil field in Ghana, located about 60 km off the coast of the Western Region. The field has an estimated reserve of 1.5 billion barrels of oil and 500 billion cubic feet of gas (Wikipedia, 2023). The field started production in 2010 and reached its peak production of 120,000 barrels per day in 2014 (Tullow Oil, 2015). The field is operated by a consortium of international and national companies, led by Tullow Oil, with the Ghana

National Petroleum Corporation as the main partner. The oil and gas industry has generated significant revenues for the government, amounting to about $5.7 billion between 2011 and 2019 (Aglina, 2021). The government has allocated these revenues to four priority areas: debt repayment, stabilization fund, heritage fund, and annual budget support. The annual budget support is further divided into four sectors: agriculture, education, health, and roads and other infrastructure. The government has also established the Petroleum Revenue Management Act (2011) and the Public Interest and Accountability Committee (2011) to ensure transparency and accountability in the management of the oil and gas revenues. One of the regions that has been affected by the oil and gas industry in Ghana is the Western Region, which hosts most of the offshore oil fields and related infrastructure. Although the region is also rich in other natural resources, such as gold, cocoa, and timber, and has a diverse population of about 2.4 million people, belonging to different ethnic groups and religions, it also has a high poverty rate of 21.2%, compared to the national average of 18.8%, and faces various development challenges, such as poor infrastructure, low education, and health outcomes, and conflicts over land and resources (Wikipedia, 2023c).

The oil and gas industry has also had its impact both socially and environmentally for the local communities in the region, especially in the six coastal districts, viz, Ellembelle, Jomoro, Nzema East, Ahanta West, Sekondi-Takoradi, and Shama. The Ellembelle District is one of the 22 districts in the Western Region, and one of the six coastal districts that are directly affected by the oil and gas industry. The district has a population of about 87,000 people, mostly engaged in agriculture, fishing, and petty trading. The district has a low human development index of 0.49, and a high poverty incidence of 35.7%. The district also suffers from environmental degradation, land disputes, and social conflicts (Twum-Baah Crystabel, 2020).

Literature Gap

The literature on the impacts of the oil and gas industry on the livelihoods of local communities is extensive and diverse, covering different countries, regions, and contexts. However, most of the studies focus on the negative impacts, such as environmental degradation, social conflicts, and the resource curse. Few studies examine the positive impacts, such as economic growth, social development, and the resource blessing. Moreover, most of the studies are descriptive and qualitative, rather than analytical and quantitative. There is a need for more empirical and rigorous research that can measure and compare the different impacts of the industry on the livelihood outcomes of the households, and identify the factors that influence these impacts (DFID, 2008; Saha et al., 2023; Timothy R. Frankenberger, 2001).

1.2 Problem Statement

The oil and gas industry is a major driver of economic development and social change in Ghana, especially in the Western Region, where most of the offshore oil fields and related infrastructure are located (Amoako et al., 2022; Bawumia & Halland, 2017; Cicowiez & Lofgren, 2017). However, the industry also poses significant challenges and risks for the environment and the livelihoods of the local communities, who depend on agriculture, fishing, and natural resources for their survival and well-being (Acheampong Michael, 2018; Adusah-Karikari, 2015; Agyei et al., 2015) (Boohene & Peprah, 2011). The Ellembelle District is one of the coastal districts in the Western Region that has been directly affected by the oil and gas industry, both positively and negatively (Ahenkan et al., 2017; Osei-Tutu et al., 2018). The district has experienced increased employment, income, and infrastructure, as well as reduced land, livelihoods, and environment, as a result of the industry. The district has also witnessed social conflicts, health problems, and migration issues, as a consequence of the industry.

Despite the importance and relevance of the oil and gas industry for the livelihoods of the communities in the Ellembelle District, there is a lack of empirical and comprehensive research that can assess the livelihood outcomes and implications of the industry in the district. Most of the existing studies on the impacts of the oil and gas industry in Ghana are either macro-level or sectoral, focusing on the national or regional economic, environmental, or social aspects of the industry (Ablo, 2018; Adusah-Karikari et al., 2014; Akakpo, 2015; Annan, 2011; Asante et al., 2018; Kusi et al., 2018). Few studies have examined the micro-level or holistic impacts of the industry on the livelihoods of the households and individuals in the affected communities, especially in the Western Region (Adu-Gyamfi, 2017; Agyemang, 2017; Osei-Tutu et al., 2018). Moreover, most of the studies have adopted a descriptive and qualitative approach, rather than an analytical and quantitative approach, to measure and compare the different impacts of the industry on the livelihood outcomes of the households (Adu-Gyamfi, 2017a; Amoah P. A., 2019; Egyir, 2012; Ovadia et al., 2020; Owusu et al., 2023). There is also a gap in the literature on the factors that influence the livelihood outcomes and implications of the oil and gas industry on the households, such as the assets, institutions, policies, and strategies of the households and the industry (Ahenkan et al., 2017; Amoako-Tuffour et al., 2016; Amoako et al., 2022; Boohene & Peprah, 2011).

Therefore, this study aims to fill this gap by conducting a mixed-methods research that can assess the livelihood outcomes and implications of the oil and gas industry in the Ellembelle District, Western Region of Ghana. The study will use the sustainable livelihoods framework as a conceptual and analytical tool to understand and evaluate the complex and dynamic relationships among the different elements of the livelihood system of the households in the district, and how they are affected by the oil and gas industry (DFID, 1999b; Scoones, 1998). The study will also use a participatory and inclusive approach to involve the stakeholders and beneficiaries of the research in the design, implementation, and dissemination of the study

(Chambers, 1994; Cornwall & Jewkes, 1995). The study will contribute to the academic and practical knowledge on the impacts of the oil and gas industry on the livelihoods of the local communities, and provide useful insights and recommendations for the policymakers, practitioners, and civil society actors, who are involved in the governance and management of the oil and gas industry and the promotion of sustainable development in the region.

1.3 Research Questions

Based on the problem statement, the following questions are expected to be answered by this study.

1. What are the community's perception of the impact of Oil and Gas industry in the study areas?
2. What is the current livelihood outcome (food security, job security, health) within the study areas?
3. What is the association between respondents' perception on the Oil and Gas exploratory industry and livelihood outcomes?
4. What is the migration intension of members within the communities?
5. What is the role of migration intension as a mediator variable between the oil and gas exploratory activities and livelihood outcomes in the study.

1.4 Research Objectives

1.4.1 Main objective

The main objective of this research is to assess how livelihood outcomes of communities in the Ellembelle District have been influenced by the Oil and Gas exploratory industry.

1.4.2 Specific objective

The following specific objectives were set to accomplish the main objective:

1. To determine respondents' perception on the impact of oil and gas industry on livelihood outcomes in the study areas.
2. To assess current livelihood outcome, food security, and job security within the study areas.
3. To determine the migration intension of members within the communities and assess the role of migration intension as a mediator variable between the oil and gas exploratory activities and livelihood outcomes in the study areas.

1.5 Justification of the Study

The 'natural-resource curse' is plaguing developing countries and Ghana is no exception. Empirical data has demonstrated that contrary to expectations, the discovery of oil and gas in Ghana and subsequent extraction has negatively impacted the livelihood of local communities (Acheampong et al., 2023; Adu-Gyamfi, 2017b). This is due to land use changes caused by onshore and offshore exploration activities. Therefore, to address the mismatch between high expectations and reality of oil and gas development in developing countries, this study sought to investigate the relationship between oil and gas exploration and livelihood outcomes among communities in the Ellembelle District of the Western Region of Ghana. A better understanding of this relationship is essential in creating awareness and providing evidence-based data for policy making that would alleviate poverty and enhance sustainable use of natural resources.

The Covid-19 pandemic, climate change and geo-political tensions globally and within the sub-region has increased the vulnerability of poor-rural communities to socio-economic and environmental shocks. Impoverished people often over-exploit their natural resources for sustenance and have the least capacity to adapt (Rapport, 2007). At the same time, development activities such as oil and gas exploration limit the ability of ecosystems to provide services such as food, clean air, and water. Over-exploited communities cannot provide sustainable livelihoods and expose humans to severe health risks (Charron et al., 2012). This study can

also inform targeted mitigation and adaptation measures relevant to the local conditions. Moreover, the findings of this study will be useful to environmental scientists, practitioners and development partners interested in natural resource use and livelihood outcomes. This study also reflects local actions necessary in meeting our obligations under the Paris Agreement and in achieving the regional aspirations envisaged under the African Union (AU) Agenda 2063 (Moono, 2021) and the United Nations Sustainable Development Goals (SDG's) (UNEP, 2020).

1.6 Organization of the study

This study is organized in six broad chapters. In chapter one, the background of the study is discussed. It includes sub-sections on problem statement, the research objective, and its coherent questions and the rationale that supports the study. In chapter two, the empirical literature on oil and gas exploration in Sub-Saharan Africa and Ghana and its link to the development, challenges, and impacts of oil discovery on the environment and livelihoods of fishing and farming communities. The reviews also focus on policies and actions that have been put in place to regulate and protect communities by the government and the UN, as well as the theoretical and conceptual underpinnings of the study, the sustainable fisheries and livelihood approach and the sustainable livelihood framework. The third chapter of this study consists of a general methodology, the study area, and the research design as well as a guide on how the objectives will be achieved. The general findings and results related to the objectives of the study are presented in chapter four. Chapter five presents the discussions concerning the research findings and results. Chapter six presents the conclusions based on the findings and highlights some policy recommendations.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

A study to assess the relationship between the Oil and Gas exploratory industry and livelihood outcome is presented. A review of literature in livelihood diversification, household strategies and rural livelihood diversification communities, livelihood and natural resources, theory of change is presented. The review dives into the essential elements found in livelihood diversification and some common strategies associated with the rural communities in most developing countries. The review will also adapt a theoretical framework on livelihood to assess its relationship with the Oil and Gas exploratory industry. It also includes sections on a conceptual framework that was adopted from the theoretical framework.

2.2 Definition of Terms

The key terms used in this study are defined and conceptualized below.

This study will adopt the Chambers & Conway (1992) definition of livelihoods as the assets required in order to earn a living. Livelihoods are often determined by human capital and material resources. Livelihood strategies are specific activities that people engage in to earn a living (Tanle, 2015). In this study, migration has been conceptualized as both an adaptive strategy against environmental change and a livelihood strategy (Rademacher-Schulz et al., 2014). Livelihood outcomes refer to the impacts of livelihood activities (Tanle, 2015). The outcome can be positive, negative, or neutral. This study will consider livelihood outcome as either positive or negative. Positive livelihood outcomes infer better health, quality environment, and improved food security while negative livelihood outcomes imply decline in the three aspects.

2.3 Concept and definition of sustainable livelihood

The concept of sustainable development has been defined widely by various authors and proponents of sustainable development. In simple terms, livelihood is how individuals make a living. According to Bennett (2010) the most commonly cited definition of sustainable livelihood by the Department for International Development (DFID) emerged from an earlier definition by Chambers and Conway. They defined livelihood as;

> "A livelihood comprises people, their capabilities, and their means of living, including food, income, and assets. A livelihood is socially sustainable when it can cope with and recover from stress and shocks, and provide for future generations" (Chambers and Conway, 1992).

A more current definition of livelihoods used by development practitioners is a modification to Chambers Conway definition.

> "A livelihood comprises the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base." (DFID, 1999a).

People's decision on livelihood is centred around a framework with two objectives; First, it connects holistically the range of means by which rural residents survive within the environments in which they live. Second, it pays attention to the processes shaping these endeavours as well as the actions of institutions and people operating outside the communities under examination yet influencing how people try to survive. (Hebinck and Bourdillon, 2001). To Hebinck and Bourdillon, a framework for development raises the issues of ways by which rural people make a living. Again, they argue that frameworks lend itself to activities that institutions and individuals consider understanding the processes and complexities in a bid to

help people achieve a sustainable livelihood. Hebinck and Bourdillon, (2001) asserts that, the definition of livelihood by Chambers and Conway (1992) explains how people make use of their resources and assets to make a living. Nonetheless, livelihood occurs in varying contexts and individual's are constrained by vulnerabilities (i.e., poverty etc.) that limit their potential to make a living (Hebinck and Bourdillon, 2001).

The concept has now become a mainstay in what Robert Chambers, a British academic and development practioner, particularly refers to as 'putting the last first'. In view of this, associations, Governing bodies, and Organisations such as The United Nations Development Programme (UNDP), The Department for International Development (DFID), Cooperative for Assistance and Relief Everywhere (CARE) have adopted the framework and have included it in their programs. While the United Nations Conference on Environment and Development (UNCED) views it as "an integrating factor that allows policies to address development, sustainable resource management, and poverty eradication simultaneously", the Department for International Development (DFID) views it from the angle of how poor people understand their livelihood in response to poverty.

2.4 Department for International Development Sustainable Livelihood Framework

Many analytical tools exist for implementing sustainable livelihood in the development context. Carney (2003) puts it, the 'public face' as the DFID Sustainable Livelihood Framework has been the most used Livelihood Framework till date. In 1997, UK Department for International Development set up the Sustainable Development Framework (SLF). The main legal basis for the existence of DFID was the International Development Act 2002 which provides "assistance for the purpose of sustainable development or welfare and likely contribute to poverty reduction and humanitarian assistance" DFID (2008). The SLF has been used in varying contexts because it provides a multidimensional outlook on developmental issues. For instance, in the global south where economies are plagued with developmental

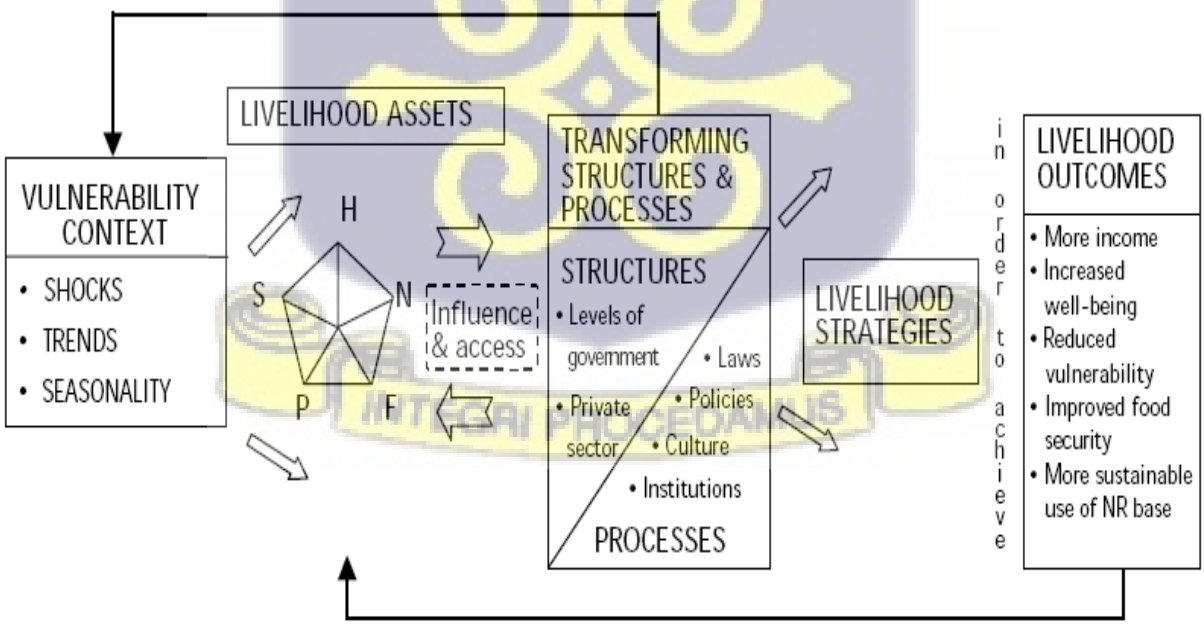
issues such as food insecurity because of poor agriculture and pockets of skyrocketing multifaceted poverty. Fahad *et al.*, (2022) identifies an objective of the SLF. To them, the SLF enables development practitioners to achieve a comprehensive understanding of a "real situation" of poor populations and propose livelihoods that will be sustainable through programme planning and processes. Regardless of how the SLF is used, its application is flexible and has the capacity to fit into specific contexts in a participatory manner with fundamental principles. Key emphasis of the approach are that it provides an alternate way of conceptualizing poverty while considering the poor livelihoods of poor societies in order to identify issues in specific contexts to reduce the incidence of poverty (Krantz, 2001). Key in the DFID SLF is the fact that there is an interaction between assets, the vulnerability contexts (i.e., local dynamics) policies and institutions Carney (2003).

To have an effective contribution, Krantz came up with the opinion based on his assessment on DFID that poor people must be given direct access to assets which will form the basis of livelihood. To him another area which needs to be strengthened is the availability of structures and process. These include policies and organizations that influence access to assets as well as their influence on livelihood strategies that are made available to people. Krantz (2001) proposed a poverty-focused principle which should be people centred, responsive and participatory, multi-Clevel, conducted in partnership, sustainable, and dynamic. He argues that sustainable livelihood approaches must be committed to fundamentals of poverty alleviation and eradication. DFID SL is not a representation of reality but rather it provides a broad and systematic way of understanding the challenges of livelihoods and how they are related. This is consistent with observations made by Carney. He argues that the framework does not adequately capture the reality of sustainable livelihood thinking neither does it provide sound methodologies on how to implement the approach (Carney, 2003). Furthermore, the sustainable livelihood framework makes no attempt to define what constitutes poverty since it is

multidimensional and context specific. To add on, observations made by Carney for a study carried out in Indonesia helped to identify the principal cause of poverty using the Livelihood Framework (LF). Nonetheless, he argues that the framework did not represent urban situations. He cites Carriere (2002) to redefine 'natural capital' to include issues like air quality, waste assimilation and protection from floods instead of a mere use of natural resource.

The application of Sustainable Livelihood (SL) has been well documented (Carney, 2003). They have been implemented in national-level planning, DFID country programme preparation, development of large-scale poverty eradication scenarios and structuring large-scale standard of living survey). Other areas include institutional analysis, sectoral reforms, policy process analyses and research.

Figure 1 *Department For International Development* ***Sustainable Development Framework***



Source: DFID Sustainable Development Framework (adapted from* (Carney, 1998)*)

2.4.1. Vulnerability context of sustainable livelihood

Generally, populations i.e., households, groups, and communities are not immune to stress and shocks in their quest to make a livelihood (Damas and Rayhan, 2004). All attempts to conceptualize and define livelihood have included vulnerabilities of populations. The vulnerability contexts exist in the external environment within which populations live. The availability of assets is usually influenced by trends, (i.e., population, resource, technology, governance and economic) shocks, (i.e., human health, natural, economic, conflicts and crop/livestock health) and seasonality of (production, prices, health, and employment opportunities) which populations have limited control over (DFID, 1999). The use of vulnerability does not necessarily suggest a negative livelihood outcome as argued. for instance, technological trends may prove to reduce the drudgery of work for the rural poor although they come with challenges such as affordability and maintenance i.e., assets. Nonetheless, vulnerability contexts highlight a more complex situation which is responsible for the negative livelihood outcomes of poor populations. Meanwhile, unstable livelihoods are more prone to stress and shocks, and poverty often makes it increasingly difficult to alter these conditions. Populations become vulnerable to threats when they are faced with limited capacity to cope as with rural poor.

2.4.2 Livelihood assets of sustainable livelihood

Assets are the tangible and intangible resources that are required to make a living. Livelihood assets are the resources that different households possess and forms the basis for which people construct their livelihoods. The livelihood asset portfolio referred to as capital is grouped into five categories: human, social, financial, natural and physical capital (DFID, 1999a). There is no attempt made to arrange these in any order of importance. For populations to achieve self-defined goal in making a livelihood sustainable, these livelihood assets are imperative to

consider. According to Krantz (2001) asset in the Sustainable Livelihood Framework is the most complex especially because there are intangible resources that cannot be measured.

This approach is based on the existing belief that the average person would require an asset in the form of resources for livelihood (Carney, 2003). "Assets are the building blocks of a sustainable livelihood" and this could cope with human challenges to make ends meet (DFID, 1999a). These assets, as interchangeably referred to as capital includes human capital, social capital, natural capital, physical capital and financial capital (Kollmair & Gamper, 2002). Each of these if provided averagely would help reduce poverty and enable sound livelihood. They reflect as an instrument or tools that respond to the physiological and esteem needs of an individual either fully or partially.

The human capital or asset involves skills, knowledge, and health. Physical capability forms part of a human asset. Social capital involves relationship with members, networks, and affiliations. Natural resources which is tangible in nature, is mainly accessible for direct usage by individuals. According to (Farrington et al., 1999) natural resources may be categorised into two which are stocks and environmental services. The stocks include resources generated from water or aquatic, soil or land, air or oxygen, forest whiles the environmental services are services derived from the stocks. In a wider sense, the natural resource as a means of livelihood is mostly adapted by the rural setting in an economy.

The physical asset could be finished goods like infrastructure, equipment, furniture etc. Financial assets are mainly savings, credit, earned income, pension etc. These may serve as an agent of change, in what is referred to as livelihood outcome (Keeley, 2001; Shankland, 2000). But before the changes could take place, two key structures namely institutional processes and livelihood strategies occur.

2.4.3 Transforming Structures and Processes of sustainable livelihood.

The institutional processes or "transforming structures" as espoused by (Kollmair & Gamper, 2002) represent the institutions, associations and policy makers that regulate the flow of asset. They may serve as governing bodies intended to set out and implement decisions that could affect livelihood in the long run. The role of these institutions is essential in checking the society against any alarming rate of degradation or pollution hence "Policy-determining structures" as seen in (ADB, 2017; Asian Development Bank, 2017) may seek to enforce policies in access to natural resources like the felling of trees, using chemicals for fishing and mining of minerals. The institutional process may take into key consideration the government and private sectors forming a structure and processes like the laws, policies, and culture.

2.4.4 Livelihood Strategies for sustainable livelihood

The livelihood strategy is adopted to stimulate an outcome. Livelihood strategies are influenced at the national level, the firm and individual level (DFID, 1999a, 2008). It comprises of these bodies making strategies to achieve an outcome. Evans et al., (2006) emphasised that stakeholders and groups are influenced by issues and problems. These may want to satisfy their conditions to arrive at a target, which many vulnerable in societies are aiming at.

2.4.5 Livelihood outcomes for sustainable livelihood

Livelihood outcomes is borne by livelihood strategies attained. This stage of the livelihood process is the final stage at which livelihood is sustained. This may include more income (e.g. cash), increased well-being (e.g. non material goods, like self-esteem, health status, access to services, sense of inclusion), reduced vulnerability (e.g. better resilience through increase in asset status), improved food security (e.g. increase in financial capital in order to buy food) and a more sustainable use of natural resources (e.g. appropriate property rights)" (Kollmair & Gamper, 2002). These outcomes may help to reduce shocks and stresses if livelihood is properly sustained. Livelihood outcomes can be positive or negative and can be influenced by

a myriad of factors referred to as transforming structures and processes in the DFID sustainable development framework. In relation to this study, oil and gas industry are represented by both the private and government sector and are managed by policies and institutions whose actions and activities affect livelihood of people in the neighbouring communities.

2.5 Oil and Gas exploration and development implications

The discovery of oil in the 19th century promised to boost African economies through the significant revenue from trade (Adeola *et al*., 2022). This was expected to reverse fortunes and uplift millions from poverty through socio-economic development. Mohammed *et al.*, (2022) described the contrasting outcomes of oil and gas discovery in Ghana as 'rising expectations and dying hope.' The study observed that in over a decade since the discovery of fossil fuels, there was little significant development outcome. This situation in developing countries, was described by Richard Auty as a 'Natural-resource Curse' (Auty, 2002). Other scholars have described it as a 'resource curse in Africa' suggesting that anticipation of natural resource revenue led to poor governance, economic turmoil, conflict and increased public debt (Frynas & Buur, 2020).

In Ghana, Acquah-Andoh, (2018) noted that even though oil production contributed to growth of the economy through enhanced GDP, it also occasioned a decline in agricultural output affecting sectors such as forestry, cocoa and fisheries. Multinational Oil Companies in Ghana have also contributed to local development as a corporate social responsibility (Amponsah-Tawiah & Dartey-Baah, 2016). Companies such as Tullow Oil have invested in public goods such as education and healthcare of local communities as part of their CSR (Ablo, 2020; Amponsah-Tawiah et al., 2015). However, local opinion remain divided on the CSR impact of Tullow Oil as observed by Fragouli *et al*., (2015) in a study of communities proximate to Jubilee Oil field in the Western Region. Residents recorded dissatisfaction due to lack of employment, poor infrastructure and social amenities, loss of livelihoods, pollution of the

environment and vices such as crime and prostitution (Fragouli et al., 2015). Negative externalities due to oil and gas development directly impacts dimensions of livelihood outcomes such as the environment, human health and food security as discussed in the next section.

2.5.1 Oil and Gas exploration, livelihoods, and the environment

The impact of oil and gas production activities on the environment has been well studied. Scientific literature has documented the nature and scope of land-use and land-use changes due to exploratory activities (Asamoah, 2014; King & Kutah, 2018). These include loss of agricultural land, deforestation and varied forms of environmental degradation and pollution such as soil erosion, air, and water pollution. For example, a study by Appiah-Opong *et al*., (2021) in Southwest Ghana found high concentration of heavy metals such as Lead (Pb) in drinking water used by communities around the Jubilee Oil Field. This finding is also corroborated by Raimi *et al*., (2022) who found that groundwater in the Ebocha-Obrikom communities of River State (Nigeria) was heavily polluted with chemicals and heavy metals due to oil and gas flaring activities. In both studies heavy metal in water far exceeded the WHO standard for drinking water. Garcia-Gonzales *et al.*, (2019) & Gonzalez *et al.*, (2022) also found that ambient air in communities around Oil and Gas extraction sites was contaminated with Hazardous Air Pollutants such as Particulate Matter, Nitrogen Dioxide and Carbon Monoxide among others.

Oil and Gas activities have also affected coastal ecosystems in different ways which in turn, impacts resource-dependent livelihoods and wellbeing of coastal communities. In the Western Region, exploration of oil and gas has restricted access to sections of the sea by fishermen, and caused fish migration and decline in fish stocks (Andrews et al., 2021; Dowokpor, 2015b). The deliberate or accidental release of liquid petroleum hydrocarbons into the ocean or oil spilling is also common occurrence. Rout & Sharma (2019) noted the extent at which Oil spills and

release of other industrial wastes into the sea threatened all forms of marine life through toxic contamination and destruction of habitats. This affects aquatic habitats such as coral reefs, sea birds and mammals, fishing activities and other local industries including leisure and tourism (Rout & Sharma, 2019).

Anthropogenic causes of climate change remains the greatest threat to livelihoods, human health and wellbeing (McMichael et al., 2006; St. Louis & Hess, 2008). Energy production activities such as oil and gas extraction is a significant contributor to global warming and is responsible for more than 70% of greenhouse gases (UNEP, 2020). Ayompe *et al.*, (2021) in analysing the trend and drivers of fossil fuel CO_2 in Africa between 1990-2017 found that the growing energy demand will further increase emissions beyond the set climate goals. Some of the adverse impacts of climate change include coastal erosion, flooding and rise in sea level (Armah 2005; MPA, 2009). Report by Johnson, (2020) suggested that Ghana's coastal communities are vulnerable to climate extremes which threatens both the ecosystems and the livelihoods dependent on coastal resources for sustenance, trade and employment. Environmental resources are essential for individuals and nations' survival, both for basic needs and as a source of economic stability. However, when these resources are compromised, there is a tendency to affect livelihood outcomes negatively.

The relationship between economic development and the environment is also explained by the Environmental Kuznets Curve (EKC) theory. The hypothesis suggests that early stages of economic development such as oil and gas exploration and production is often accompanied by environmental pollution and degradation (Maneejuk *et al.*, 2020). At the same time, heavy polluting industries have taken advantage of the weak environmental policies, institutional capacity, and regulatory frameworks in Africa to establish themselves in resource-endowed countries such as Ghana. This has made these countries a pollution haven as advanced by the Pollution Haven Hypothesis (PHH). Solarin *et al.*, (2017) confirmed both EKC and PHH in

Ghana. Under these circumstances, the current environmental pollution trend will continue and so will the impacts on people and the environment.

2.5.2 Food security

Land-use change due to oil and gas exploration has direct effect on the three dimensions of food security; availability, access, and utilization. Scientific literature has documented the destructive impact of natural resource extraction on arable land in Ghana, which results in food insecurity (Danyo & Osei-Bonsu, 2016). A study by King & Kutah (2018) in the Western Region found that food production declined in areas with active natural resource extraction activities. The paper attributed the scenario to lose of farmlands, soil erosion and pollution of land and water bodies. Households engaged in small-scale farming had abandoned growing food and cash crops and instead focused on extraction of minerals and fossil fuels, commonly referred to as *galamsey* (King & Kutah, 2018). The wide scale of environmental challenges as described in the last section negatively affects the quality and quantity of food production. Climate change, growing food demand by an increasing population and environmental stressors will further weaken already-vulnerable food systems and exacerbate food insecurity (Armah et al., 2019).

Perhaps, most scientific literatures have focused on how oil and gas exploration has affected the fishing industry in the Western Region (Adams *et al.*, 2019; Andrews et al., 2021; Asamoah, 2014; Boohene & Peprah, 2011; Cuba *et al.*, 2014; Dowokpor, 2015b; Egyir, 2012; Lewis & Amo-Fosu, 2020; Mohammed et al., 2022). The disruption of fish production and subsequent decline in fish stocks is not only a threat to livelihoods but also exposes the communities to food insecurity as fish is the main source of protein in the country.

2.5.3 Health

Resource extraction presents a risk to human health through exposure to toxins found in polluted air, water and land (Appiah-Opong et al., 2021; Entwistle et al., 2019). While investigating exposure to heavy metals and health risk in a mining community in the Western Region, Ewusi *et al.,* (2022) found that extreme toxicity in ground water exposed the people to increased carcinogenic risk. A similar study in the coastal communities of River State (Nigeria) with active oil and gas industries conducted by Onyegeme-Okerenta *et al.,* (2022) also found that the sea food was contaminated with total petroleum hydrocarbons and polycyclic aromatic hydrocarbons. The bioaccumulation of pollutants with carcinogenic and mutagenic properties in humans through consumption of sea food such as oysters predisposes the community to cancer and other serious ailments (Onyegeme-Okerenta et al., 2022).

A systematic study and meta-analysis of epidemiological data by Okoye *et al.,* (2022) reported increased risk of chronic kidney disease among residents in oil and gas communities compared to unexposed populations. Other serious ailments associated with exposure to Oil and Gas pollutants include cardiovascular diseases, anaemia, neurological disorders, and respiratory infections (Kalagbor *et al.,* 2019; Raimi, et al., 2022). In addition, a study by Nriagu *et al.*, (2016) also concluded that oil and gas-activities affected psychological health of local communities exposed to pollution.

Nevertheless, there is need for more comprehensive studies on the health impacts of environmental pollution in oil and gas communities in Ghana. The complex relationship between health and environmental pollution is often poorly characterized (Briggs, 2003). This is compounded by weak regulatory mechanisms and poor monitoring technology. Entwistle *et al.,* (2019) noted that research on environment-health nexus was maturing with availability of improved technology such as biomarkers capable of identifying the level of exposure, effects of single pollutants and health variations within populations.

2.5.4 Migration and livelihoods

Migration is a critical component of population change and involves movement from place of birth or residence to another geographical boundary (destination). Scientific literature attributes the movement to economic, demographic, or environmental dynamics. Migration is considered as a livelihood strategy that is necessary for an upward shift in social and economic mobility in households. Tanle (2015) established the relationship between migration, livelihood activities and livelihood outcomes in Ghana, and further observed that factors such as power relations i.e., gender, government policies and livelihood activities at the destination contributed to either a positive, negative, or neutral livelihood outcome. These outcomes not only apply to the migrants but also their families or households in the place of origin. Therefore, a negative livelihood outcome due to health or food insecurity to the household head increases the vulnerability of entire households to socio-economic shocks (Tanle, 2015). The influx of migrants in il and gas communities is often perceived as a threat to livelihoods by locals. Fragouli et al., (2015) found that residents were dissatisfied with experiences of increased migration into their communities due to oil and gas exploration activities. Migration is also a response to environmental change. A study by Sekyi (2021) demonstrated that out-migration was an adaptive strategy by small-scale fishermen in the Western Region whose livelihoods were disrupted by crude oil development. The fishermen migrate to new fishing grounds in search for better fish stocks and new markets. In subsistence farming communities of Northern Ghana, seasonal migration is a livelihood strategy during the dry season to shield households from vulnerabilities such as food insecurity (Rademacher-Schulz et al., 2014). In this case, migrants can support their families through remittances until the rainy season when they return and participate in food production. In the framework for sustainable livelihoods, migration is one of the livelihoods coping mechanisms or strategies and its role in mediating the relationship between oil and gas industry and livelihood outcome cannot be overemphasized.

2.6 Community Perception of The Oil and Gas Industry

The community perception of the oil and gas industry is a complex and multifaceted issue that has been studied from various perspectives and disciplines. The oil and gas industry is one of the most important and influential sectors in the global economy, but it also faces many challenges and controversies related to its environmental, social, and ethical impacts. Therefore, understanding how the public views and evaluates the industry is crucial for its sustainability and legitimacy.

One of the main themes in the literature is the historical and contextual factors that shape the public perception of the oil and gas industry. A study by Theodori & Jackson-Smith, (2010) examined how the public perception of the natural gas industry in the US was influenced by the changing political, economic, and technological conditions over the last 35 years. They found that the public tended to distrust the industry and dislike its negative social and environmental consequences, while appreciating its positive economic and service-related benefits. They also suggested that the public perception was associated with the individual's past and future behaviors in response to the exploration and production of natural gas. Similarly, Edman, (2013) traced the historical evolution of the public perception of the oil and gas industry in the US, highlighting the role of events such as the oil crises, the environmental movements, the technological innovations, and the shale revolution. She argued that the industry needed to improve its communication and engagement with the public to address the persistent mistrust and misunderstanding.

Another theme in the literature is the risk perception and safety of the oil and gas industry, especially in the offshore context. Rundmo, (2000) conducted a survey of offshore workers in Norway to measure their risk perception and attitudes to safety. It was found that the workers perceived the risks as relatively low and acceptable, and that their risk perception was related to their personal characteristics, work experience, and safety culture. Again, it was noted that

the workers' risk perception differed from the objective risk calculations and the public perception. Furthermore Oltedal, (2011) analysed the media coverage of the offshore oil and gas industry in Norway and the UK, focusing on the framing of risk and safety issues. He observed that the media tended to emphasize the negative aspects of the industry, such as accidents, conflicts, and controversies, while neglecting the positive aspects, such as achievements, innovations, and benefits. He also pointed out that the media coverage varied depending on the national context and the type of media outlet.

A third theme in the literature is the sustainability reporting and disclosure of the oil and gas industry, which reflects its social and environmental performance and accountability. A study by Levy & Kolk, (2002) compared the sustainability reporting practices of the major oil and gas companies in the US and Europe, finding that the European companies were more advanced and comprehensive in their reporting than the US companies. They attributed this difference to the institutional and cultural factors, such as the regulatory environment, the stakeholder pressure, and the corporate culture. Likewise, Braga et al., (2022) conducted a critical discourse analysis of the sustainability reporting of the global upstream oil and gas industry, identifying the potential bias and gaps in the reporting. They argued that the industry tended to use vague and ambiguous language, omit, or downplay the negative impacts, and emphasize the positive impacts and actions. They also suggested that the industry needed to improve its transparency and credibility in its reporting to enhance its social and environmental responsibility.

Ovadia et al., (2020) conducted a longitudinal study of the impacts (real and perceived) of oil and gas production in Ghana, based on field research in six coastal districts near the offshore fields. They found that the communities were growing angrier and frustrated at their loss of livelihoods, increased social ills and dispossession from land and ocean, while receiving few benefits from the industry. They warned that high expectations, real and perceived grievances, and social fragmentation could lead to conflict and underdevelopment.

Ablo & Otchere-Darko, (2022) also described and examined the impact of Ghana's local content policy and legislation, which was introduced in 2013 to promote local participation and linkages in the oil and gas sector. They identified the successes and challenges of implementing the law, such as data transparency, institutional support, certification, and business fronting. They also highlighted the prospects for the local content law to create value in terms of employment, technology transfer, local ownership, and regulatory enforcement.

Mohammed et al., (2022b) explored the local perceptions of oil and gas extraction in a low-income community in Sekondi-Takoradi, the oil city of Ghana. They found that the oil production was creating complex processes of accumulation, contradiction, and displacement, resulting in rising expectations and dying hopes among the locals. They argued that the oil and gas industry needed to address the social and environmental concerns of the affected communities and ensure equitable distribution of the resource rents.

Agyei et al., (2012) analysed the offshore oil industry activities and their effects on fishing in Ghana, using community perceptions as a measure. They found that the oil exploration and production had negative impacts on the livelihoods of the fishers, such as reduced fish catch, increased operational costs, restricted fishing zones, and increased conflicts. They recommended that the oil and gas industry should adopt sustainable solutions to mitigate the impacts and enhance the coexistence of the two sectors.

Literature has shown that the community perception of the oil and gas industry is a dynamic and diverse phenomenon that depends on various factors, such as the historical and contextual background, the risk and safety assessment, and the sustainability reporting and disclosure. Literature also indicates that the industry faces many challenges and opportunities to improve its public image and reputation, and to foster a more constructive and collaborative relationship with the stakeholders and the society.

2.7 Policy and Regulatory frameworks on Oil and Gas development in Ghana

2.7.1 Domestic policies and Legal frameworks

The main regulatory frameworks guiding oil and gas exploration in Ghana are the Petroleum Act (E&P) of 2016, Ghana National Petroleum Corporation Act (GNPC) of 1983 and the Petroleum Commission Act 2011 (Ferdinand & Godson-Amamoo, 2021). Most of these regulatory frameworks were legislated following the discovery of oil and gas reserves in the Western Basin which is made up of the Cape Three Point Basin and the Tano Basin. The Ghana Gas Company Limited (GGCL) was tasked to manage natural gas exploration, extraction, and supply.

The Environment Protection Agency (EPA) established through Act 490 of 1994 is mandated to formulate environmental policy, monitor, and enforce compliance. EPA also conducts Environmental Impact Assessments of activities with potential negative effects on the environment including oil and gas development. However, the institutional quality and effectiveness of EPA remains in doubt. While confirming the Pollution Haven Hypothesis (PHH) in Ghana, Solarin *et al.*, (2017) recommended for expansion of the 1994 EPA Act to regulate emissions from international companies. The study also called for more oversight power to EPA over international companies such as International Oil Companies.

The mismatch between natural resource extraction and development of local communities has been well established. To remedy this outcome, governments introduced Local Content Policies (LCPs) as a policy intervention. LCPs are designed to create backward linkages between the government and multinational corporations to local communities that would ensure that indigenous communities benefitted from the resource extraction (Vasquez, 2016). In Ghana, Petroleum local content regulations were passed in 2013 and focused on creating employment, knowledge transfer and local participation (Suleman & Zaato, 2021). In investigating the implementation of LCPs in Ghana's oil and gas sector, Suleman & Zaato

(2021) recommended the need for a local content (LC) implementation master plan, establishment of a local content fund and enhancement of human capital and technical expertise of local indigenes. These measures are intended to build the capacity of local communities to fully exploit the benefits of oil and gas extraction and boost local economies.

Ablo (2020) addressed the need for stakeholder engagement in Ghana to better understand the relationship between LCPs and CSR. At the same time, while conceptualizing CSR in the oil and gas industry, Andrews, (2013) argued for a bottom-up approach in order to meet the high development expectations of local communities. It is important to note that the bottom-up approach is similar to the objectives driven by LCPs such as local participation.

2.7.2 International Policies and Frameworks

Ghana as a party to both the United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto protocol has committed to addressing climate change by reducing its GHG emission by 15% by the year 2030 (Dawson & Spannagle, 2008; GH-INDC, 2015). It further committed that a reduction by 45% was attainable based on external support through technology, finance, and capacity building. This mitigation goal targets key sectors responsible for bulk of the emissions namely energy, transport, and industries. Sustainable extraction of natural resources such as fossil fuels contributes to improved livelihoods by limiting adverse environmental impacts on local communities involved.

The Paris Agreement sought to limit global warming to 2^0C above the pre-industrial (Green Network, 2021). This, was believed, would reduce the risks, and impacts of climate change. However, there is little evidence of a viable path to attaining the goals under Article 2 of the Paris Agreement. Continued exploration and extraction of fossil fuels threatens livelihoods as it will accelerate global warming through GHG emissions leading to increased climate-risks and impacts such as environmental pollution and floods.

Ghana, like many countries in SSA, is a natural resource-based economy upon which socioeconomic systems are built. As a signatory to these conventions, Ghana is bound to implement climate change mitigation policies in all sectors including Oil and gas (OG). However, like many developing countries, there is need for technology transfer, capacity building and financing from developed countries to meet our commitments. Sustainable extraction and use of natural resources is linked to the attainment of SDG's (UNEP, 2020).

2.8 Sustainable Livelihood Approach

Development practitioners are concerned about the participation processes of all stakeholders to ensure maximum policy outcomes with a positive impact on intended beneficiaries. The concept of development exists to ensure vulnerable populations and groups are identified in varying contexts and emancipated from the curse of poverty.

The Sustainable Livelihood Approach (SLA) is a concept that was developed by Chambers & Conway, (1992) with the idea of understanding the multidimensional forms of poverty. Sustainable Livelihoods is the foundation of varying Sustainable Livelihood Approaches that exist in development practice and has been widely used in different contexts and application. Most importantly, the SLA is developed on the principle that populations are subject to vulnerabilities and that their capabilities and potentialities are compromised in the process. It has been widely explained that following the introduction of 'sustainable livelihood' at the centre stage, the 1987 Brundtland Report of the World Commission on Environment and Development (WECD), the Greening of Aid Conference at the International Institute for Environment and Development also in 1987 and the first Human Development Report in 1990 followed the Chamber and Conway study. Although environmental issues were central to all these conferences, they contributed an important narrative of livelihood that are discussed today, more than three decades ago (Haan and Zoomers, 2005). The blend of a "supportive political environment, resources and available intellectual capacity" gave rise to what we know

today as SLF's developed by bilateral and multilateral organizations such as DFID, FAO, UNDP, World Bank, and the World Food Programme. Also, NGOs such as CARE International, Khanya, Oxfam, and SIDS developed and adopted their own frameworks to solve its poverty related agendas (Human Rights Careers, 2022).

To reduce the negative impact of these development issues, the affected depend on their assets and policies to protect or expose them to more vulnerabilities. Nonetheless, in the disposition of assets and policy framework/institutions and processes, the SLA also focuses on livelihood strategies that are available to resource users to make a livelihood. Ferrol-Schulte *et al*., (2013) adds that the SLA exists to assess all aspects of interrelationships between poverty and wealth and that questions of "why" cannot be overemphasized. Nonetheless, it has been subject to critique by various scholars and proponents of development in the field of behavioural studies. For instance, Ferrol-Schulte *et al*., (2013) highlights the challenges of using the SLA. They argue that there is the tendency of research bias from respondents on social issues and concepts such as poverty and natural resource management. They also use constructivism as support for their claim, which holds that reality is an outcome of people's perception and that taking risks typically results in what they refer to as positional knowledge. To them, the researcher will always draw inferences based on perception of the local context because opinions and knowledge from respondents on social issues are different. Further, Ferrol-Schulte *et al.*, (2013) adds that the SLA may not be the most suitable for comparative analysis due to data fragmentation and the potential of a study losing its credibility because of lost detail and accuracy. Thus, a significant loss in data means it cannot be applied to heterogenous communities as pointed by their paper. Regardless of the difficulties highlighted, there is a strong tendency for local populations to plan their development through shared cooperation and collective action using the SLA. They concluded in their assessment of using the SLA coastal marine dependent livelihoods that the link between natural resource governance and

poverty alleviation programmes in developing nations in the tropics must be strengthened. Notable achievements by the application and implementation of the SLA has eased the process of understanding challenges faced by the poor and trends in their livelihood which often includes frequent migration (Carney, 2003).

2.9 Conceptual framework

The conceptual framework proposed for the study was adopted from the Sustainable Livelihood Approach. It draws on the principle that the livelihood occurs under shocks, trends, and seasonality (i.e., impact of oil and gas industry) and that given asset (i.e., socio-demographic indicators) people can make a livelihood. However, these processes do not occur in a vacuum as people naturally respond to their vulnerabilities through livelihood strategies (i.e., intention to migrate) as well processes and structures that shape the livelihood outcome. The main objective of this study is to assess the impact of the oil and gas industry explorative activities on the livelihood outcome of communities within the Ellembelle District. It goes on to suggest that people's intention to migrate as conceptualized in this study as a livelihood strategy also influence the livelihood outcome of populations. As previously established, livelihood outcome is a combination of multifaceted indicators and thus the SLA is the most appropriate social model to explain this phenomenon.

In this study, impact of oil and gas industry and explorative activities refers to all the negative impacts and experiences which place people in a vulnerable position. The impact of oil and gas industry here is perceived as a social issue which people experience and often leads to both external and internal shocks that affects the livelihood of rural populations. As a livelihood strategy adapted by rural populations to cope with shocks and stress (i.e., negative impact of the oil and gas industry) people's intention to migrate was used as a mediating variable. It is evident in the SLF that migration plays a role in the livelihood outcome of rural populations (DFID, 2008). They present a change in the environment which is perceived to be a risk adverse

where the role of vulnerabilities to shocks and stress are reduced for a positive livelihood outcome.

This emphasize that the importance of asset portfolio cannot be overemphasized. Nonetheless, all the practical indicators of capital assets could not be established and thus, socio-demographic indicators such sex, age, religion, educational level, marital status, occupation, years of residency and household head status which represent intangible resources are conceptualized as asset. As established, asset is strongly linked to the livelihood outcome of rural populations and thus, the study draws a link between socio-demographic indicators and livelihood outcome. Overall, since livelihood outcomes is not influenced by only the impacts of oil and gas industry activities, this study seeks to explore the influence of other factors such as intention to migrate and socio-demographic indicators as independent variables.

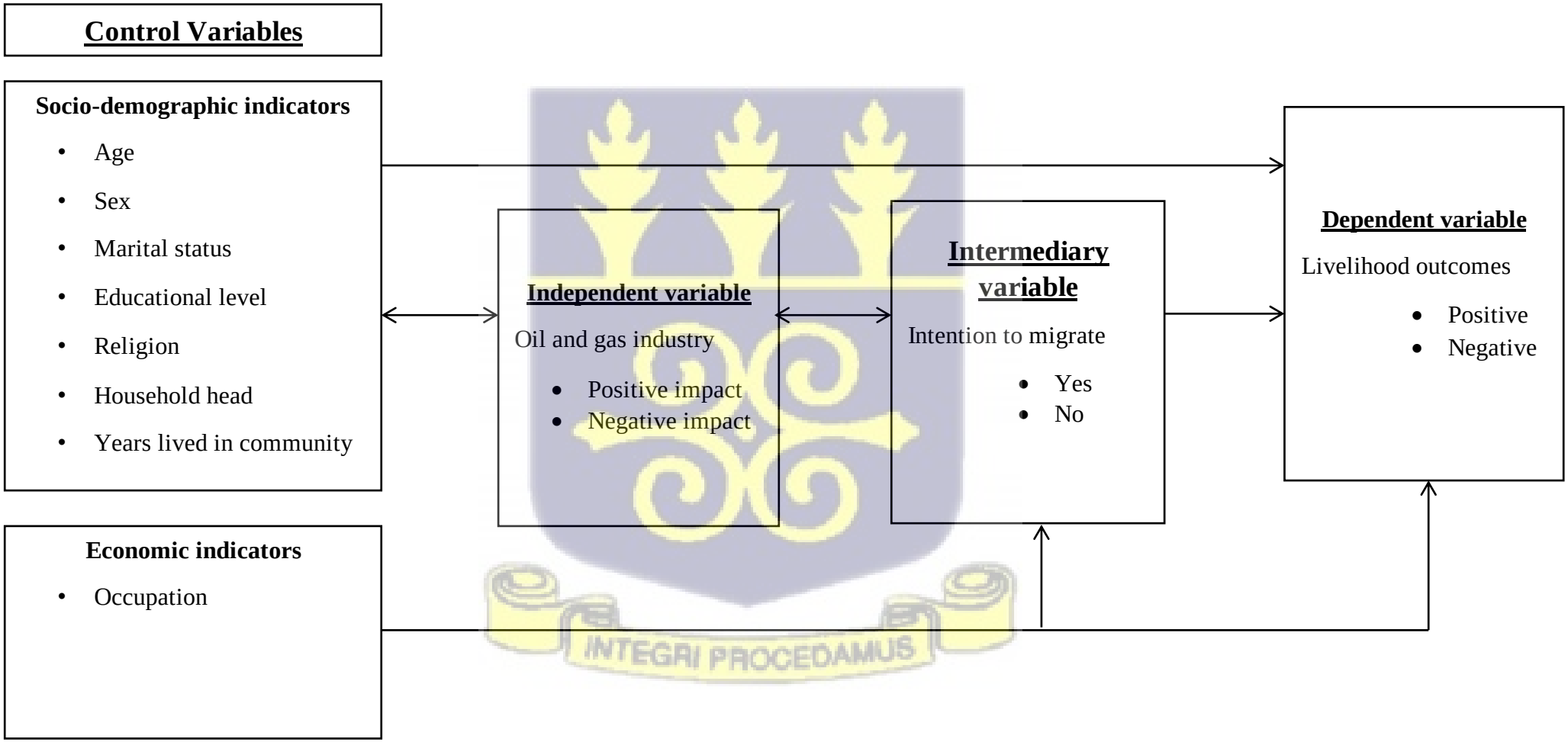


Figure 2: A conceptual framework showing the relationship between oil and gas activities, intention to migrate, socio-demographic

2.10 Hypotheses

Based on the conceptual framework above, this study hypothesizes that;

1. Respondents with a positive experience with the oil and gas industry are more likely to have a positive livelihood outcome compared to respondents who have a negative experience with the impacts of the oil and gas industry.
2. Respondents with intentions to migrate are more likely to have a positive livelihood outcome compared to respondents who do not intend to migrate.

2.10.1 Null hypothesis

1. There is no relationship between the respondent's positive experience with oil and gas industry and positive livelihood outcomes.

2. There is no significant statistical relationship between Intention to migrate and positive livelihood outcomes.

CHAPTER THREE

3.0 METHODOLOGY

This chapter contains two main parts. Specifically, it describes the study area's geographical characteristics relevant to the study and the methods and approaches used during the study.

As stated elsewhere, this study was divided into four major themes of interest including: (a) the current livelihood outcome situation within the study areas, (b) the respondents' experience with the impact of the oil and gas industry in the study areas, (c) the association between respondents' experience on the oil and gas exploratory industry and livelihood outcome, (d) the community members' perception of the oil and gas industry.

The geographical context focused on the study location, climate, and population. The statistical methods, methods of data analysis, and forms of presenting data are also described in this chapter. This chapter reflects upon my role as a researcher and discusses the ethical considerations that were scrutinized to ensure the effective completion of the study.

3.1 Geographical Context

3.1.1 The Study Area: location and population

The study was carried out in the Western Region of Ghana, the following communities were selected from the Ellembelle District; Baku, Ngalekpole, Atuabo, Ngalekyi, Krisan, Anokyi, Sanzule, Bakanta, Eikwe, and Asem Nda. Ellembelle District in the Western Region was chosen as the study area because of the presence of the oil and gas industry, the gas plant and its activities within the region and district.

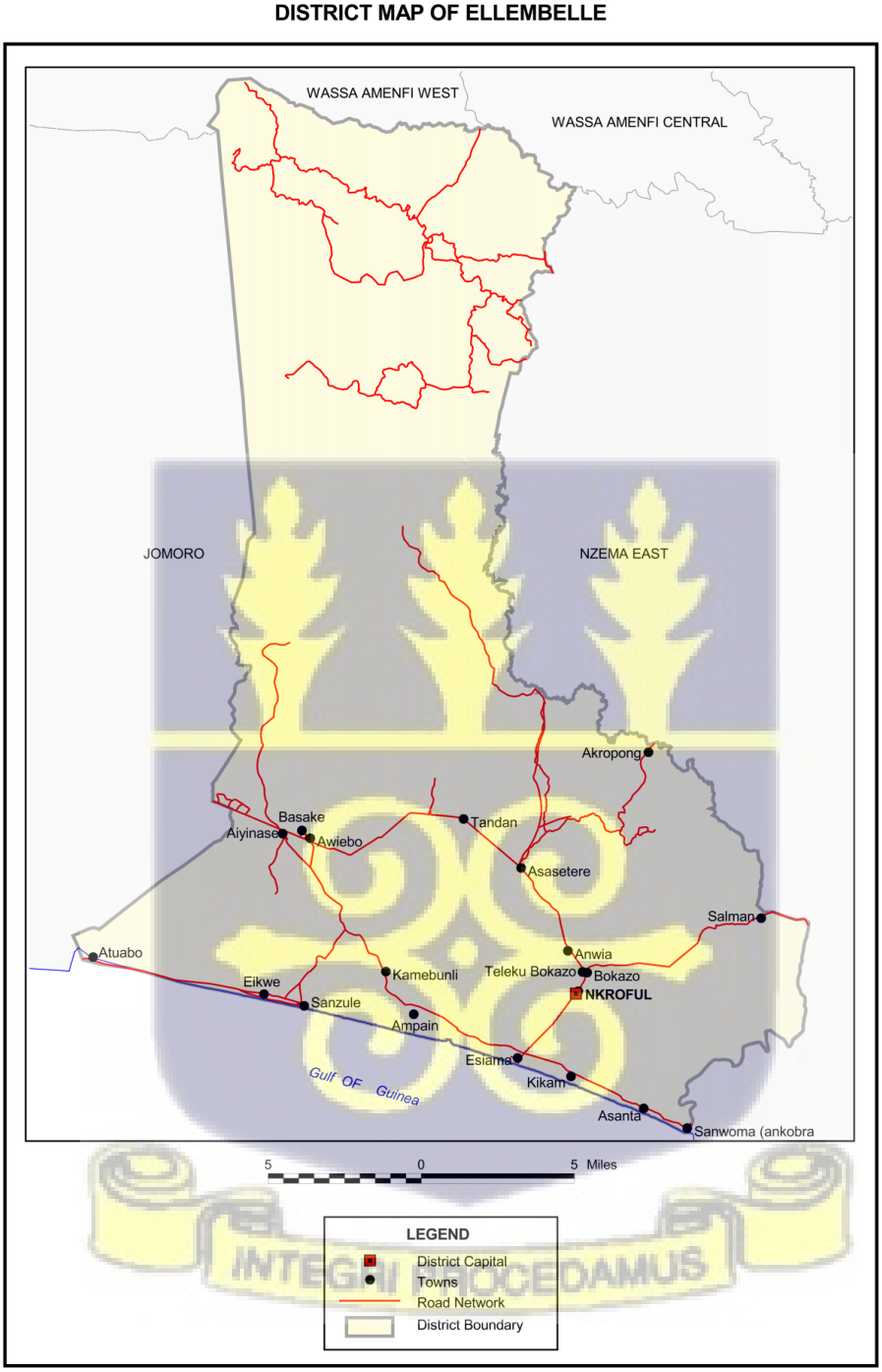


Figure 3 Map of Ellembelle district

Source: Ghana Statistical Service, 2021

Ten communities with different features in the oil and gas sector were selected because the district was large. They were Baku, Ngalekpole, Atuabo, Ngalekyi, Krisan, Anokyi, Sanzule, Bakanta, Eikwe, and Asem Nda.

The Ellembelle District is one of the twenty-two (22) districts that make up Ghana's Western Region. In December 2007, (LI) 1918 formed the district out of the then-Nzema East District. It was established on February 29, 2008, with its capital at Nkroful (Ghana Statistical Service-GSS, 2014).

The district is located between Longitude 2° 05"W and 2° 35"W and Latitude 4° 40"N and 5° 20"N. It borders the Jomoro District to the west, the Wassa Amenfi West District to the north, Nzema East Municipal to the southeast, Tarkwa-Nsuaem Municipal to the east, and a 70-kilometre stretch of sandy coastline along the Atlantic Ocean to the south (Ghana Statistical Service-GSS, 2014).

It has a total size of 995.8 km^2, accounting for approximately 9.8 per cent of the Western Region's landmass. The district has one seat, the Ellembelle Constituency, as well as seven (7) Area Councils and 31 Electoral Areas.

According to the 2020 Population and Housing Census (PHC), the district has a population of 120,893 accounting for approximately 5.9 per cent of the total population of the Western Region. The female population accounts for 60,307 (49.9%), with men accounting for 60,586 (50.1%). The population of 120,893 may suggest that there is much strain on the land and its resources.

The district is primarily rural (71.9 per cent), with 86,975 people living in rural areas and 28.1 per cent (33,918) living in urban areas. Many people move into and out of the district, a possible reason for this is the fishing seasons, the movement of farm workers, the influx of miners seeking jobs, and the presence of refugees in the area (Ghana Statistical Service, 2022).

The communities chosen for this study, Baku, Ngalekpole, Atuabo, Ngalekyi, Krisan, Anokyi, Sanzule, Bakanta, Eikwe, and Asem Nda, are the closest to the oil and gas industry in terms of distance. Thus, the impact of the oil and gas activities would be better experienced by the members of these communities.

3.1.2 Geology, Relief and Soil

The district's geography is usually undulating, with the highest point at 450 feet above sea level. The underlying rock is mainly composed of the Cambrian Birimian formation and Tarkwaian Sandstone-Association of Quartzite and Phylites. Economic minerals such as kaolin, silica, and gold can be found here, as well as sandstone deposits. The district's soil is mainly composed of ferric acrisols and dysric fluvisols. The ferric acrisols soil type covers around 98 percent of the area's terrain and allows for the growth of a wide variety of crops such as cocoa, coffee, coconut, oil palm, plantain, and cassava (Ghanadistricts.com, 2022).

3.1.3 Drainage

A variety of rivers and streams flow through the region. The Ankobra River, with large tributaries like the Ahama and Nwini rivers, is prominent among them. Others, like the Ankasa and Draw rivers and its tributaries, drain the region's northern half, and serve as borders between the Ellembelle and Wassa Amenfi West Districts. The Amansure River in the district's southwest, as well as a few other minor rivers and streams, run all year. The Ankobra Basin is formed by these streams and rivers that form a dendritic pattern (Ghana Statistical Service, 2022).

3.1.4 Climate and Vegetation

The district is located in the West African sub-semi-equatorial region's climate zone. The region receives rain throughout the year, with the largest or maximum monthly mean rainfall coming in May and June. The average yearly rainfall ranges from 26.8mm to 46.6mm. The average temperature in the area is at 29.40 ^{o}C, with monthly temperature variations ranging

from 40°C to 50°C throughout the year. The average relative humidity levels range from 80 percent to 90 percent throughout the year.

The district's vegetation is composed of wet semi-deciduous rain forest in the north, but transitions to secondary forest in the south owing to human activities such as logging and cultivation. The coastline is mostly covered with savanna vegetation (Ghanadistricts.com, 2022). The region has a variety of wood species as well as non-timber forest products such as rattan and bamboo. It is also rich in game and animals, all of which provide prospects for resource extraction, tourism, and business growth.

3.1.5 Economy and Living Conditions of the Ellembelle District

According to data from the 2020 PHC, agriculture (including fishing and forestry) remains the most common employment in the district, employing more than 42.0 percent of the population. The district's land area is mostly covered by forest vegetation (in the north), whereas the southern section is mostly seashore. As a result, the majority of residents in the district's northern belt are primarily involved in tree crop cultivation such as cocoa, coffee, rubber, oil palm, perennial crops such as cassava, and plantain, whereas a large number of people along the coastal belt rely on fishing farming for a living. The district's relief and drainage system also encourage the development of fish aquaculture and the production of rice, sugar cane, and dry season vegetables.

The area is home to 31 of the region's 90 landing beaches. The primary marine fishing season runs from July to September, with a smaller season from November to January. Sardinella and tunas are two of the most often caught fish (Boye et al., 2022). Despite this potential, fishing is still mostly characterised by focusing on traditional techniques such as dug-out boats and beach seine fishings. Seasonal fishing is available in the district. During the main fishing season, economic activities in the district picks up, with a large influx of people moving into the district capital. However, there is a slowdown in economic activities during the off-season

period, resulting in seasonal unemployment among the people. The district's fish farming by inland fishing (fishponds) is underdeveloped. Many ponds are tiny, with an average surface area of 700m^2.

Land acquisition, sharecropping, tree tenure, and the exploitation of Non-Timber Forest Products (NTFP), among other things, continue to be stumbling blocks to agricultural growth in the region. With a magnitude rainfall in that portion of the nation and several rivers and bodies of water every year, agriculture in the district is still rain-fed. Seasonal employment is created by the seasonality of fishing and farming. This is being addressed by the development of small/medium size, labor-intensive, rural companies, or work opportunities, such as the Ghana Social Opportunity Project (GSOP) now being undertaken in the area.

3.1.6 Social and Cultural Structure

Health and educational facilities, water and sanitation, telecommunications facilities, and information and communication technology (ICT) facilities are among the district's social infrastructure and amenities (Ghana Statistical Service, 2022).

3.2 Methods of Data Collection

3.2.1 Population and Sample size

The population for the study is the inhabitants of some communities within the Ellembelle District in the Western Region of Ghana. The target population was forty households who are directly and indirectly impacted by the oil and gas industry in each of the ten communities in the Ellembelle District namely Baku, Ngalekpole, Ngalekyi, Krisan, Eikwe, Asem Ndasuazo, Sanzule, Atuabo, Bakanta, and Anokyi. The population of these communities were used due to easy accessibility.

A sampling technique is the subset of a population that acts as an accurate depiction of that community. It is the process of selecting a population to study from a larger population. In

other words, it involves picking a smaller group, analysing it, then drawing conclusions about the overall group based on the larger group researched. During data collection in these ten towns, a convenient nonprobability sampling technique was used. A non-probability sampling approach employs a population that is conveniently available to take part in a study. This method primarily demands first-hand primary data to evaluate without the requirement for any other circumstances.

The Cochran's formula was used to determine the sample size for this study. Using the sample size formula proposed by Cochran, $n_0=Z^2pq/e^2$.

Where e; is the desired margin of error (0.05),

n_0; is the unknown sample size

p: is the estimated proportion of the population which has the attribute in question (0.5), standard deviation,

q; is 1-p,

z; is the z-value in a Z table (1.96), the confidence level.

Sample size (n_0) = $(1.96)^2$ (0.5) (1-0.5)/ $(0.05)^2$

= 384.16 ≈ 385

Therefore, a sample size of 385 was generated, which means the study targeted 385 respondents. This 385 was rounded to 400 during data collection.

3.2.3 Sampling Procedure

A convenient and purposive sampling technique was adopted during questionnaire administration, and this was due to the large population of the communities. Purposive and convenient sampling procedures were used to select households that were readily available at

home during the survey and data collection period as some household members went to the farms, sea to fish to trade.

The convenient sampling was carried out by selecting participants based on their availability, willingness, or accessibility to the researcher. Households that were close by, easy to contact, or willing to cooperate were chosen. The target respondents were households in the ten communities within the oil and gas industry. Purposive sampling was used to select the communities based on their characteristics, such as size, location, or involvement in the industry. The technique was chosen because of the large population of the communities, the limited resources of the researcher, the researcher wanting to capture a wide range of perspectives from different communities, but also save time and money by using convenient sampling within each community.

The strengths of the techniques are that it allows the researcher to access a diverse and relevant sample of participants, while also reducing the cost and effort of data collection. The weaknesses of the technique are that it introduces sampling bias and reduces the generalizability of the findings. The participants might not be representative of the population, and the results might not be applicable to other contexts or groups.

A maximum of forty households were interviewed in each of the ten communities.

3.2.4 Data Collection Sources & Instruments Used In The Study

Two main sources of data were used for the research work (i.e., primary, and secondary). The primary data collection sources included interviews, surveys, and observation while the secondary data collection sources included data from district records, published works, books magazines, journals, internet, data collected from other research and information collected available at the government departments etc.

3.2.4.1 Questionnaires

A structured questionnaire consisting of a set of questions was self-administered to the community members. The researcher read questions, interpreted to those who cannot read and then choose their responses from the multiple set of answers provided. The questions in the questionnaire took two forms: close ended questions and open-ended questions. The close ended questions included possible answers or pre-written response categories, and respondents chose among them. The open-ended questions allowed respondents to answer in their own words. The questionnaires administered were coded and retrieved for data analysis.

3.2.4.2 Interviews

In-depth interviews were conducted for 5 specific/ key people (chief, assemblyman and youth leader) in the communities. Focus group discussions were organized for some fishermen (6) and farmers (6) within the communities. This allowed respondents to express themselves freely and fully. The responses were recorded on phone with the respondent's permission using an interview guide including a set of questions on several issues of interest to the research. For analysis, the recorded responses were transcribed and categorised into distinct themes. Much of the information acquired by this instrument (interview guide) were qualitative in nature.

3.2.4.3 Personal Observation

Observation is another means of acquiring facts. Data is gathered using a visual technique in this procedure. As a result, it featured a non-participant observation in which the researcher watched the process and documented what was observed. All areas of data gathering were utilised in the observation, particularly among the community members. For analysis, data from observations were captured as field notes.

3.3 Data Analysis for The Study

Quantitative field data was collected using the computer assisted personal interview (CAPI) using the JotForm as the collection platform. The data was exported to Microsoft excel for

cleaning and sorting where required and subsequently exported to the latest version of International Business Machines Corporation's Statistical Package for the Social Science (SPSS) for further analysis. The initial analysis focused on the descriptive statistics of all the variables used in this study and summarized using tables and graphical charts to present the percentages for each variable respectively. Further analysis was conducted to compare the relationship between each of the independent variables and the dependent variable. This was established by using the chi-square test of association.

At the advanced stages (i.e., multivariate analysis), the study depended on a regression analysis to determine which variables best predicts the dependent variable. Thus, the study relied on the binary logistic regression model to assess this association since the dependent variable (i.e., livelihood outcome) is a dichotomous variable with categories 0 = positive livelihood outcome and 1 = negative livelihood outcome. The study relied on two binary logistic models to draw conclusions on the objectives set out to explore. The first model (Model 1) included all the independent variables except for the intermediate variable. The second model (Model 2) included as the variables to assess the role of the intermediate variable in the study.

The binary logistic regression model is as follows

$$\ln [P1-P] / P = b0 + b_1X_1 + b_2X_2 + \ldots\ldots\ldots + b_n.X_n$$

In the model, P refers to the probability of the outcome, b – is a constant value, bi - refers to the regression coefficients and Xi……Xn, - refers to all the independent variables (including the control and intermediate variables). The beta coefficients in the binary logistic regression show an expected odds ratio on the dependent variable. This is associated with a unit change in the independent variable. An odds ratio greater than 1 demonstrates a positive relationship between the independent and the dependent variable. Consequently, when the odds ratio is less

than 1, a negative relationship is implied. A separate coefficient was recorded for the categories in each variable.

3.3.1 Construction of variables for this study

The study set out to examine the impact of oil and gas industry exploration activities on the livelihood outcome of residents in the Ellembelle district. As such, the independent variable in the study is impact of oil and gas industry in the district. Other independent variables include the socio-demographic indicators and background of the respondents as well as intention to migrate which was conceptualized as an intermediate variable. The main dependent variable is livelihood outcome. All the variables used in this study were collected and measured accordingly as categorical variables. The author conceptualized the main dependent and independent variables and as such, proxy indicators were created to ensure that these variables were analyzed.

3.3.2 Dependent variables employed in this study

The study lends the Sustainable Livelihood Approach as a framework for the purpose of this study. The SLA conceptualizes livelihood outcome based on 5 key indicators which needs to be satisfied for an individual to be considered as having a positive or negative livelihood outcome. In this study, these indicators are limited to only three (3) key indicators which are vulnerability, well-being, and food security. Food security in this study was conceptualized as food sufficiency. The variable, livelihood outcome was measured using a 4-item Self-Reporting Questionnaire developed by the author. The questions were designed to solicit information about issues related to livelihood outcome being subject to impacts from the oil and gas industry exploration activities in the district. The 4-item questionnaire is scaled between 0 and 4. Thus responses for the four questions were computed and summed for each respondent. "Yes" responses ranging between 0 and 1 were coded as "0" which indicates a positive livelihood outcome. Consequently, affirmative "yes" responses for the questions

ranging between 2 and 4 were coded "1", which indicates a negative livelihood outcome. The resulting variable "livelihood outcome" was a dichotomous variable with two categories: positive livelihood outcome and negative livelihood outcome which was measured accordingly as a binary variable.

Table 1 xv: Self-Reporting Questionnaire items on livelihood (Vulnerability, Well-being, and Food sufficiency)

No	4-item livelihood outcome questions	Yes/No
1	Has your community experienced any environmental change/damage due to the oil and gas activities?	
2	Have you encountered any health problems due to the siting of the oil and gas industry?	
3	Has your living standard improved since the exploration of oil and gas in 2009?	
4	Your ability to meet your household food needs now	

3.3.3 Independent variable employed in this study

The independent variable, impact of oil and gas industry exploration activities was measured using a 7-item SRQ developed by the author. The variable has been conceptualized theoretically by many authors. However, there are not many practical measurement of the variable. The 7-item questionnaire constitute questions related to the impact of oil and gas industry in the district. These questions were summed to obtain a dummy variable categorized as yes or no and subsequently labeled as positive or negative impact, with 0 and 1 as their respective codes. The indicators of the impact of oil and gas industry includes; economic effects, loss of assets, occupational effects (specifically fishing and farming), safety, implication on disputes, social activities, and culture. An index of the responses was created ranging between 0 and 7. "Yes" affirmative responses between 0 and 3 were coded as 0,

indicating a positive impact and responses between 4 and 7 were coded 1, indicating a negative impact. The results generated a dichotomous variable with two categories and measured accordingly.

Table 2 xz: 7-Scale Self-Reported Questionnaire on the impact of oil and gas industry and exploration activities

No	Indicator	7-scale item questionnaire	Yes/No
1	**Economy**	Has the oil and gas industry activity stopped you totally from your major economic activity?	
2	**Assets**	Have you lost any property or land to the oil and gas industry?	
3	**Occupation**	Has the oil and gas industry affected fishing and farming activities in your community?	
4	**Safety**	The community is safe compared to the period before the oil industry.	
5	**Disputes**	The oil industry has played a significant role in the disputes (the communities and the oil & gas industry)	
6	**Social norms**	The oil industry has adversely affected social activities	
7	**Culture**	The oil industry has adversely affected cultural norms and practices	

3.3.4 Intermediary variable for this study

In this study, livelihood strategy was conceptualized by the author as an individual respondent's or a family member's intention to migrate out of the district. Intention to migrate was categorized in this study as a binary variable (i.e., yes, or no) which was coded as 1 = yes and 2 = no for responses on whether there has been an intention to migrate.

3.3.5 Control variables employed in this study

Mchopa and Jeckoniah (2018) have demonstrated how socio-demographic variables such as education were significantly associated with livelihood outcome levels in Iramba District, in Tanzania. Thus, to get a clearer understanding on the relationship between the impact of oil and gas industry on the livelihood outcome of residents within the study district, socio-demographic variables (i.e., control variables) were employed. These include age, sex, educational level, marital status, religion, occupation, household head, and years of residency. Each of the control variables used in this study were collected and measured as categorical variables.

Sex and the household head status was categorized as binary variables with only two groups. For instance, sex was grouped as male or female. Household head was categorized as yes or no. Age of the respondents was categorized as between 0 and 29, 30 to 39, 40 to 49 and above 50. Educational level of the respondents was categorized as basic, secondary, and tertiary. Basic education included both primary and JHS. Meanwhile, tertiary education comprised of respondents who had acquired an HND/diploma and university education. Religion of the respondents initially included Christianity, Muslim, and Traditional religion. However, due to small counts in Muslim and Traditional religion, the variable was recategorized into two groups: Christian and others. Marital status was categorized as single, married and formerly in union (divorced, separated and widowed). Occupation was categorized as unemployed, fishing/farming, trading, government sector employee and private sector employee. Finally, respondents' number of years lived in the community was categorized into four groups: between 0 to 10 years, 11 to 20 years, 21 to 40 years and above 40 years.

Table 3 xx: Measurement of indicated variables used in the study

Variable indicators	**Measurement**

Impact of oil and gas	Measured as a categorical variable which included a 7-item questions on the impact of the oil and gas industry in the study area. The questions were subsequently merged (composite sum), indexed and recoded as either 0 = positive impact or 1 = negative impact.
Livelihood outcome	Measured as a categorical variable which computed a 4-item questions on three facets of livelihood outcome (well-being, environmental vulnerability, and food security). The dummy variable was recoded as 0 = positive outcome and 1 = negative outcome.
Intention to migrate	The variable was coded as 1 = yes and 0 = no based on whether the respondent or family had intentions to migrate from the study areas.
Age	The variable was measured as a categorical variable with 4 categories. 1 = 0 – 29 years, 2 = 30 – 39 years, 3 = 40 – 49 years, 4 = Above 50 years.
Sex	The variable was coded as 1 = male and 2 = female.
Educational level	The variable originally collected constituted 5 categories which were subsequently recoded into three categories as 1 = basic, 2 = secondary and 3 = tertiary.
Marital status	Originally collected as a variable with 5 categories and subsequently recoded into 3 categories measured as 1 = single, 2 = married and 3 = formerly in union.

Religion	Originally constituted 3 categories which was reduced to 2 categories because of low expected counts. The variable was subsequently measured as 1 = Christianity and 0 = others.
Occupation	It was obtained by measuring as a categorical variable with 5 categories coded as 1 = unemployed, 2 = fishing/farming 3 = trading, 4 = government sector employee and 5 = private sector employee
Household head	The variable was coded as 1 = yes and 0 = no.
Years of residency	Originally collected as a categorical variable with four classes measured as 1 = 0 – 10 years, 2 = 11 -20 years, 3 = 21 – 30 years and 4 = above 40 years

3.4 Limitation of the Study

This research has certain limitations. Many development practitioners have critiqued the use of the SLF, although it has a proven record of value in areas such as understanding and improving poor people's lives. However, the framework appears overly simplistic in nature as a result of what Bennett (2010) refers to as a 'technocratic development drive', which has led to the bottom-up approach exhibited in development paradigms today. Thus, issues such as the role of culture are excluded, although they may play an essential role in the poverty alleviation nexus. More practically, the independent variable was without a reference period because the impact of oil and gas may change over time and thus affect livelihood outcomes. Again, all facets of the SLF were not used in this study. For instance, it would make a difference to know the influence of transforming structures and processes on the livelihood outcomes of people.

Secondly, most community members were not accessible at home during the data collection; they had either gone to the sea to fish or to a market to trade. This means that the majority of

respondents from these sites were individuals who had recently graduated from high school, were pensioners, were unemployed youths, or were fisherfolks/farmers who had a low fish catch and returned home because they were mostly the ones who were present at home to be interviewed or questioned. Even on taboo days or rest days, fishermen still go to the sea not to fish but to fix their nets and boats

This increases the prospect of gender favouritism in the results. Most women within the location at the period of data gathering were questioned, to address this prejudice, resulting in an outstanding feminine representation in the group of participants.

Finally, this study establishes a link between the oil sector and the variables, as there may be multiple other factors that impact a particular phenomenon through simple and complicated processes. Aside from oil industry operations, numerous other variables might influence fish populations, catch, and stock. The same may be said for migratory trends and changes in land use and land cover.

3.5 Ethical Issues

The Institute for Environment and Sanitation Studies (IESS) issued an introductory letter to be presented to the organizations or communities involved in the project.

This study is a part of a more extensive or main project by the United Nations University, Institute for Natural Resources in Africa (UNU-INRA), titled Just Energy Transition in the Informal Sector of Ghana. Therefore, ethical clearance sought from The College of Basic and Applied Sciences for the UNU-INRA project covered this study.

The College of Basic and Applied Sciences also issued an ethical clearance letter permitting UNU-INRA, which covers the researcher to obtain data for the study. These were the first point of contact for approval. Following acceptance, key stakeholders were adequately advised about the goal of the research as well as the time required to complete the interview

guide/questionnaire. Respondents were assured of confidentiality about using data obtained from them. Authors of academic literature used in this study are appropriately referenced as part of carefully adhered ethics.

CHAPTER FOUR

4.0 RESULTS

A study to assess the relationship between the oil and gas exploratory industry and livelihood outcome of residents within 10 communities is presented. Questionnaires and interview guides were used to elicit and collect responses from the 400 respondents from 10 selected communities in the Ellembelle District.

The findings of the study are presented here with the summary of the main dependent and independent variables as well as the economic impact of the oil and gas exploration activities, the sociocultural impact of the oil and gas activities, rate of development and education of the community members, climate, environmental and health impact of the oil and gas activities, and their energy source used. The other sections examine the relationship between each independent variable (including control and intermediary variables) and the dependent variable, presented as bivariate and multivariate, respectively.

4.1 Univariate Analysis of information about respondents

In this section, the information on the respondents' background characteristics is depicted with descriptive statistics (i.e., tables and graphical blueprints), typically with a frequency distribution. This was done to explore the variations that exist in the data. All the variables in this study are categorical and mutually exclusive. The distribution of the respondent's background information is summarised in Table 4.

4.1.1 Background characteristics of respondents

A total number of 400 responses were selected to participate in the study from the Ellembelle district, where oil and gas exploration activities and industries are situated. About 54% of the respondents in the study were males. About 35% of the respondents were in the age group 30 – 39 years, with only about 15% being above 50 years. It can be observed from Table 4.1 that

more than half (53.5%) of the respondents had obtained basic education. Interestingly, all the respondents had obtained some form of formal education which indicated a high literacy rate within the district. Also, about 56% of the respondents were currently in a union (married), with about 11% having previously been in a union (i.e., formerly in a union). They are comprised of divorced respondents, separated from spouses, and widowed. It can also be observed that Christianity was prevalent in the district, as the majority (93.2%) of the respondents reported being affiliated with the religious faith. The others comprised Muslim and Traditional believers. Additionally, a higher proportion (about 62%) of the respondents reported being household heads responsible for the well-being of their households. About 39% of the respondents have been residents within the district for 21 – 40 years. Meanwhile, about 23% have lived within the community in their lifetime. It was also reported that the primary source of livelihood was fishing and farming, with about 29% engaged in these activities as their occupations. Additionally, about 71% of the respondents and their families had perceived the intention to migrate out of the district as shown in Table 19. The occupation of majority (about 29%) of the respondent were fishing and farming.

Table 4. Distribution of background characteristics of respondents

Indicators	Frequency	Percentage (%)
Sex		
Male	215	53.7
Female	185	46.3
Age		
0 – 29 years	100	25.0
30 – 39 years	139	34.8
40 – 49 years	99	24.8
Above 50 years	62	15.4
Level of education		
Basic	214	53.5
Secondary	132	33
Tertiary	54	13.5
Marital status		
Single	134	33.5
Married	223	55.7
Formerly in union	43	10.8
Religion		
Christian	373	93.2
Others	27	6.8
Occupation		
Unemployed	60	15.0
Fishing/farming	115	28.75
Trading	105	26.25
Private sector employee	79	19.75

Government employee	41	10.25
Years of residency		
0 – 10 years	42	10.5
11 – 20 years	112	28.0
21 – 40 years	156	39.0
Above 40 years	90	22.5
Dependent		
0 – 5	228	57.0
6-10	128	32.0
11-15	28	7.0
16-20	16	4.0
Total	**400**	**100.0**

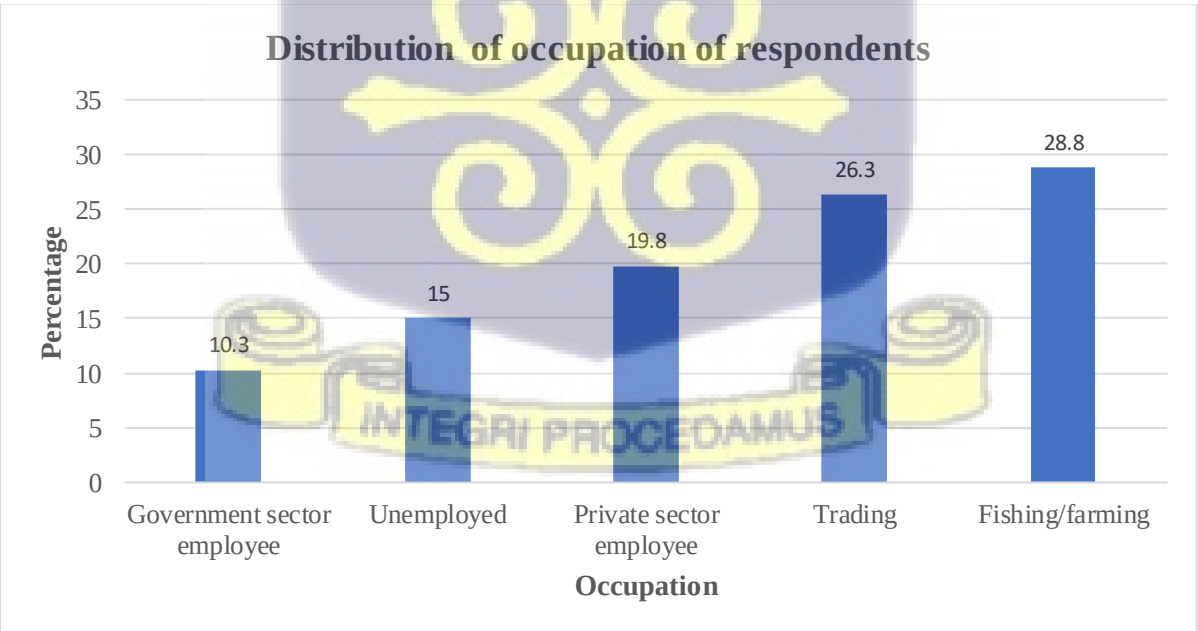


Figure 4 Percentage distribution of occupation of respondents

Indicators	Frequency	Percentage (%)
Oil and gas		
Positive impact	212	53.0
Negative impact	188	47.0
Livelihood outcome		
Positive	119	29.8
Negative	281	70.2
Intention to migrate		
Yes	285	71.2
No	115	28.8
Total	400	100.0

Table 5: Percent distribution of independent, intermediary, and dependent variables

Source: Field survey, 2022 (Ellembelle District)

4.2 Economic Impact of Oil and Gas Exploration Activities.

Respondents were asked about their economic activity before and after the oil and gas industry emerged in their communities or district. The study revealed that most respondents were traders and farmers/fisherfolks before the oil and gas industry emerged, whiles their major current economic activity after the emergence of the industry was trading, farming, and fishing on a very low scale.

4.2.1 Major Economic Activity Before the Oil and Gas Industry

Regional landscapes were shaped by a number of significant economic activity prior to the establishment of the oil and gas industry. Examining rural economies, trading routes, and important industries that established the groundwork for society structures, this section examines the major economic activities before the oil and gas industry in the District.

Activity	Percentage
Commerce	22.25
Artisans	3.5

Fashion	3.5
Farming	21.5
Fishing	21.25
Government	5.75
Others	17
Unemployed	5.25
Total	100

Table 6. Major Economic Activity Before Oil and Gas Industry Emerged

From the research study, 22.25%, of the respondents were traders, 21.25% were fisherfolks, and 21.5% were farmers before the oil and gas industry emerged. Additionally, 57.25% of the respondents were not involved in any of the three main livelihood activities; they were involved in at least one of the primary livelihood activities listed in Table 5.

4.2.2 Current Major Economic Activity

From the research study, 32% of the respondents are currently traders, 15% are currently fisherfolks, and 12.5 are currently farmers. Additionally, 40.5% respondents are currently not involved in any of the three main livelihood activities; they are involved in at least one of the primary livelihood activities listed in Table 6.

Activity	**Percentage**
Commerce	32
Artisans	5.5
Fashion	3
Farming	12.5
Fishing	15
Government	7.75
Others	8.75
Unemployed	15.5
Total	100

Table 7. Current Major Economic Activity After Oil and Gas Industry Emerged

4.2.3 Impact of The Oil and Gas Industry on Major Economic Activity

It can be observed from Table 7 that majority (75%) of the respondents reported that the establishment of the oil and gas industry has had an impact on their major economic activities. However, about 25% of the respondents indicated it didn't affect their major economic activity.

Statement	**Percentage (%)**
Yes	75.0
No	25.0
Total	**100**

Table 8. Impact of the Oil and Gas industry on their major economic activity

4.2.4 How the Oil and Gas industry has affected the community members.

During the fieldwork, a man in his middle age who was both a farmer and a fisherman remarked that "*The oil discovery and the oil and gas industry have harmed us in many ways. They have taken over our lands and turned them into residential areas and work sites. Our farms are now far away from us, and we have to use their roads to get there. This makes our farming time and productivity decrease and affects our food supply. Our fish catch has also reduced a lot because they limit our fishing days and areas. We are losing our livelihoods and our rights to our resources*." (**Field survey, 2022**).

Reports on interviews with key informants from some communities revealed that:

An interview with some key informants (local residents who have witnessed the changes and impacts of the industry on the community's livelihood and well-being) from one of the communities revealed that:

"The oil and gas industry has brought us more benefits than problems."

"They promised to train some natives by taking them to school to further their education, but they didn't." (**Field survey, 2022**).

The statements above summarize the informant's positive attitude towards the industry and its effects on community, as well as their disappointment and frustration with the industry's unfulfilled promises and lack of support for the community.

4.2.5 Standard of Living Since 2009, The Exploration of Oil and Gas.

The research study shows that 157 (39.3%) respondents reported that the standard of living of the community members has worsened since 2009, the exploration of oil and gas within their communities. It can be observed that 141 (35.3%) respondents reported that the standard of living remains the same because things are becoming more expensive and difficult to buy even in other regions without the oil and gas industry. A number of variables, including access to basic necessities, healthcare, housing, education, and income is conceptualised as standard of living in this study.

Statement	**Percentage (%)**
Unchanged	35.3
Improved	15.0
Significantly improved	9.0
Worsened	39.3
Significantly worsened	1.5
Total	**100**

Table 9. Standard of living since the exploration of oil and gas from 2009

4.2.6 Loss of Property or Land to The Oil and Gas Industry

The research results show that 71 (17.75%) reported lost their property to the oil and gas industry, whiles 329 (82.25%) respondents didn't lose any property. The property lost included farmlands, resident lands, houses, crops, animals, and many other properties.

Statement	Percentage (%)
Yes	17.75
No	82.25
Total	**100**

Table 10. Loss of property to the oil and gas industry

4.2.7 Compensation Received for The Loss

The research findings revealed that of the 71 respondents that lost their property or their land, 40 (56.34%) did not receive compensation for their lost property, while 31 (43.66%) received compensation.

Statement	Percentage (%)
Yes	43.66
No	56.34
Total	**100**

Table 11. Compensation received for the loss

4.2.8 Type of Compensation

The oil and gas industry has a significant impact on the environment and the livelihoods of the people living in the areas where it operates. One of the ways that the industry tries to mitigate its negative effects is by offering compensation to the affected communities. However, the type and amount of compensation may vary depending on the situation and the preferences of the recipients.

Statement	Percentage (%)
Money	25.35
Assets (Poultry farm, fishpond, palm-nut farm, plastic chairs, and canopies for renting services)	29.55

Nothing	45.10
Total	**100**

Table 12. Compensation type received

The table shows that the most common type of compensation given to the 71 respondents who lost a property or land, was assets 21 (29.55%) (poultry farms, fishponds, palm-nut farms and plastic chairs and canopies for renting services), followed by money 18 (25.35%). The least common types of compensation were fishpond and palm-nut farm. However, the most striking finding is that almost half of the respondents 32 (45.10%) reported that they received no compensation at all. This suggests that the oil and gas industry is not fulfilling its social responsibility to the communities it affects, and that there is a need for more transparency and accountability in the compensation process.

Outcome of respondents explained as follows:

One of the interviewees, a fisherman from Atuabo, expressed his frustration with the oil and gas industry:

*"The oil and gas project took away our land and livelihoods, and we received either nothing or a meagre amount of compensation that never matched their promises. Some of us were excluded from the payment process, while others were told to wait indefinitely. We don't trust the industry or our leaders to be fair and transparent with us." (**Field survey, 2022**).*

Reports on interviews with some key informants from some communities revealed that:

Another interviewee, a key informant from Ngalekyi, also expressed her concerns about the oil and gas industry:

"*The oil and gas industry took over 365 acres of land from the natives and destroyed their crops. The natives received compensation in cash and food, which was increased after a better*

deal by their new chief. The natives are satisfied with the industry and its impact on their living standards and economy." ***(Field survey, 2022).***

4.2.9 Job Opportunities Due to The Oil and Gas Industry

The research findings show that 258 respondents representing 64.5%, stated that there had not been any job opportunities due to the oil and gas industry in their communities. Additionally, 142 respondents (35.5%) stated there have been job opportunities due to the oil and gas industry, but the opportunities are mainly cleaning, cooking services and security.

Statement	**Percentage (%)**
Yes	35.5
No	64.5
Total	**100**

Table 13. Job opportunities due to the oil and gas industry

4.2.10 Effect of The Oil and Gas Industry on Fishing and Farming Activities Within the Communities

The research study shows that 299 (74.75%) respondents stated that the oil and gas industry has influenced and is still affecting their fishing and farming activities, whiles 101 (25.25%) respondents said otherwise.

Statement	**Percentage (%)**
Yes	74.75
No	25.25
Total	**100**

Table 14. Effect of the oil and gas industry on fishing and farming activities within the communities

4.2.11 Degree of Effect on Their Fishing and Farming Activities

On degree of the effect of the oil and gas activities on their fishing and farming activities, one old aged farmer explained that:

*"My farming business has suffered greatly." First and foremost, I had to start farming from the beginning. It requires a great deal of effort to maintain a stable farm like the one I used to have. Second, I used to be able to get on my bike and go to my farm. Now that they have taken our lands, they are no longer accessible since we must walk a long way to get to our new farms." (**Field survey, 2022**).*

4.2.12 Ability to meet household food needs before and after the oil activities

The research study shows that before the oil and gas activities 183 (45.75%) respondents could easily meet their household food needs with surplus, and 161 (40.25%) could most of the time meet household food needs. Concerning their ability to meet household food needs now, 120 (30%) rarely meet their food needs now, and 50 (12.5%) easily meet their food needs with a surplus.

Statements	**Easy with surplus**		**Most of the time**		**Sometimes**		**Rarely**		**Total**	
Your ability to meet your household food needs before the oil activities	183	45.75%	161	40.25%	38	9.5%	18	4.5%	**400**	**100**
Your ability to meet your	50	12.5%	191	47.75%	39	9.75%	120	30.0%	**400**	**100**

household food needs now.										

Table 15. Ability to meet household food needs before and after the oil activities

On their ability to meet household food needs before and after the oil and gas activities one middle aged female farmer explained that:

*"The activities of the oil and gas industry are a problem for us." I had a large farm with many crops on it, but the gas company had divided it in two. Since I cannot cultivate within a specific distance of the industry, I have lost many crops due to the industry. Because I have no other land, I must return home and starve. There should have been some education and public awareness before destroying our lands. It is unjust to show up and do whatever you want. As a result, we, the farmers, are suffering. We are unable to support our families. We are a small agricultural town. On the other hand, our lands are being taken over, which is quite upsetting for most of us." (**Field survey, 2022**).*

4.3 Socio-Cultural Impact of Oil and Gas Exploration Activities

4.3.1 Rate of migration in the communities since 2009

The study findings show that the migration rate into these communities since the exploration of oil and gas in 2009 has increased. The vast majority of 265 (66.25%) responded that the rate of migration into these communities has increased, while 67 (16.75%) characterized it as moderate. The remaining 68 (17%) were characterized as low. Migration rate from the communities recorded a high rate of 161 (40.25%), a moderate rate of 116 (29%), and a low rate of 123 (30.75%).

On the rate of migration in the communities since 2009, one respondent explained as follows:

*"Migration into our towns has gone up; this can be attributed to the oil and gas industry. Many organizations and individuals visited the town recently." (**Field survey, 2022**).*

Additionally, the respondent's thoughts on the rate of migration from their communities were sought.

*"Most of the village's youths are leaving in pursuit of better grounds." They hoped to find work in the oil business, but that did not materialize, and fishing and farming are no longer viable options, so they are leaving." (**Field survey, 2022**).*

4.3.2 Thought and Willingness to Migrate from Their Community

The research study shows that as far as the thought of migration is concerned, 115 (28.8%) respondents have not considered travelling out of the communities, while 285 (71.3%) have considered leaving their communities.

Statement	Frequency	Percentage (%)
Yes	285	71.3
No	115	28.8
Total	**400**	**100**

Table 16. Their thought and willingness to migrate from their communities

4.3.3 Reasons for Intention to Migrate

The research study's result concerning the reason for their intention to travel shows that 212 (53%) respondents, more than half of them intend to travel to seek better job opportunities, 88 (22%) and 50 (12.5%) respondents wish to travel out of their communities due to the decreasing fish catch and the loss of their farmlands respectively. The remaining intend to travel in order to change their environment for a good life and other reasons.

Statement	Percentage (%)
Decreasing fish catch	22.0
Loss of farmlands	12.5
Better job opportunity	53.0
Change in environment	7.5
Others (not thought about it)	5.0
Total	**100**

Table 17. Respondents reason for the intention to migrate from their community

4.3.4 How Long Have They Thought About Migrating

The research findings show that 207 (51.75%) respondents thought of migrating after the oil activities began, while 110 (27.5%) respondents had always thought of migrating.

Statement	Percentage (%)
Before the oil industry	20.75
After the oil activities began	51.75
I have always had the thought	27.5
Total	**100**

Table 18. How long have they thought about migrating

4.3.5 Where They Intend to Migrate To

The study findings revealed that 173 (43.25%) respondents intend to travel to other major cities for better job opportunities or good living conditions, 91 (22.75%) to Accra, 52 (13%) to Secondi-Takoradi, 43 (10.75%) to Kumasi and 41 (10.25%) to other villages where farming is conducive.

Statement	Percentage (%)
Kumasi	10.75

Accra	22.75
Secondi-Takoradi	13.0
Another major city	43.25
Another village	10.25
Total	**100**

Table 19. Where respondents intend to migrate to

4.3.6 Safety in The Community Now Compared to The Period Before the Oil and Gas Industry

The results show that safety in the communities now compared to the period before the oil and gas activities remain unchanged180 (45%). Of the remaining, 90 (22.5%) reported that safety has slightly decreased in their communities, with 89 (22.25%) reported that safety has slightly increased. In comparison, the remaining 25 (6.25%) and 16 (4%) indicated safety in their communities to have significantly increased and significantly decreased, respectively.

Statement	**Percentage (%)**
Significantly increased	6.25
Slightly increased	22.25
Unchanged	45.0
Slightly decreased	22.5
Significantly decreased	4.0
Total	**100**

Table 20. Safety in the community now compared to the period before the oil and gas industry

On safety in the communities now compared to the period before the oil and gas industry, one respondent explained that:

"The gas plant has brought us insecurity, fear, and conflict. We don't trust each other or the industry. We are afraid of the fire and the explosion. We are fighting over the land and the compensation. We have lost our peace and our safety." **(Field survey, 2022)**.

4.3.7 Frequency of Current Land-Related Disputes in The Communities Compared To The Period Before The Oil Industry Activities

The research findings show that of the 400 respondents, the vast majority of 155 (38.75%) reported that the frequency of land-related disputes remained unchanged since the oil and gas activities started. It was observed that the frequency of land-related disputes has increased slightly 97 (24.25%), 63 (15.75%) reported that it has significantly increased, 56 (14%) reported it has slightly decreased, and the remaining 29 (7.25%) reported a significant decrease in land-related disputes.

Statement	**Percentage (%)**
Significantly increased	15.75
Slightly increased	24.25
Unchanged	38.75
Slightly decreased	14.0
Significantly decreased	7.25
Total	**100**

Table 21. Frequency of Current land-related disputes observed in the study

4.3.8 Statements About the Oil and Gas Industry

The research findings indicated that 166 (41.5%) disagree that the oil industry has played a significant role in the disputes between them and the communities, 251 (62.75%) agree that the oil and gas industry has adversely affected social activities, and 163 (40.75%) respondents agree that the industry has adversely affected cultural norms and practices of the communities.

	Agree		**Neither agree nor disagree**		**Disagree**		**Percentage (%)**	
The oil industry has played a significant role in the disputes (the communities and the oil & gas industry)	128	32%	106	26.5%	166	41.5%	**400**	**100**
The oil industry has adversely affected social activities	251	62.75%	66	16.5%	83	20.75%	**400**	**100**
The oil industry has adversely affected cultural	163	40.75%	78	19.5%	159	39.75%	**400**	**100**

norms and practices								

Table 22. Statements about the oil and gas industry

4.3.9 Clashes Between Community Members and The Oil and Gas Companies

The research findings show that 268 (67%) respondents reported that there was no clash between community members and the oil and gas companies, whiles 132 (33%) reported that there was a clash between community members and the oil and gas companies.

Statement	**Percentage (%)**
Yes	33.0
No	67.0
Total	**100**

Table 23. Clashes between community members and the oil and gas companies

Respondents' outcome of clash between community members and the oil and gas companies explained as follows:

"There hasn't been any misunderstanding between both parties since oil and gas exploration. An interview like this is a big problem for the natives because they feel it won't be of use, sometimes leading to a fight between the natives and the one who responds to the questions." **(Field survey, 2022).**

4.3.10 Fear of Clashes Between Community Members and The Oil and Gas Companies in Future

The study findings show that 258 (64.5%) respondents, more than half of them, indicated that they live with the fear of clashes between them and the oil and gas companies in future, whiles 142 (35.5%), have no fear of clashes occurring in future.

Statement	Percentage (%)
Yes	64.5
No	35.5
Total	**100**

Table 24. Fear of clashes between community members and the oil and gas companies in future

4.4 Impact of the Oil and Gas Activities on Development and Education in the Study Area

4.4.1 Most development options of the communities

The study findings show that respondents' topmost development priority is building an ICT and science lab 115 (28.75%) for the students in the various schools i.e., educating the young ones and equipping them.

Statement	Frequency	Percentage (%)
Building of ICT and Science labs for students	115	28.75
Employment/ job opportunities	110	27.5
Scholarships for students	58	14.25
Construction of roads	32	8.0
Building of health facilities (clinics & CHPS compounds)	51	12.75
Teachers for the school	25	6.25
Construction of Astro Turf	15	3.75

Renovation of school buildings	12	3.0
Provision of a market centre	11	2.75
Distribution of dustbins	10	2.5
Provision of streetlight	8	2.0
Building a training centre in the community	7	1.75
Total	**400**	**100**

Table 25. Topmost Development Priority for the study communities

4.4.2 Vacancy (linking to their skills) opportunities they will take if any of the oil and gas industries are recruiting.

The study shows that the most job opportunity they would want to occupy is the cleaning position 83 (20.75%), and this is due to their educational background, followed by security 56 (14%) and the least is data analyst 5 (3.75%).

Statement	**Percentage (%)**
Cleaner	20.75
Security	14.0
Cook/ catering services	10.75
Driver	8.5
Electrical engineer	8.25
Human resource department	5.75
Administration work	5.25
Carpentry	4.75
Mechanic	4.5

Welding & fabrication	4.25
Any job opportunity	4.25
Computer engineer	4.0
Accounting & Finance	3.75
Data analyst	3.75
Total	**100**

Table 26. Vacancy opportunities respondents would occupy

4.4.3 Their readiness to be skilled or further trained for employment by the oil and gas industry.

The research findings revealed that of the 400 respondents, 340 (85%), more than half reported that they are ready to be skilled or further trained for employment in the oil and gas industry, while the remaining 60 (15%) reported that they were not ready to be skilled.

Statement	**Frequency**	**Percentage (%)**
Yes	340	85.0
No	60	15.0
Total	**400**	**100**

Table 27. Their readiness to be skilled or further trained for employment by the oil and gas industry

4.4.4 Sustainable livelihood of interest to the community members

The study shows that the four most sustainable livelihoods of interest to the respondents are a well-paid job or business 124 (31%), poultry farming 35 (8.75%), expansion of their current economic activity and fishing 31 (7.75%).

Statement	**Percentage (%)**
A well-paid job/ business	31.0
Farming/ agriculture	4.0

Can't work because of age and health	0.5
Mechanic/ engineer	5.75
Catering/ baking	4.25
Security	0.75
Carpentry	2.5
Poultry	8.75
Cleaning services	0.5
Dressmaking/ seamstress	4.0
Driving	6.0
Electrical engineer/ electrician	2.75
Expansion of current economic activity (provision shop, cement, hairdressing, Momo agent, seamstress)	7.75
Fishing	7.75
Furthering education for a good and stable job	2.75
Hairdressing	2.25
Maison	0.5
Painting	1.0
Pig farming	3.5
Trained police personnel	3.25
Government work	0.5
Total	**100**

Table 28. Sustainable livelihood of interest for respondents

4.4.5 How the oil and gas activities and the industry has improved infrastructure.

The research findings show that 238 (59.59%) respondents stated that the oil and gas industry has improved infrastructure within their communities. The remaining 162 (40.5%) stated that infrastructure hasn't improved in their communities.

Statement	**Percentage (%)**
Yes	59.59
No	40.5
Total	**100**

Table 29. Respondents perception/ views on whether oil and gas activities and the industry has improved infrastructure in the study communities

Respondents that answered yes to the improvement of infrastructure explained that:

I. "Our roads were very bad before the industry came into this district, but now our roads are very good and tarred."

II. "A lot of educational facilities have been constructed within certain communities and solar systems connected. This is giving our kids the zeal to go to school."

4.4.6 The impact of the oil and gas activities and the industry on education in the communities

The study findings show that 259 (64.75%) respondents reported that oil and gas activities have impact on education in their communities, while 141 (35.25%) reported no impact on education in their communities.

Statement	**Percentage (%)**
Yes	64.75
No	35.25

Total	**100**

Table 30. Respondents view on the impact of the oil and gas activities and the industry on education in the communities

Respondents that responded yes to the impact of the oil and gas activities on education in the communities explained that:

James a young graduate from the teacher training college who couples as a fisherman mentioned that:

"The oil and gas industry has ruined our fishing and our education. I want to go back to school, but I have no money. The free SHS is not enough, and the kids have no future." **(Field survey, 2022).**

4.4.7 The impact of the oil and gas industry and its activities on the youth in the communities

The study shows that 301 (75.25%), more than half of the respondents indicated that oil and gas activities have an impact on the youth in their communities, while 99 (24.75%) indicated no impact on their youth.

Statement	**Percentage (%)**
Yes	75.25
No	24.75
Total	**100**

Table 31. The impact of the oil and gas industry and its activities on the youth in the communities

Excerpts from respondents that answered yes explained that:

"It's difficult to educate our children or take them to school. Education is now expensive for us because we don't earn enough to cater for fees. Most of our kids have stopped schooling because we can't afford to join these "galamsey" and bad social vices to take care of themselves. The ladies are just getting pregnant because they are lured by these "oil boys" and

given money. Some have also become prostitutes, and the males' become thieves and armed robbers." **(Field survey, 2022).**

4.5 Environmental and Health Impact of the Oil and Gas Industry and its Activities

Environmental changes in this study were attributed to their air, water, temperature, and other physical environmental changes they have experienced since the operation of the oil and gas industry. Due to the flaring of the gas, it is expected that the communities directly close to the industry may experience very high weather temperatures because of the heat the flaring generates. Gas flaring produces large flames and smoke that can be seen from far away. The flames and smoke can also create light and noise pollution, affecting the quality of life of nearby residents and wildlife. Gas flaring emits greenhouse gases such as carbon dioxide and methane, which contribute to global warming and climate change.

4.5.1 Their community experiencing any environmental change/ damage due to the oil and gas activities.

The research study shows that 204 (51%) respondents aren't experiencing any environmental change or damage in their communities due to oil and gas activities, while 196 (49%) stated that they are experiencing environmental changes.

Statement	Frequency	Percentage (%)
Yes	196	49.0
No	204	51.0
Total	**400**	**100**

Table 32. Their community experiencing any environmental change/ damage due to the oil and gas activities

4.5.2 Perceived health problems due to the location of the oil and gas industry

The research study shows that 290 (72.5%) respondents aren't experiencing any health problems due to oil and gas activities, while 110 (27.5%) stated that they are encountering health problems due to oil and gas activities.

Statement	**Frequency**	**Percentage (%)**
Yes	110	27.5
No	290	72.5
Total	**400**	**100**

Table 33. The community members encountering any health problems due to the location of the oil and gas industry.

4.5.3 Environmental changes experienced over the last 5-10 years

Statement	**Frequency**	**Percentage (%)**
Increased temperature (very hot weather)	295	73.75
Air pollution	5	1.25
Noise pollution	5	1.25
Clean drilled water	1	0.25
no idea/ don't know	88	22.0
Low rainfall	9	2.25
Total	**400**	**100**

Table 34. environmental changes experienced over the last 5-10 years

4.6 Energy Sources Used

4.6.1 Energy sources available in the communities

The research study shows that for the traditional energy sources, wood 100 (25%), charcoal 57 (14.25%), and kerosene 22 (5.5%) are the energy sources available in the various communities. In comparison, wood, and charcoal 153 (38.25%), wood charcoal and kerosene 55 (13.75%), wood, charcoal, kerosene, and crop 13 (3.25%) are the energy sources used together in some households (fuel stacking).

The modern energy sources available in the communities are electricity 115 (28.75%), LPG 65 (16.25%), electricity and LPG 205 (51.25%), biogas 5 (1.25%), electricity and biogas 5 (1.25%), electricity, LPG, and biogas 5 (1.25%). Most respondents use multiple sources of energy and not just one source.

Traditional Sources	**Percentage (%)**
Wood	25.0
Charcoal	14.25
Kerosene	5.5
Wood and charcoal	38.25
Wood, charcoal, and kerosene	13.75
Wood, charcoal, kerosene, and crop residue	3.25
Total	**100**
Modern Sources	**Percentage (%)**
Electricity	28.75
Liquefied Petroleum Gas (LPG)	16.25
Biogas	1.25
Electricity and biogas	1.25

Electricity and LPG	51.25
Electricity, LPG, and biogas	1.25
Total	**100**

Table 35. Energy sources available in the study communities

4.6.2 Energy Sources Used by Households in Study Communities

The 400 households use both the traditional and modern energy sources. The study indicated that for the traditional energy sources, wood 16.5%, charcoal 13.25%, and kerosene 2.5% are the most frequently dominant energy sources used for households in the selected communities. In comparison, wood and charcoal 52.5%, wood charcoal and kerosene 13.5%, wood, charcoal, kerosene, and crop 1.5% are the energy sources used together in some households (fuel stacking).

The modern energy sources used by households in the communities are electricity with frequency 88, LPG with frequency 77, electricity and LPG with frequency 195, biogas with frequency 10, electricity and biogas with frequency 7, electricity, LPG, and biogas with frequency 23.

Traditional Sources	**Percentage (%)**
Wood	16.5
Charcoal	13.5
Kerosene	2.5
Wood and charcoal	52.5
Wood, charcoal, and kerosene	13.5
Wood, charcoal, kerosene, and crop residue	1.5
Total	**100**

Modern Sources	Percentage (%)
Electricity	22.0
Liquefied Petroleum Gas (LPG)	19.25
Biogas	2.5
Electricity and biogas	1.75
Electricity and LPG	48.75
Electricity, LPG, and biogas	5.75
Total	**100**

Table 36. Energy sources and types used by their households in study communities

4.6.3 Ranking of Energy Type Being Used (most used to least used)

The study results show that LPG 24.75%, firewood/ wood 22.5%, electricity 19.5%, charcoal 17.25%, kerosene 14.75%, and biogas 1.25% were the energy type used most.

Statement	Frequency	Percentage (%)
Charcoal	69	17.25
Electricity	78	19.5
Firewood/ wood	90	22.5
LPG	99	24.75
Kerosene	59	14.75
Biogas	5	1.25
Total	**400**	**100**

Table 37. Ranking of Energy Type Being Used (most used to least used)

4.6.4 Characteristics of energy type used at the household level

4.6.4.1 Average cost of energy per week (GHC)

The research findings showed that with the cost of energy per week, 307 (76.75%) respondents spend between 10-100 cedis on energy, 55 (13.75%) spend between 101-200 cedis, 8 (2%) spend between 201-300 cedis, 7 (1.75%) spend less than 10 cedis per week. The remaining 22 (5.5%) do not buy the energy source, charcoal, and wood, to be precise. They gather them from the communities and farms.

Cost (GHC)	**Percentage (%)**
Less than 10	1.75
10-100	76.75
101-200	13.75
201-300	2.0
301-400	0.25
Don't buy it	5.5
Total	**100**

Table 38. Average cost of energy per week (GHC)

4.6.4.2 Energy source distance away from home

The study shows that 257 (64.25%) travel a long distance to obtain the energy types, whiles 76 (19%) do not travel long distances to obtain it. The remaining 67 (16.75%) stated that they sometimes travel long distances, and other times, it is delivered to them at home.

Statement	**Percentage (%)**
Yes	64.25
No	19.0
Sometimes	16.75

Total	**100**

Table 39. Energy source distance away from home (travel long distance)

4.6.4.3 Reliability (is it always available when you need it?)

The study shows that 207 (51.75%) reported that the energy types used aren't always available (reliable), whiles 132 (33%) also reported that their energy types are always available and reliable. The remaining 61 (15.25%) stated that their energy source types are sometimes reliable and other times not reliable.

Statement	**Percentage (%)**
Yes	33.0
No	51.75
Sometimes	15.25
Total	**100**

Table 40. Reliability (is it always available when you need it?

4.6.5 Stove types being used

The study shows that 150 (37.5%) use the traditional three-stone fire stove, 146 (36.5%) use the traditional coal pot, and 64 (16%) use the improved stove.

Stove type	**Percentage (%)**
Traditional three-stone fire	37.5
Traditional coal pot	36.5
Car rim metal stove	0.75
Improved stove	16.0
Burner for LPG	1.5
Electrical stove	0.5
Traditional coal pot and car rim metal stove	3.75

Traditional coal pot and LPG	3.5
Total	**100**

Table 41. The stove types being used

4.6.6 Is the government doing a good job monitoring the oil and gas industry for environmental compliance?

The study findings revealed that 230 (57.5%) respondents reported that the government's level of monitoring of the oil and gas industry is very poor and bad, and 24 (6%) reported that the level is extremely effective.

Statement	**Percentage (%)**
Extremely effective	6.0
Very effective	4.25
Moderately effective	12.5
Slightly effective	10.25
Not at all	57.5
Do not know	9.5
Total	**100**

Table 42. The government's level of monitoring the oil and gas industry

4.6.7 Standard of living without the oil and gas industry and its activities. Will economic and social activities change or remain the same?

The results show that 289 (72.25%) respondents stated that their standard of living will be better without the oil and gas industry, 101 (25.25%) stated that their standard of living won't change, and 10 (2.5%) stated that it was a difficult decision to make since the economy is already hard now.

Statement	Percentage (%)
The standard of living will be better without the industry	72.25
The standard of living won't change	25.25
It's difficult to decide since the economy is hard now.	2.5
Total	**100**

Table 43. Response from how the standard of living would be without the oil and gas industry

One respondent thought on standard of living as favorable and better without the oil and gas industry was sought. He explained that:

"The oil and gas industry has harmed our livelihoods, environment, and well-being. We have lost our fish, farms, lands, sea, and happiness. We have faced pollution, heat, weeds, and high prices. We would be better off without them, except for the roads they built." **(Field survey, 2022).**

Other respondents thought on how standard of living would be without the oil and gas industry was sought. It was explained that:

"The oil and gas industry has not made any difference in our lives, except for the roads. We still face the same challenges and opportunities as before." **(Field survey, 2022).**

4.6.8 Responses on any other comment or statement/ submissions

The results show that respondents found issues like unemployment 105 (26.25%) as a major concern.

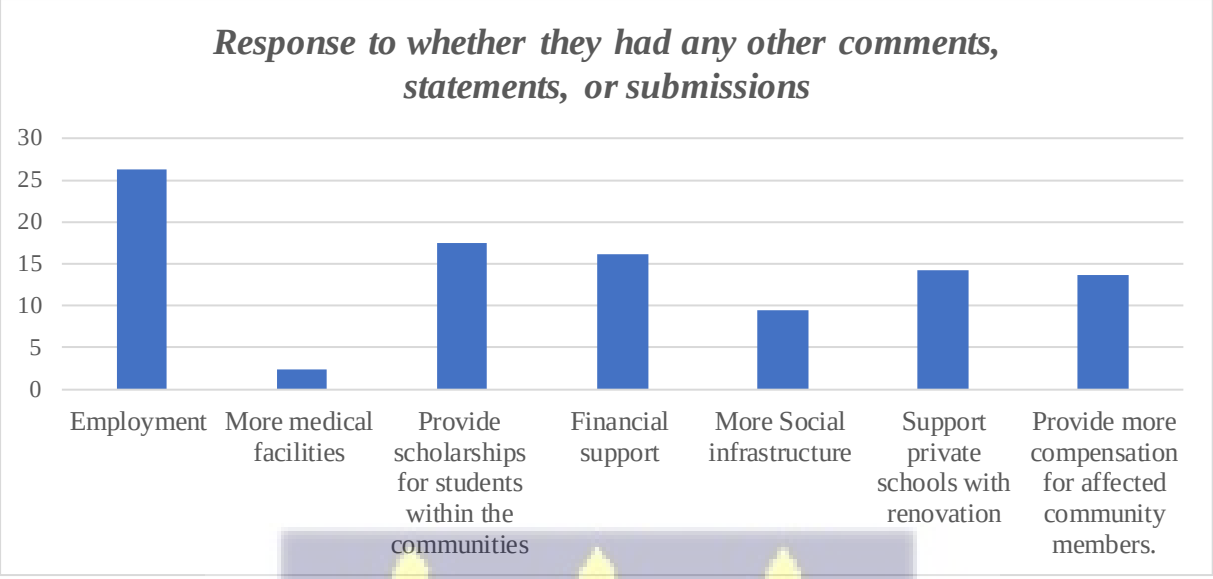


Figure 5: Respond to whether they had any other comments, statements, or submissions.

Respondents who had any other comments or submissions explained that:

I. *"The oil and gas companies should support our education, infrastructure, and environment. We want them to help our schools, markets, toilets, clinics, and Astroturf. We want them to give us free gas, scholarships, loans, and incentives. We want them to prevent the heat, pollution, and damage. We want them to pay for the land they took."*

II. *"The oil and gas companies should create more opportunities for us. We want them to improve our skills, employ our people, and empower our women. We want them to offer us jobs, training, and programs. We want them to respect our rights, livelihoods, and dignity."*

4.7 Bivariate analysis: Association between each independent variable and livelihood outcome

This section examines the relationship between each independent variable i.e., the impact of oil and gas, socio-demographic indicators, and intention to migrate and the dependent variable i.e., livelihood outcome. The independent variables in this study include the impact of oil and gas, sex, age, level of education, marital status, religion, household head, occupation, years of

residency and intention to migrate. A Pearson Chi-square test statistic was computed for each independent variable and dependent variable at an alpha value of 0.05 to measure the relationship that exists between each of the independent variables and livelihood outcome. A significant relationship is reported when a test statistic value less than 0.05 is observed. A summary presented in tables representing each independent variable and the dependent variable as follows:

4.7.1 Impact of oil and gas and livelihood outcome

Table 45 indicates a significant relationship between the impact of oil and gas industry activities on respondents and livelihood outcomes. The results indicate a chi-square test statistic with an α-value of < 0.001, which therefore inferred that a negative livelihood outcome is highest amongst respondents who reported a negative impact on the oil and gas industry (about 80%). The results are lower for respondents who reported a positive impact on the oil and gas industry about 62%).

Table 44. Relationship between respondent's experience with the oil and gas industry activities and livelihood outcome

Oil and Gas	**Livelihood outcome**		**Number**
	Positive (%)	**Negative (%)**	
Positive impact	38.2	61.8	212
Negative impact	20.2	79.8	188
Total	119	281	400
χ^2 = 15.438 df = 1 p-value = < 0.001			

4.7.2 Intention to migrate and livelihood outcome

Table 46 shows the relationship between respondents' intention to migrate and livelihood outcomes. The results indicate a significant relationship between the intention to migrate and

livelihood outcome. The results from the table also indicate a chi-square test statistic with an α-value of < 0.001. About 73% of the respondents who intended to migrate were reported to have negative livelihood outcomes compared to about 64% of the respondents who had decided to stay in the district.

Table 45. Relationship between respondent's intention to migrate and livelihood outcome

Intention to migrate	**Livelihood outcome**		**Number**
	Positive (%)	**Negative (%)**	
Yes	27.4	72.6	285
No	35.7	64.3	115
Total	119	281	400
	χ^2 = 2.690 df = 1 p-value = < 0.101		

4.7.3 Sex and livelihood outcome

Table 47 shows results on the relationship between respondents' sex and livelihood outcome. The results indicate that there is no significant relationship between the respondent's sex and livelihood outcome. The results from the table also indicate a chi-square test statistic with a p-value of 0.655. About 72% of the respondents who were females had negative livelihood outcomes compared to about 69% of the male respondents in the district.

Table 46. Relationship between respondent's sex and livelihood outcome

Sex	**Livelihood outcome**		**Number**
	Positive (%)	**Negative (%)**	
Male	30.7	69.3	215
Female	28.6	71.4	185
Total	119	281	400

χ^2 = 0.200 df = 1 p-value = 0.655

4.7.4 Age and livelihood outcome

Table 48 shows results on the relationship between respondents' age and livelihood outcome. The results indicate that there is no significant relationship between respondents' age and livelihood outcome. The results from the table also indicate a chi-square test statistic with a p-value of 0.234. About 74% of the respondents who are in the age range between 30 – 39 years were reported to have negative livelihood outcomes compared to 63% of the respondents who are in the range of 0 – 29 years living within the district.

Table 47. Relationship between respondent's age and livelihood outcome

Age	Livelihood outcome		Number
	Positive (%)	Negative (%)	
0 – 29 years	37.0	63.0	100
30 – 39 years	25.9	74.1	139
40 – 49 years	26.3	73.7	99
Above 50 years	32.3	67.7	62
Total	119	281	400

χ^2 = 4.264 df = 3 p-value = < 0.234

4.7.5 Level of education and livelihood outcome

The results showed in Table 49 indicate a significant relationship between respondent's level of education and livelihood outcome. This can be inferred from the table with a chi-square test statistic with a p-value of 0.001. Negative livelihood outcome was highest amongst about 77% of the respondents who had only basic education and reduced as the level of education increased. A higher educational level is associated with a lower negative livelihood outcome,

as can be observed in table 4.42. 50% of the respondents who had tertiary education were reported to have a negative livelihood outcome.

Table 48. Relationship between respondent's level of education and livelihood outcome

Education	Livelihood outcome		Number
	Positive (%)	Negative (%)	
Basic	23.4	76.6	214
Secondary	31.8	68.2	132
Tertiary	50.0	50.0	54
Total	119	281	400
	χ^2 = **15.041 df = 2 p-value = 0.001**		

4.7.6 Marital status and livelihood outcome

Table 50 shows results on the relationship between respondents' marital status and livelihood outcome. The results indicate that there is no significant relationship between the respondent's marital status and livelihood outcome. The results from the table indicate a chi-square test statistic with a p-value of 0.096. About 84% of the respondents who are formerly married were reported to have negative livelihood outcomes compared to about 66% of the respondents who are single.

Table 49. Relationship between respondent's marital status and livelihood outcome

Marital status	Livelihood outcome		Number
	Positive (%)	Negative (%)	
Single	33.6	66.4	134
Married	30.0	70.0	223
Formerly in union	16.3	83.7	43

Total	119	281	400

χ^2 = 4.684 df = 2 p-value = 0.096

4.7.7 Religion and livelihood outcome

Table 51 shows results on the relationship between respondents' religion and livelihood outcome. The results indicate that there is no significant relationship between respondents' religion and livelihood outcomes. The results from the table indicate a chi-square test statistic with a p-value of 0.186. About 81% of the respondents who belonged to other religious faiths were reported to have negative livelihood outcomes compared to about 69% of the respondents who are Christians.

Table 50. Relationship between respondent's religion and livelihood outcome

Religion	**Livelihood outcome**		**Number**
	Positive (%)	**Negative (%)**	
Christian	30.6	69.4	373
Other	18.5	81.5	27
Total	119	281	400

χ^2 = 1.748 df = 1 p-value = 0.186

Source: Computed from field survey, 2022 (Ellembelle District)

4.7.8 Occupation and livelihood outcome

The results from Table 52 indicate that there is a significant relationship between respondents' occupations and livelihood outcomes. The table shows a chi-square test statistic with a p-value of 0.033. Negative livelihood outcome is lowest amongst respondents who are employed by the government. The table also indicate that about 59% of the respondents, who are government sector employees had negative livelihood outcomes compared to about 76% of respondents

who are involved in fishing and or farming. There was no difference between respondents who are unemployed and respondents who are private sector employees, with 63% reported to have negative livelihood outcomes, respectively.

Table 51. Relationship between respondent's occupation and livelihood outcome

Occupation	Livelihood outcome		Number
	Positive (%)	Negative (%)	
Unemployed	36.7	63.3	60
Fishing/farming	22.6	77.4	115
Trading	23.8	76.2	105
Private sector employee	36.7	63.3	79
Government sector employee	41.5	58.5	41
Total	119	281	400
	χ^2 = 10.475 df = 4 p-value = 0.033		

4.7.9 Household head and livelihood outcome

The results from Table 53 indicate that there is no significant relationship between the respondent's household head status and livelihood outcome. This can be inferred from the table, which shows a chi-square test statistic with a p-value of 0.170. About 73% of household heads were reported to have the highest negative livelihood outcome compared to 66.2% of respondents who are not household heads.

Table 52. Relationship between respondent's household position and livelihood outcome

Household head	Livelihood outcome		Number
	Positive (%)	Negative (%)	

Yes	27.3	72.7	249
No	33.8	66.2	151
Total	119	281	400

χ^2 = 1.880 df = 1 p-value = < 0.170

4.7.10 Years of residency and livelihood outcome

The results from Table 54 indicate that there is no significant relationship between the number of years a respondent has been resident in the district and their livelihood outcome. This can be inferred from Table 54, which shows a chi-square test statistic with a p-value of 0.223. A high proportion (77.8%) of the respondents who had lived in the communities for more than 40 years were reported to have negative livelihood outcomes compared to about 64% of the respondents who have lived within the district for 11 – 20 years.

Table 53. Relationship between respondent's years of residency and livelihood outcome

Years of residency	**Livelihood outcome**		**Number**
	Positive (%)	**Negative (%)**	
0 – 10 years	31.0	69.0	42
11 – 20 years	35.7	64.3	112
21 – 40 years	29.5	70.5	156
Above 40 years	22.2	77.8	90
Total	119	281	400

χ^2 = 4.381 df = 3 p-value = < 0.223

4.8 Multivariate analysis: Binary logistic regression

This section examined which independent variables best predict the outcome variable, livelihood outcome. The study makes use of binary logistic regression to estimate the influence of all the independent variables on livelihood outcomes. In this section, two models are

presented. Model 1 includes all the independent variables, including the control variables, except for the intention to migrate. Model 2, the intention to migrate was included to demonstrate its influence on the relationship between the other independent variables and the dependent variable.

4.8.1 Binary logistic regression model of the impact of oil and gas industry activities, socio-demographic characteristics, and livelihood outcome (Model 1)

A binary logistic regression model is summarised in table 54 and presented as Model 1 below. It can be observed that the overall model was statistically significant, with a p-value of 0.001 with a chi-square value of 43.59 with 18 degrees of freedom. The analysis revealed a Nagelkerke pseudo R2 value of 0.147. This means that the impact of oil and gas industry exploration activities and the socio-demographic indicators of the respondents explains about 14.7% of the variation in livelihood outcomes. Additionally, Model 1 predicts that the only variables which were statistically significant with livelihood outcome were the impact of oil and gas industry activities and level of education. Age, sex, marital status, religion, occupation, household status, and years of residency were statistically not significant with livelihood. Overall, the model classification prediction was 74%.

As observed in Model 1, the impact of oil and gas industry activities is a strong predictor of livelihood outcomes with a p-value of 0.001. Compared to respondents who reported positive impacts of the oil and gas industry, respondents who reported negative impacts of the oil and gas industry are 2.27 times as likely to have a negative livelihood outcome. Additionally, it was observed that level of education was also a significant predictor of livelihood outcomes. Respondents who have had basic education were 2.73 times as likely to have negative livelihood outcomes compared to respondents who have had tertiary education. Also, compared to respondents who have tertiary education, respondents who have had only secondary education were 2.43 times as likely to have negative livelihood outcomes.

4.8.2 Binary logistic regression model of the impact of oil and gas industry activities, socio-demographic characteristics, intention to migrate and livelihood outcome (Model 1)

It can be observed that the overall model was statistically significant with a p-value of 0.000 with a chi-square value of 45.75 with 19 degrees of freedom, as summarised in table 54. The results also show a Nagelkerke pseudo R2 value of 0.160 in Model 2, which demonstrates that the variable explains about 16% of the variation in livelihood outcome. In Model 2, the variables that statistically predict the livelihood outcome were the impact of oil and gas industry activities, intention to migrate and level of education. The inclusion of intention to migrate in Model 2 establishes the variable as a strong predictor of livelihood outcome and thus makes the model a good fit. Again, age, sex, marital status, religion, occupation, household status, and years of residency were statistically not significant with livelihood.

Model 2 showed that the impact of oil and gas industry activities is a strong predictor of livelihood outcomes with a p-value of 0.001. Compared to respondents who reported positive impacts of the oil and gas industry, respondents who reported negative impacts of the oil and gas industry are 2.35 times as likely to have a negative livelihood outcome. It was also observed that level of education was also a significant predictor of livelihood outcome. Respondents with basic education were 2.86 times as likely to have negative livelihood outcomes compared to respondents who have had tertiary education. Compared to respondents who have tertiary education, respondents who have had only secondary education were 2.56 times as likely to have negative livelihood outcomes. The variable intention to migrate is a significant predictor of livelihood outcome. Respondents who had no intentions to migrate were 0.58 times as likely to have negative livelihood outcomes compared to respondents who had intentions to migrate.

Table 54. Binary logistic regression model of the relationship between the impact of oil and gas industry activities, intention to migrate and socio-demographic characteristics on livelihood outcome.

Indicator variables	Livelihood outcome			
	Model 1		Model 2	
	OR [95% CI]	p- value	OR [95% CI]	p- value
Oil and gas				
Positive impact *(Ref)*	1.00		100	
Negative impact	2.27 [1.4, 3.7]	**0.001**	2.35 [1.4, 3.8]	**0.001**
Intention to migrate				
Yes			0.58 [0.3, 1.0]	**0.04**
No			1.00	
Sex				
Male	1.05 [0.6, 1.8]	0.85	0.98 [0.6, 1.7]	0.95
Female *(Ref)*	1.00		1.00	
Age				
0 – 29 years (*Ref)*	100			
30 – 39 years	1.42 [0.7, 2.8]	0.32	1.34 [0.7, 2.7]	0.41
40 – 49 years	0.74 [0.3, 1,8]	0.50	0.74 [0.3, 1.8]	0.50
Above 50 years	0.36 [0.1, 1.0]	0.04	0.38 [0.2, 1.0]	0.06
Marital status				
Single *(Ref)*	1.00		1.00	
Married	1.10 [0.5, 2.1]	0.78	1.12 [0.6, 2.1]	0.76
Formerly in union	2.27 [0.8, 6.7]	0.14	2.34 [0.8, 7.0]	0.13
Level of education				

Basic	2.73 [1.2, 6.4]	**0.02**	2.80 [1.2, 6.6]	**0.02**
Secondary	2.43 [1.1, 5.5]	**0.03**	2.56 [1.1, 5.9]	**0.03**
Tertiary *(Ref)*	1.00		1.00	
Religion				
Christian	0.50 [0.1, 0.2]	0.21	0.51 [0.2, 1.5]	0.22
Others *(Ref)*	1.00		1.00	
Occupation				
Unemployed *(Ref)*	1.00		1.00	
Fishing/Farming	1.34 [0.6, 3.0]	0.48	1.35 [0.6, 3.0]	0.47
Trading	1.39 [0.6, 3.1]	0.42	1.43 [0.6, 3.2]	0.38
Private sector employee	0.90 [0.4, 2.0]	0.79	0.95 [0.4, 2.1]	0.90
Government employee	1.10 [0.4, 3.2]	0.86	1.12 [0.4, 3.3]	0.83
Household head				
Yes *(Ref)*	1.00		1.00	
No	0.89 [0.5, 1.6]	0.68	0.78 [0.4, 1.4]	0.41
Residency years				
0 – 10 years	0.59 [0.2, 1.6]	0.30	0.61 [0.2, 1.7]	0.34
11 – 20 years	0.47 [0.2, 1.1]	0.08	0.48 [0.2, 1.1]	0.09
21 – 40 years	0.61 [0.3, 1.3]	0.21	0.64 [0.3, 1.3]	0.24
Above 40 years *(Ref)*	1.00		1.00	
Nagelkerke's R2	0.147		0.160	
Model Chi square (df)	43.59 (18)	**0.001**	47.75 (19)	**0.001**

CHAPTER FIVE

5.0 DISCUSSION

This thesis reports on a study conducted in selected communities in the Ellembelle district in the Western Region of Ghana to assess the relationship between the oil and gas exploratory industry and livelihood outcomes. Specifically, assessed the current livelihood outcome of food security, job security, health and climate situation within the study areas, determined respondents' perception of the impact of the oil and gas industry, assessed the association between respondents' perception of the oil and gas exploratory industry and livelihood outcome, determined the migration intension of members within the communities, and assessed the role of migration intension as a mediator variable between the oil and gas exploratory activities and livelihood outcomes in the study.

5.1 Demographic Characteristics of Survey Respondents

The findings (table 4.1) indicate that of the total 400 respondents captured in the survey from the Ellembelle District, 215, representing 53.7%, were males between the ages 30-39 years 139 (34.8%). The highest age range dominance of 30-39 years means the youth dominated in these towns more than the other age groups. The study finds out that all the respondents had obtained some education, indicating a high literacy rate within the district but mainly at the basic level, which earns them poor or low-paid jobs. Therefore, most of the respondents are likely to engage in other livelihood activities requiring a basic level of education certificate, giving them fewer options for livelihood activities. Most of the respondents were married (223, 55.7%).

The high proportion of male respondents (53.7%) in the study may indicate a gender imbalance in the participation and representation of the local communities in the oil and gas industry. According to a study by the Asamoah Kofi Vincent, (2014), women are often marginalized and excluded from the decision-making processes and benefit-sharing

mechanisms of the oil and gas projects in Ghana. Women also face more negative impacts from the industry, such as loss of livelihoods, increased domestic violence, and reduced access to natural resources (Asamoah Kofi Vincent, 2014).

The dominance of the youth (30-39 years) in the study respondents (34.8%) may suggest a high level of interest and expectation from the younger generation regarding the oil and gas industry. The youth are often seen as the potential beneficiaries of the industry, as they have more opportunities to access education, training, and employment in the sector. However, the youth also face many challenges, such as lack of skills, experience, and capital, as well as competition from foreign workers and companies. The youth may also be more vulnerable to the social and cultural changes brought by the industry, such as migration, urbanization, and consumerism.

5.2 Relationship between the oil and gas exploratory industry and livelihood outcome.

This study set out to explore the relationship between the oil and gas exploratory industry activities and the livelihood outcome of people living in the study area. There was no reference period for which the study was assessed. For example, various conceptualizations were adopted to clarify the relationship between the oil and gas explorative industry activities and livelihood outcomes. For instance, the oil and gas industry and exploratory activities were conceptualized as either positive or negative. Again, livelihood outcome, intended to be negative or positive, was conceptualized using a set of questions related to food security, job security, health, and climate change. These questions were subsequently indexed to obtain a binary variable (i.e., positive livelihood outcome or negative livelihood outcome). Two set of analyses were conducted to assess this relationship.

The results of both i.e., bivariate, and multivariate analyses indicated a positive relationship between the two variables. Subsequently, it can be inferred from the analysis at the advanced stages that the oil and gas exploratory industry activities are a strong predictor of livelihood outcomes. Thus, a positive experience due to the oil and gas explorative activities strongly

predicts a positive livelihood outcome. For instance, on the one hand, if the oil and gas industry has improved fishing and farming activities in the communities, livelihood outcomes would likely be improved and thus positive livelihood outcomes. Otherwise, if the oil and gas industry have negative impact on livelihood, then it is sure to have a negative livelihood outcome. A study by Boohene and Peprah (2012) found a positive relationship between oil and gas exploration and the livelihood of women in two communities at Cape Three Points in the Western Region of Ghana. In Shama, also in the Western Region of Ghana, Dowokpor (2015) found that the establishment of the oil and gas industry affected the livelihood of both men and women in the communities. These findings are consistent with that of this study, as previously established that there was indeed a relationship between the oil and gas industry and livelihood outcome.

5.3 Current livelihood outcome food security, job security, health, and climate change in the study areas i.e., livelihood outcome situation within the ten communities

This study sought to explore the current livelihood outcome situation within the study communities. It was expected that a higher negative experience from the presence of the oil and gas industry would lead to a more negative livelihood outcome. However, in the univariate analysis, 70.2% of the respondents reported experiencing a negative livelihood outcome, whilst 29.8% had positive livelihood outcome. Subsequently, it can be inferred that the presence of the oil and gas industry and explorative activities has led to a negative livelihood outcome. However, this cannot be a conclusive statement because there may be a myriad of events taking place simultaneously that has the potential to equally contribute to a negative livelihood outcome as experienced by rural communities. For instance, livelihood outcomes can be influenced by socio-demographic and economic indicators such as education, income, and occupation (Baddianaah et al., 2022). Another contributing factor that can influence the

livelihood outcome of rural communities are the extraction of natural resources which provide livelihood options in communities where they are extracted.

Oil production was expected to generate alternative livelihood alternatives for fishermen and others whose occupations would be impacted by oil and gas production. Their aspirations have faded, and citizens are becoming dissatisfied with the role of the government and its development partners in generating and supporting alternative livelihoods for those impacted by the oil and gas activities.

5.4 Respondent's perception on the impact of the oil and gas industry.

The impact of the oil and gas industry on livelihood outcomes was examined in the study communities. It was observed that in the univariate analysis that 53% of the respondents reported a positive impact on the establishment of the oil and gas industry. In general, since the establishment of the oil and gas industry, it was expected that the industry would free up employment, thereby creating more jobs. The net effect is an influx of people in these areas where the oil and gas industry has been set up. For instance, in the National Migration Policy for Ghana in 2016, the discovery of natural resources such as oil and gas was expected to create patterns in migration, with an increase in migrant workers in the Western Region (Ministry of Interior, 2016). However, Boohene and Peprah (2011) found that rural communities are not satisfied with establishing the oil and gas industry. Their research indicated that the communities reported decreased fish catch, general loss of employment opportunities, and reduced income levels. In Nigeria, Chondough (2021) in her research to establish the link between Corporate Social Responsibility (CSR) practices and sustainable livelihood in Nigerian oil and gas production regions, found that host communities had not benefited from the establishment of oil and gas industries. In fact, to her, the industry has looked at the financial rewards to the country without paying attention to the social and environmental implications

that have been adversely affected. This could explain why some people in affected areas would choose to migrate to other communities for an improved livelihood.

Local community members use increasingly controversial techniques to seek benefits from oil and gas firms, as reported by (Mohammed, 2019) and confirmed in this study. As he highlighted, these techniques may become more challenging to regulate if quick regulatory and legislative measures are not implemented to arbitrate local benefit talks between local actors and oil and gas firms.

Oil resources (the oil and gas industry) offered appalling and inadequate benefits to the fishermen, who lost out because of oil exploration and production. Respondents, on the other hand, mentioned a few items such as plastic chairs and flat-screen televisions provided to specific fishing towns years ago, scholarships for basic education and postgraduate studies, school facilities and water projects, and so on. Nonetheless, the fishermen have voiced unhappiness with the oil firms' advantages thus far and are adopting various bargaining techniques to obtain more significant and more durable rewards. Fishermen employ contentious negotiation methods and certain collaborative negotiation strategies to attain their goals. According to (Mohammed et al., 2022a), fishermen along the coast of the Western Region deliberately infringe on the buffer zones around oil rigs to anger the oil firms, even though they will be arrested if found. The fishermen have sworn to keep fishing near the rigs until the oil firms and government develop adequate venues for fishermen to discuss their expected benefits from the oil.

5.5 Migration intention of members within the communities.

Rural-urban migration has been linked to the improvement of standard of living (Selod and Shilpi, 2021). Migration has been long established to be a coping strategy to achieving a positive livelihood outcome in many rural areas, with the intention to migrate to urban areas the priority for most people. Alternatively, rural people migrate to other rural communities for

subsistence farming in order to allow a fallow period on their farms. The study assessed the intention of respondents to migrate from their communities as a coping strategy.

The results gathered from the univariate analysis show that 71.2% of the respondents had intention to migrate to other communities or urban centres. Interestingly, this figure is close to the number of people who reported a negative livelihood outcome in the communities. It is therefore not surprising that when there are more negative livelihood outcomes being reported, the next rational decision will be to migrate to other areas where livelihood outcomes can be improved or best managed. For rural people one way of managing their livelihood outcome is through migration and thus the outcome of the results from this study is no different from other studies. For instance, Centre for Migration Studies (2011) assert that patterns in migration are influenced by economic, political, and social drivers.

There are also social cultural dimensions to migration that have been discussed extensively by literature. The results from this study resonates with GSS (2014) reports that a considerable number of people migrate out of the Ellembelle district because of off-season fishing which creates seasonal unemployment among the population. However, there were some 23.9% (second after in-migration in the Western Region as reported by the (GSS, 2014). The findings from this study show that there are more people migrating out of the area.

5.6 Role of migration intention as a coping strategy between the oil and gas exploratory activities and livelihood outcomes.

Migration was used as a risk response to the oil and gas industry and therefore, it appears that many people are moving out of the communities also because of their negative livelihood outcomes. For instance, Hermans and Garbe (2019) asserts that livelihood strategies can be best understood when it is assessed objectively and thus focusing on a particular driver may not necessarily paint a realistic picture. The findings from the study indicated that respondent's livelihood outcomes are strongly moderated by their intention to migrate. In the last objective

of this study was to assess how migration mediated the relationship between oil and gas industry explorative activities and livelihood outcome. As established, intention to migrate (migration) in this study was adopted as a mediating variable i.e., livelihood strategy. In this study, it was found that the relationship between intention to migrate and livelihood outcome was not significant at the bivariate level of analysis. Nonetheless, after controlling for all other variables in Model of the analysis at the advanced stages i.e., multivariate analysis it was observed that intention to migrate was a strong predictor of the livelihood outcome. The study established a significant relationship between one's intention to migrate and livelihood outcome. The result from this study provides a consistent reasoning that links migration as a livelihood strategy to achieve a positive livelihood outcome. However, so far as the association between migration as a livelihood strategy has been reported to exist, Tanle (2015) research asserts otherwise. To him, the link between migration and livelihood has not been clearly established. This is also corroborated by many reviews that debate the relationship between migration and poverty (an outcome of livelihood). Mcdowell and Haan (1997) argue that this relationship is context specific and complex. There was no effect on the relationship between the independent variable (i.e., oil and gas industry) and the dependent variable (livelihood outcome).

5.7 Socio-demographic indicators and livelihood outcomes

In this study, level of education was significantly associated with livelihood outcome as predicted by the literature. This is consistent with a recent study by Tran *et al*. (2020) whose micro-econometrics analysis revealed a strong correlation between education and positive effect on livelihood outcome. This could explain why education has been linked to development in the last decades. Generally, people with education are able to make informed decisions that tend to influence their livelihood. For instance, an educated person is more likely to get a well-paying employment compared to one who is not educated. Nonetheless, it is also

possible for non-educated person to achieve a positive livelihood outcome compared to an educated person. In both the bivariate analysis and multivariate analysis of this study, there was a significant relationship between level of education and livelihood outcome.

Age, sex, marital status, household status, religion, and number of years of residency has been discussed to have a significant relationship with livelihood outcome by the literature extensively. A study by Obiaocha (2018) revealed that these socio demographic indicators were strong determinants of non-farm rural livelihood patterns in Southeast Nigeria. However, in this study, the relationship of these variables was not significant to livelihood outcome as expected.

The assumptions of the hypotheses put forward have been met and subsequently, congruent with the findings of this study. The findings from the study revealed that, there was a relationship between the oil and gas industry and livelihood outcome. Thus, respondents with a positive experience with the oil and gas industry generally are expected to have a positive livelihood outcome.

CHAPTER SIX

6.0 SUMMARY, CONCLUSION AND POLICY RECOMMENDATION

This chapter summarizes and draws conclusion on the study and is divided into three sub-sections.

6.1 Summary

- The main objective of this study was to assess the relationship that exists between the oil and gas explorative activities and livelihood outcomes among ten communities in the Ellembelle District in the Western Region of Ghana. There was no attempt to find a causal relationship between the two variables; thus, all conclusions drawn will be based on association/relationship. The results from the analysis indicated a significant relationship between the two variables.
- Another objective this study sought to achieve was assessing the impact of the oil and gas industry (i.e., positive, or negative impact) and the livelihood outcome situation in the ten communities. In addition, this study sought to examine the migration intention of the respondents and how migration intention mediates the relationship between the oil and gas industry and livelihood outcomes. To achieve these objectives, primary data consisting of both quantitative and qualitative data were collected with a sample size of 400 respondents representing the ten communities.
- This study employed three levels of quantitative statistical analysis; univariate, bivariate and multivariate (regression) analyses, and qualitative analysis using thematic networks to draw conclusions. The univariate analysis performed precisely describes the background characteristics of the respondents taking into consideration age, sex, and level of education, among others. It has summarised the reporting of the independent, dependent, and intermediary variables. The analysis was presented in a

table and chart for easy reporting. The bivariate analysis was performed to establish the relationship between the main independent variable, the control, and the dependent variables. This was achieved using Pearson chi-square tests and a two-way binary regression model at a 95% confidence interval.

- To achieve the objective set, it was imperative to create dummy variables and recategorize some variables to suit the analysis. For instance, a composite sum of four SRQs had to be computed to obtain a dichotomous variable. Likewise, a seven-set of SRQ was computed to obtain a dichotomous variable for the main independent variable.
- The first specific objective that this study set out was to assess the impact of the oil and gas situation in the district. The results from analyses showed that 53% of the respondents perceived a positive impact of the oil and gas industry in the district, which indicates that the oil and gas industry has generally made a positive impact on the communities that are in the district. Additionally, about 70 % of the respondents reported a negative livelihood outcome, with about 71.2% of the respondents having intentions of migrating out of the communities. This accounts for the second and third objectives of the study, respectively. Lastly, two regression models were fitted to establish how the intention to migrate mediates the relationship between the impact of the oil and gas industry and livelihood outcome. The variable was excluded in the first model while controlling for other variables. However, when introduced in the second model, the results revealed that the intention to migrate was a significant predictor of livelihood outcome. The relationship between the impact of the oil and gas industry and livelihood outcomes remained significant. Thus, the inclusion of the intention to migrate did not affect the relationship between the former and the latter.
- It was observed at the bivariate level that out of all the independent variables (i.e., main independent variable (impact of oil and gas), control variables (socio-demographic

indicators) and intermediate variable (intention to migrate) that were tested against the dependent variable (livelihood outcome), the only impact of oil and gas, level of education and occupation were found to be significant variables to livelihood outcome. Further analysis of the multivariate using the binary logistic regression model revealed that only the impact of oil and gas, intention to migrate and level of education were significant predictors of livelihood outcome.

6.2 Conclusion

The following are conclusions drawn from the study based on the findings:

The establishment of the oil and gas industry in some communities have led to various interpretation of its impact on livelihood outcomes in the communities. Based on this premise the first objective of this study was to examine the relationship between the impact of oil and gas industry and livelihood outcomes in the district. The study found a positive and significant relationship between oil and gas industry activities and livelihood outcome. To assess the community perception of the impact of oil and gas industry in the district, the study revealed that a high of the respondents perceive the oil and gas industry to have a positive impact in the district. However, majority of the respondents report that they experience a negative livelihood outcome. This may be attributed to a myriad of factors including health and food security issues brought about through the establishment of oil and gas industry in the district. This development led to majority of the respondents having an intention of migrating to other communities or urban centers. Overall, the addition of intention to migrate as a mediator variable made the model estimation parameters fit better.

Livelihood outcomes are complicated, especially with multiple frameworks, which a myriad of complex factors with unique dimensions of measurement and conceptualizations can influence. As previously established, it was expected that there would be a positive relationship between the impact of the oil and gas industry and the livelihood outcomes of people. Ideally,

livelihood outcomes result from several interacting factors working simultaneously and independently. Additionally, it was demonstrated that there is indeed a relationship between the impact of the oil and gas industry and livelihood outcomes. The impact of the oil and gas industry is a strong predictor of livelihood outcomes. Respondents with a negative livelihood outcome are more likely to have reported a negative impact from the oil and gas industry. It is important to highlight the importance of the oil and gas industry in national development in financial terms. However, there are people whose livelihood outcomes are compromised by the activities of the oil and gas industry. The most important are the social and environmental vulnerabilities experienced physically and how they are negatively affected in the process. These lapses must be addressed at both the local and national levels to reduce the chances of unsettling livelihood outcomes of communities in which these industries are established. In general, the study contributes to the ongoing discussion on the impact of oil and gas and its effects on livelihood outcomes, especially in developing economies whose host communities have not reaped the benefits of the oil and gas industry but are left to suffer the devastating effect of this natural resource.

To conclude, the results of this study are consistent with the hypotheses set. Also, the adoption of the Sustainable Livelihood Framework was supportive in achieving the objectives that were set out by this study. Additionally, this study advances the use of the SLF for future studies on the impact of the oil and gas industry and livelihood outcomes. It provides a fundamental understanding of the relationship between the impact of the oil and gas industry and livelihood outcomes. Thus, further studies on the topic can adopt different conceptualizations to explore the relationship. A gap in this study is how livelihood outcome is influenced by transforming structures and processes from policies, institutions, and processes amid the influence of the oil and gas industry. This study offers a new look at how livelihood outcomes of local communities can be protected vis à vis natural resources such as oil and gas.

6.3 Recommendations

The study recommends the following to enhance policy interventions related to the subject. The findings of this study are relevant for current and future research, policy and practice on natural resource-development and its implications on human health and wellbeing.

- First, there is need for future studies to conceptualize livelihoods outcomes and its dimensions in a way that is relevant in local contexts. Livelihoods, livelihood strategies and their outcomes are often place-based and vary from one locality to another. It is also imperative for future research to incorporate indigenous livelihood strategies in assessing livelihood outcomes at localized settings such as in oil and gas communities. Studies should also utilize modern technology such as biomarkers in identifying pollutants, their exposure levels and health outcomes in at-risk oil and gas communities. Also, cross-sectional data will provide a better understanding of the relationship between resource extraction, livelihood strategies and outcomes, and their trend variation over time.
- As previously stated, the oil sector has multiple impacts on the livelihoods of the local residents. However, in my study, my primary focus was on local community members in areas where the oil and gas sector can be located, to uncover hidden or unintended consequences for indigenous people whose properties and livelihoods have been harmed. To better understand the extent of the differences in impacts between the ten groups of people, the study should be expanded to include the perspectives and experiences of social and political ruling classes, foreign and indigenous businessmen, and oil industry players, among others, for comparative analysis.
- My focus was on residents from ten communities or towns in the Ellembelle district for this study because the ten places were relevant to the oil sector. It has also been suggested that local citizens and influential people have distinct effects. However, one

point remains unanswered: "Does the severity of the oil industry's unfavourable impact on citizens decreases with distance from the oil industry?" To address this issue, it will be necessary that the study is broadened to other places in the Western Region that do not have the same importance to the oil sector as the ten (10) communities examined for comparative examination in this study.

- Toxicology experiments in a laboratory setting should be conducted in the future to establish the toxicity and presence of other harmful substances on the development of aquatic species and local inhabitants who use the water for various household uses.

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APPENDICES

Appendix I: Questionnaire for

UNIVERSITY OF GHANA

COLLEGE OF BASIC AND APPLIED SCIENCE

INSTITUTE FOR ENVIRONMENT AND SANITATION STUDIES (IESS)

Dear Sir/Madam,

Questionnaires on Assessing the Implications/ Impacts of Ghana's Oil and Gas Industry on Livelihoods of Local Communities in the Ellembelle District

Thank you for agreeing to participate in this important study aimed at assessing how the oil and gas industry has affected your community in terms of the sociocultural well-being of the people and the development of the community. I would like to seek your thoughts and opinions on what energy source you use and its influence on your health and environment, the impact of the oil and gas company on your economic activities, developmental issues due to the oil and gas company and the impact on education.

This survey would only take 10-15 minutes to complete. Be assured that all answers you provide will be treated with confidentiality and only used for academic & research purposes.

Thank you for your cooperation.

Section A: Socio-demographic characteristics

1. Sex a. Male [ ] b. Female [ ]
2. Age
   a. Below 20 [ ] c. 30-39 [ ] e. 50 and above [ ]
   b. 20-29 [ ] d. 40-49 [ ]
3. Level of Education
   a. Primary [ ] d. Higher degree (master/ PhD) [ ]
   b. JHS [ ] e. Degree [ ] f. Diploma/ HND
   c. Secondary/ SHS [ ] g. Other (Please specify) ……

4. Marital Status

a. Single [ ] c. Divorced [ ] d. Separated [ ]

b. Married [ ] e. Widowed [ ]

5. Religion

a. Christian [ ] c. Traditional [ ]

b. Muslim [ ] d. Others (please Specify) …….

6. What is your full-time (main) occupation? ……

a. Farming
b. Fishing
c. trading
d. Work with a private company
e. Government Sector Employee
f. Others (Please specify) ……

7. What is your monthly household income?

a. Less than GH₵ 200 [ ]
b. GH₵200 - GH₵499 [ ]
c. GH₵500 - GH₵799 [ ]
d. GH₵800 - GH₵ 999 [ ]
e. GH₵ 1000 and above [ ]

8. Are you the main provider of your household? a. Yes, b. No
9. How many dependents do you have in your household? ……
10. How long have you been in this community?.....

Section B: Economic Impact of Oil and Gas Exploration Activities

11. What was your major economic activity before the oil and gas industry in your community? …….

12. What is your major current economic activity?

    ……

13. Has the oil and gas industry activity stopped you totally from your major economic activity? A. Yes b. No

14. If Yes, explain how? …….

15. How has your standard of living been since 2009, the exploration of oil and gas?

    a. Unchanged b. Improved c. Significantly improved d. Worsened Significantly worsened

16. Have you lost any property or land to the oil and gas industry?

    a. Yes b. No Please specify if yes ……..

17. Did you receive any compensation for the loss?

    a. Yes b. No

18. If Yes, please specify the compensation type……

19. Have there been job opportunities due to the oil and gas industry?

    a. Yes b. No

20. Has the oil and gas industry affected fishing and farming activities in your community?

    a. Yes b. No

21. If Yes, explain how……..

22. How would you describe the following?

	Easy with surplus	Most of the times	Sometimes	Rarely
Your ability to meet your household food needs before the oil activities				
Your ability to meet your household food needs now				

Section C: Sociocultural Impact of Oil and Gas exploration activities

23. Describe the amount of migration in this area since 2009.

	1- Very Low	2 - Low	3 - Moderate	4 - High	5 – Very High
Migration into this area					
Migration from this area					

24. Have you or any of your family thought of migrating out of this community? a. Yes, b. No

25. If Yes (to migration), which of the following reasons most accurately describe the reason for which you intended to migrate?

a. Decreasing fish catch b. Loss of farmlands c. better job opportunities d. Change in environment e. Other, please specify……..

26. For how long have you thought about migrating?

a. Before the oil industry b. After the oil industry activities began c. I have always had the thought

27. To where do/did you intend to migrate? a. Kumasi b. Accra c. Sekondi-Takoradi d. Other major city e. Another village

28. How would you describe safety in this community compared to the period before the oil industry?

a. Significantly increased b. Slightly increased c. Unchanged d. Slightly decreased e. Significantly increased

29. How would you describe the frequency of land-related disputes in this community compared to the period before oil industry activities?

a. Significantly increased b. Slightly increased c. Unchanged d. Slightly decreased e. Significantly increased

30. State whether you agree or disagree with these statements

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree
the oil industry has played a significant role in the disputes (the communities and the oil & gas industry)					
the oil industry has adversely affected social activities					
the oil industry has adversely affected cultural norms and practices					

31. Have there been any clashes between members of your community and the oil companies? a. Yes, b. No

32. When you think of the oil industry, do you have any fears that there may be clashes between members of your community and the oil companies? a. Yes, b. No

Section D: Development and Education

33. What is the topmost development priority of the community (rank) ?

Rank	Priority
1	
2	
3	
4	

34. In your opinion, what possible vacancy (link to your skills) will you take advantage of if any of the oil and gas industries are recruiting ?

……

35. Are you ready to be skilled or further trained in order to be employed by the oil and gas industry?

    a. Yes b. No

36. What sustainable livelihood is of interest to you now?

    ……
    …

37. Has the oil and gas activities improved infrastructure?

    a. Yes b. No

    if yes, please specify the types of infrastructure……..

38. Has the oil and gas activities had an impact on education in your community?

    a. Yes b. No

39. Has the oil and gas activities impacted the youth in your community?

    a. Yes b. No

    specify……

Section E: Climate, Environmental and Health Impact

40. Has your community experienced any environmental change/damage due to the oil and gas activities? A. Yes b. No please specify……

41. Have you encountered any health problems due to the siting of the oil and gas industry?

    a. Yes b. No Please specify……

42. What has changed about your climate and environment over the last 5-10 years?.....

Section F: Energy Use

43. What energy sources are available in this community?

    a. Traditional (Tick: wood [ ], charcoal [ ], kerosene [ ], crop residue [ ], paraffin [ ] others (specify)……)

    b. Modern source (electricity [ ], LPG [ ], biogas [ ] others(specify) ……..)

44. What energy source/ type does your household use?

a. Traditional (Tick: wood [ ], charcoal [ ], kerosene [ ], crop residue [ ], paraffin [ ] others (specify)……)

b. Modern source (electricity [ ], LPG [ ], biogas [ ] Others (please specify) …….

45. Rank the energy types you use? (Where 1=most used, 4=least used)

Rank	Energy types used
1.	
2.	
3.	
4.	

46.

Energy type	Average cost per week (GHS)	Energy source distance away from your home (estimate)	Reliability (is it always available when you need it?) ***Yes, No, Sometimes***

47. What stove types do you use (multiple answers are allowed)?

a. Traditional three stone fire
b. Traditional coal pot
c. Car rim metal stove
d. Improved stove (specify type……)

48. Do you think the government is doing a good job monitoring the oil industry for environmental compliance?

a. Extremely effective b. Very effective c. Moderately effective d. Slightly effective e. Not at all f. do not know

49. How will standard of living be without the oil and gas industry and its activities? Will economic and social activities change or remain the same?

……

……

50. Any other comment…….

THANK YOU FOR YOUR TIME

Appendix II: Transcribed interviews from field survey

QUOTES FROM TRANSCRIBED INTERVIEWS WITH KEY INFORMANTS

HOW THE OIL AND GAS INDUSTRY AFFECT OR DISTURBS THE COMMUNITY MEMBERS

"The natives or community members use the oil and gas workplace route to their farms. The natives informed the industry of another road at the back of the workplace. They agreed to do it, but they didn't. Because they didn't construct the road, we are allowed to use their work area to our farms, which has increased our journey to the farm, and it's a big worry. Our roads were destroyed by heavy and long trucks and were not fixed. They only fixed the roads leading to their company or industry."

THEIR PERCEPTION OF THE OIL AND GAS INDUSTRY

"The natives do have little knowledge about these being ENI or Ghana Gas etc. The natives think these people (the oil & gas industry or the ENI) bring dirt to the shores of the sea because the information will be passed to the natives that no one should resist or go to the Sea. Unfortunately, they will meet dirt all around when they return. It is assumed they cause it."

COMPENSATION RECEIVED FOR PROPERTY LOST AND SATISFACTION

"About 365 acres of land were taken from the natives, and farm crops were destroyed. Compensations were made to the affected natives. Foodstuffs were also given to them—E.g., Beans, Rice, etc. The compensation amount wasn't okay when they started due to lousy negotiation by their old chief, but later, something was added after a good negotiation by the current chief. All affected persons have received their compensation in full and will also be

reviewed in 30 years. Truly, introducing the oil and gas industry in the community has improved the standard of living; our whole economy draws us back."

LIVELIHOOD AFTER THE COMMENCEMENT OF THE OIL AND GAS INDUSTRY

"The introduction of the oil and gas industry has improved small businesses like poultry farming. Prices of houses for rent have increased. Food price is at an average rate. Transportation is standard. It somehow created employment; some natives were employed full-time, others on contract. They promised to train some natives by taking them to school to further their education, but they didn't. They were transparent in their employment of the natives. The natives are being visited often to learn about their well-being. Sanitation issues in the communities have been worked on (much improvement). Educational facilities improved. Clinical facilities also improved. Prices of cylinders have been decreased, and coal pots that won't consume much charcoal have been provided. Aside from the compensation, each affected person was given something to put up a business because they (the oil &gas industry or ENI) thought the money given to them might have finished."

PRIORITY

"Educating the youth in the community is the priority of the natives."

DISPUTES OR MISUNDERSTANDING

"*There hasn't been any misunderstanding between both parties since oil and gas exploration. An interview like this is a big problem for the natives because they feel it won't be of use, sometimes leading to a fight between the natives and the one who responds to the questions."*

Appendix III: Transcribed interviews from field survey

QUOTES FROM INTERVIEWS WITH FARMERS AND FISHERMEN

IMPACT OF THE OIL & GAS ON AGRICULTURE, FARMING AND FISHING LIVELIHOODS

"Since the advent of the Oil and Gas industry, this neighbourhood has been subjected to a slew of negative repercussions. We've lost many farmlands. First, the Oil and Gas Company built a gas pipeline on our farmland. They forcibly removed us from our lands. As if that weren't enough, the lands are being auctioned for both residential and business use. Many of us have lost our farmland as a result of this."

"I will add that one of the ways we are being harmed is by the residences that have been built as a result of the oil discovery." Previously, our farms were extremely close to us; currently, all the once-cultivated lands have been zoned for residential reasons. Because our farms are so far apart, individuals cannot farm as much because we spend so much time going to the farms. This impacts the amount of food we generate as a community."

"My farming business has suffered greatly." First and foremost, I had to start farming from the beginning. It requires a great deal of effort to maintain a stable farm like the one I used to have. Second, I used to be able to get on my bike and go to my farm. Now that they have taken our lands, they are no longer accessible since we must walk a long way to get to our new farms."

"There has been a huge decrease in fishing yield. If I were to explain it in percentages, I'd say around 70%."

"What I can tell is that our fish catch has dropped substantially since the commencement of the oil and gas industry. I believe it is a product of the oil business since they prohibit us from

fishing on certain days. For example, there are some spots where we are no longer permitted to fish, and you might be caught if you go there."

"We fishermen fish in two main methods," stated a fisherman who migrated from Sekondi. "Some travel deep sea for considerably larger scale fishing and larger species like tuna, while others fish in neighbouring areas. Because oil rigs have been constructed in these locations where they go for most of their catch, the oil business has had the greatest impact on individuals who fished in deeper oceans. These oil rigs have light around them and are attracted by the fish because of the light. This drives the fish towards the direction of the light, an area we can't enter to fish. Today, we are not even permitted to enter that zone because the navy scares us away when we attempt. I am among those affected, and I can honestly state that our business is now basically non-existent."

CONSULTATIONS AND COMPENSATIONS

"I lost my land when the oil and gas project began, and I received some compensation for it." It's been more than seven years. During the project, they phoned farmers and handed us a small sum of money as an initial compensation, promising that more would follow later, but nothing has arrived."

"I lost the land I owned and received no compensation." Some people received compensation, while others did not. They claim you must be there to obtain payment, and I was travelling then. Like several other farmers, I received nothing."

"We've had meetings with the oil and gas industry where they've told us not to go fishing because of ongoing construction, and individuals raised the question of compensation." Whenever it is raised, they say we'll talk about it when it gets there. However, I'm not sure if they've ever given something to our leaders, and it didn't trickle down to us since they say they'll transmit it through the chief."

IMPACT OF THE OIL & GAS INDUSTRY ON FOOD (PRODUCTION & SECURITY)

"The activities of the oil and gas industry are a problem for us." I had a large farm with many crops on it, but the gas company had divided it in two. Since I cannot cultivate within a specific distance of the industry, I have lost many crops due to the industry. Because I have no other land, I must return home and starve. There should have been some education and public awareness before destroying our lands. It is unjust to show up and do whatever you want. As a result, we, the farmers, are suffering. We are unable to support our families. We are a small agricultural town. On the other hand, our lands are being taken over, which is quite upsetting for most of us."

"I am a divorcee." Before my divorce, I created this farm with my husband, and this piece of land was what he left me. Now, the gas business has taken up all of my property, leaving only a little portion for me. Now that I'm divorced and a single mother of two children, there's no one I can rely on to locate another plot of land to start again. The most discouraging aspect is that they intend to take away the tiny portion of my land left for me to continue farming. The difficulty is intolerable, and it is now nearly impossible for me to feed my family."

IMPACT OF THE OIL & GAS INDUSTRY ON INCOME AND ECONOMIC LIVELIHOOD

IMPACT OF THE OIL & GAS INDUSTRY ON MIGRATION

"Migration into our towns has gone up; this can be attributed to the oil and gas industry. Many organizations and individuals visited the town recently".

"Most of the village's youths are leaving in pursuit of better grounds." They hoped to find work in the oil business, but that did not materialize, and fishing and farming are no longer viable options, so they are leaving."

SAFETY IN THE COMMUNITIES

"Since the Ghana Gas Plant was erected here, security and safety in our locality have worsened substantially. Security wasn't much of an issue because everyone knew everyone, and no one would ever steal or rob anyone. However, theft has increased. We don't feel as protected anymore."

"We live in fear and panic each passing day because we fear that the gas plant will explode one day and kill us all. There was a time when the gas plant was leaking; all neighbouring communities were asked not to light a fire or put out all fires from our homes to prevent any explosion or disaster. People started running and left to hide in faraway towns".

"There is fear whenever we go to our farms and cook or set fire. The pipelines are under the earth, so we fear fires from our farms; even the little ones for cooking can cause a problem".

"There have been many conflicts lately related to families and community members fighting over lands that didn't have titled owners because the local people were farming on them even when they didn't own them. There is conflict now because there is competition for land, as the industry still pays owners off their lands. Most conflicts are still in court now".

EMPLOYMENT, STANDARD AND COST OF LIVING

"There was much joy and excitement on the part of the youth when the news of the oil and gas industry was broken to the communities. This was because the employment opportunity was considered especially by the youth. However, the issue of unemployment hasn't changed, and our youth keep migrating in search of greener pastures".

"Because there are so many foreigners in our towns and those from outside the region, they put a strain on the amenities." This raises the need for lodging and food. Regarding lifestyle, I believe the oil sector has made our communities more costly than other towns."

"There is also the problem of the very high cost of living right now." Food used to be relatively inexpensive. Today, however, it is prohibitively costly due to food scarcity. Farmers are not producing much after they lose their farms. I currently have a large family, and purchasing 100 Ghc worth of food is insufficient. Previously, 100 GhC would have been sufficient to produce a week's worth of meals."

"Goods prices have increased. However, the cost of living has not changed significantly because of most residents in this town own family homes. Therefore, there isn't as much demand for rental units, but food items are expensive now".

"The divorce rate is very high in our communities now, especially men who have lost their farms or cannot catch enough fish to make sales to cater for their families. Their women threaten them, and some leave them because they can't take care of them any longer. The foreigners come into their communities with huge amounts of money and seduce their women. This is destroying their homes".

"Most husbands, especially the youth, travel a lot to seek better jobs elsewhere. They travel for long; years and only come home seasonally to visit them".

IMPACT OF THE OIL & GAS ON EDUCATION

"I have a teaching certificate from the teacher training college, and I hope to go back to school to further my education and move up the ladder. I decided to help my father fish to save some money for my education. But now that the fishing business is bad, my dreams of returning to school might not come true".

"It's difficult to educate our children or take them to school. Education is now expensive for us because we don't earn enough to cater for fees. Most of our kids have stopped schooling because we can't afford to join these "galamsey" and bad social vices to take care of themselves. The ladies are just getting pregnant because they are lured by these "oil boys" and

given money. Some have also become prostitutes, and the males become thieves and armed robbers".

"One major effect of the oil and gas industry on our society is our kids' education. The free SHS has given some (those willing to continue) the opportunity to further their SHS education, but what happens after that? They stay home and do nothing while others live a bad lifestyle to survive".