UNIVERSITY OF CAPE COAST

ANALYSIS OF OCCUPATIONAL HEALTH, SAFETY AND ENVIRONMENTAL MANAGEMENT PRACTICES AT THE TWIFO OIL PALM PLANTATIONS

BY

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DECLARATION

Candidate's Declaration

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

Candidate's Signature:……Date:…….

Name:……...

Supervisor's Declaration

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

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Co-supervisor's Signature:……Date:…….....

Name:……...

ABSTRACT

Occupational Health, Safety and Environmental Management (OHSEM) aims to foster a safe working environment, including the protection of employers, employees and nearby communities. The study sought to examine the effectiveness of OHSEM practices at Twifo Oil Palm Plantation (TOPP) in the Hemang-Lower Denkyira District. A total of 377 respondents were sampled from a population of 19,657. Both purposive and stratified random sampling procedures were used to sample respondents for the study. The study employed interview guides and schedules as instruments for gathering data. The quantitative data were processed with Statistical Product for Service Solutions version 21. Descriptive statistics were used to analyse the data. Content analysis was used to analyse the qualitative data. The study revealed that out-growers were more exposed to Occupational Health Safety and Environmental (OHSE) risks than the community residents and unionised workers. Some of the OHSE risks the out-growers and community residents were exposed to were burning of eyes, chemical pollution of water bodies, and skin diseases. Many of the out-grower farmers did not adhere to the safety standards established by TOPP in terms of protection during spraying and safe modes of storing chemicals. The unionised workers of TOPP had the capacity to identify hazards and inform management to address them. OHSEM practices adopted by TOPP were more effective within its internal operations than with the other stakeholders. It is, therefore, recommended that the Environmental Protection Agency (EPA) should extend its monitoring and supervision to the out-growers to ensure their compliance to OHSEM standards. This would help to reduce the health complications reported by the out-growers following the application of chemicals on their farms.

KEY WORDS

Occupational Health, Safety and Environment

Risk

Hazards

Stakeholder

Out grower

Smallholder

Community residents

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DEDICATION

To Eric, my husband and kids

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LIST OF ABBREVIATIONS

ANOVA	-	Analysis of Variance
EPA	-	Environmental Protection Agency
EASHW	-	European Agency for Safety and Health at Work
GSOH	-	Ghana Society of Occupational Health
ILO	-	International LabourOrganisation
IFAD	-	International Fund for Agriculture and Development
ISO	-	International Standards Organisation
ISSA	-	International Social Security Associations
NIOSH	-	National Institute for Occupational Safety and Health
OHSE	-	Occupational He0alth, Safety and Environment
OHSEM	-	Occupational Health, Safety and Environmental Management
SHEQ	-	Safety, Health, Environment and Quality
TOPP	-	Twifo Oil Palm Plantation
WHO	-	World Health Organisation

CHAPTER ONE

INTRODUCTION

Background to the study

Workplace-related health impairments, injuries and illnesses cause great human suffering and attract high costs, both for the affected and businesses. The World Health Organisation (WHO) (2003) estimated that two million occupational fatalities occur across the world every year, which is greater than the global annual number of deaths from malaria. The highest proportions of these deaths are caused by work-related cancers, circulatory and cerebrovascular diseases, and some communicable diseases. The overall annual rate of occupational accidents across the globe, fatal and non-fatal, is estimated at 270 million (International Labour Organisation [ILO], 2005a).

According to the ILO (2001), about 160 million workers suffer from work-related diseases globally and about two-thirds of those are away from work for four working days or longer as a result. After work-related cancers, circulatory diseases and certain communicable diseases, accidental occupational injuries are the fourth main cause of work-related fatalities. As a result, the European Commission (2007) posited that strict occupational health, safety and environmental management (OHSEM) practices should be instituted by corporate entities, especially those in the industrial and manufacturing sector, to stem the rampant and high rate of occurrence of work-related injuries and fatalities across the globe. The ILO has also developed standards, frameworks and regulations on occupational health, safety and environmental practices to ensure safe working and community environment.

In 1950, the first session of the joint International Labour Organisation and the World Health Organisation Committee on occupational health and safety adopted a definition of occupational health and safety. The definition was subsequently revised in 1995 and states:

> "occupational health and safety should aim at the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; and the placing and maintenance of workers in an occupational environment adapted to their physiological and psychological capabilities and, to summarize: the adaptation of work to people and each of them to their jobs" (Guldenmund, 2010: 5).

Typical occupational health and safety risks common to the industrial sectors may be categorized as physical, chemical, ergonomic, and biological risks (Vike, 2007). Slips, trips, falls, noise, and vibration are examples of physical risks. Fires, explosions, leaks, spills, and exposure to gases, vapours, mists, dust, and fumes are common chemical risks. Musculo-skeletal problems resulting from repetitive activities such as lifting and carrying, or from spending long periods in one single position such as sitting at desks and working with computers, are typical ergonomic risks (Manuele, 2008). Lastly, exposure to bacteria, viruses, biogenic toxins, and allergens is characteristic of biological risks.

Modern occupational health, safety and environment legislation usually demands that a risk assessment be carried out prior to making an intervention

(Ngowi, 2003). This assessment should detect the hazards, identify all affected by the hazards, evaluate the risk, and offer and prioritise appropriate control measures. A hazard refers to a circumstance that has the potential to cause harm. It may indicate a physical situation or it may indicate the omission of necessary preventative measures. The evaluation of risk is based on the likelihood or probability of the harm being realized and the severity of the consequences (Hinton, Veiga & Veiga, 2003). Waichman, Eve and da Silva (2007) posited that risk assessment and hazard identification should not be limited to the internal operations of a company but be extended to the macro-habitat within which the company is situated. This is important since the operations of manufacturing companies have both direct and indirect environmental impacts on the communities in which they operate.

According to Keiner (2004), all that occupational health, safety and environmental programmes aim to foster is a safe working environment, including the protection of employers, employees, suppliers, customers, family members, nearby communities and other members of the public who could be affected by a company's operations. This suggests that business organisations are not only responsible for their workers but the community at large. In other words, occupational health, safety and environmental programmes for business organisations should extend to protect community members to ensure peaceful co-existence. This is critical because Waichman et al. (2007) argue that an organisation's activities can pose a risk of injury or ill-health, result in serious impairment of health or even fatality as well as threaten the sustainability of the livelihoods of community members.

In the establishment of OHSEM practices, International Fund for Agricultural Development [IFAD] (2008) reported that it is logical that those workers and all other stakeholders whose activities are affected by the operations of an organisation are involved in the process of risk identification and safety strategies to avert injuries and deaths. The International Standards Organisation (ISO) 45001 also emphasizes the need for stakeholder participation in the functioning of an OHSEM system, as well as requiring that an organisation ensures that its workers are trained to do their assigned tasks safely. Thus, all the stakeholders should be made aware of the dangers and be trained on the safety measures.

According to Waichman et al. (2007), risk management requires risk to be managed to a level that is as low as reasonably practical. Guldenmund (2010) also specifies that the necessary safety and protective gears and equipment as well as precautionary systems should be made available to all the stakeholders to enhance their capacity to protect themselves. Subramaniam (2007) also reported that capacity building training programmes should be organised for all stakeholders to effectively manage the risks and hazards they are exposed to ensure successful OHSEM. As such, the participation of workers and all other stakeholders in the establishment, implementation and maintenance of an OHSEM system can play an important role in ensuring that the risks are managed effectively. This is very critical in large plantation farms where pesticides are applied on a large scale and at regular intervals.

The human, social, environmental and economic costs of occupational accidents, injuries and diseases and major industrial disasters have long been a cause for concern among workers, organisations and governments (Waichman et

al., 2007). According to Subramaniam (2007), measures and strategies designed to prevent, control, reduce or eliminate occupational hazards and risks have been developed and applied continuously over the years to keep pace with technological and economic changes. However, Guldenmund (2010) posited that despite the continuous improvements, occupational accidents and diseases are still too frequent and their cost in terms of human suffering and economic burden continues to be significant.

According to Subramaniam (2007), strict adherence guidelines for OHSEM practices has led to the significant reduction in work-related injuries and fatalities, while the lack of clear compliance policies and OHSEM systems in developing countries are contributing to increase work-related injuries and deaths. In sub-Saharan Africa, the fatality rate per 100,000 workers is 21 and the accident rate is 16,000 (ILO, 2005b). This means that each year 54,000 workers die and 42 million work-related accidents take place that cause at least three days' absence from work in sub-Saharan Africa. The ILO (2005b) further reported that only 5-10 percent of workers in developing countries as against 20-50 percent of workers in industrial countries are estimated to have access to adequate OHSEM services.

High cost and other operational challenges encountered by business organisations discourage many of them from adopting comprehensive OHSEM systems to ensure safe working environments. According to Aryeetey (2004), weak regulatory framework coupled with poor capacities of state institutions to monitor and sanction corporate institutions have created situations where many institutions pay little regard to state policies on OHSEM systems. As a result,

Annah (2004) indicated that corporate institutions in developing countries are less committed to the implementation of OHSEM practices.

Health and environmental hazards created through the application of agrochemicals in the agricultural sector are enormous, which pose major risks to the lives of human beings, flora and fauna. The WHO estimates that 1-5 million cases of pesticide poisoning occur every year resulting in 20,000 fatalities among agricultural workers, most of them in developing countries (WHO, 2004a). Another estimate is that pesticides cause 14 per cent of all known occupational injuries in agriculture and 10 per cent of all fatal injuries (International Labour Conference, 1999). Over 98 per cent of sprayed insecticides and 95 per cent of herbicides reach destinations other than their target species, including non-target species, air, water, bottom sediments and food (Miller, 2004). This poses serious threats to communities hosting large plantation farms as people in such communities mostly encounter acute health problems from the large scale applications of pesticides, such as abdominal pain, dizziness, headaches, nausea, vomiting, as well as skin and eye problems (Gilden, Huffling & Sattler, 2010). The situation is dire in many developing countries where policies and regulatory frameworks to ensure OHSEM are not properly developed and enforced.

The Government of Ghana, as a result of a recommendation from the WHO, banned many pesticides, including DDT and organochlorine that were deemed harmful and have long-term effects on the environment in the early 1990s. Ghana has also ratified several ILO conventions relating to OHSEM including Underground Work (Women) Convention 1935 (No. 45); Radiation Protection Convention 1960 (No. 115); Guarding of Machinery Convention

1963 (No. 119); Hygiene (Commerce and Offices) Convention 1964; Working Environment (Air Pollution, Noise and Vibration) Convention, 1977; and Labour Inspection Convention 1947. Existing occupational health and safety legislation in Ghana is fragmented and limited in coverage.

As a result, the Labour Act of Ghana 2003 (Act 651) makes it mandatory for employers to provide safe working environment for employees. However, Annah (2004) reported that existing OHSEM legislation in Ghana is fragmented and limited in coverage. A key economic sector like agriculture is not covered by the country's occupational health and safety laws (Temeng & Abew, 2009). Although the agricultural sector employs over 60 per cent of the country's workforce, there is no form of occupational health and safety laws regulating the activities of the sector (Agyeman, Amponsah, Braimah & Lurumuah, 2012). As a result, employees and other stakeholders under this sector are mostly exposed to various hazards, which often lead to work-related injuries and deaths.

Agyeman et al. (2012) traced this situation back to colonial rule in Gold Coast, where the colonial government placed more emphasis on labour relations in sectors of the economy where formal employment relations existed. The absence of OHSEM laws to regulate activities in the agricultural sector had made it difficult for stakeholders in large scale plantation agriculture, such as the Twifo Oil Palm Plantation (TOPP) and the Benso Oil Palm Plantation, with formal working relations to implement comprehensive OHSEM practices that would help provide maximum protection to workers and all other stakeholders under the sector (Mensah-Bonsu, 2006). Temeng and Abew (2009) also report that Ghana lacks a policy defining the responsibilities of stakeholders in the

agricultural sector namely; government, employers, communities and employees in ensuring safe working environment.

Twifo Oil Palm Plantation is an agricultural project in the Twifo Hemang Lower Denkyira and Twifo Atti Morkwa districts in the Central Region of Ghana. TOPP has large tracks of oil palm plantation interlocked by several rural communities and individual oil palm plantations serving as out-growers to supply more palm fruits to the company for palm oil production. The regular application of chemicals by TOPP and the out-growers implies the exposure of all stakeholders, including community residents, out-grower farmers, and workers of TOPP to safety and environmental hazards.

Statement of the problem

TOPP is an agricultural project initiated by the Government of Ghana in 1977. The business the company is authorized to carry out include: growing oil palm and other agricultural products on a large scale, assisting processors of oil palm fruits to produce palm oil and palm kernel and other agricultural products. The scope of activities of the company is such that large quantities of pesticides and other agrochemicals are applied on the farms annually, which has serious consequences on the environment i.e., both terrestrial and aquatic resources. Waichman et al. (2007) reported that indiscriminate or large scale use of agrochemicals has debilitating impact on both the environment and the workers who work on the farms and also stay close to them.

Communities are at the receiving end of the large scale application of agrochemicals from large scale farming companies. It leads to the contamination of their water resources and the destruction of their lands, which has serious

negative impact on the health and economic livelihood of residents (Temeng & Abew, 2009). In addition to the community residents, out-grower farmers and employees who operate under large scale agricultural plantation firms have their health and lives being threatened by their continuous exposure to agrochemicals. However, much attention is given to the effectiveness of the OHSEM practices on workers of manufacturing companies at the expense of other stakeholders such as residents of nearby communities (Temeng & Abew, 2009).

As a result, Waichman et al. (2007) posited that occupational health and safety management system should be developed to cover all these stakeholders to avert frequent occurrences of work-related injuries and deaths. TOPP has subscribed to the Safety, Health, Environment and Quality (SHEQ) system of Unilever as well as all national legislations on SHEQ to promote environmental safety for workers and community residents. It is against this background that this study sought to analyse the OSHE practices adopted by TOPP to promote environmental safety for employees and community residents.

Research objectives

The general objective of the study was to assess the effectiveness of OHSEM practices at TOPP in the Hemang-Lower Denkyira District. The specific objectives are as follows:

1. Examine the occupational health, safety and environmental risks exposure among employees and community residents through the operations of TOPP.

2. Examine the occupational health, safety and environmental practices adopted by TOPP to ensure safe working environment for both employees and community residents.
3. Assess the capacity levels of stakeholders in managing the risks and hazards they are exposed to in ensuring OHSEM in the catchment area of TOPP.
4. Make recommendations to improve the effectiveness of occupational health safety and environmental practices of TOPP.

Research questions

The study sought to find answers to the following questions:

1. What occupational health safety and environmental risks are the stakeholders exposed to through the operations of TOPP.
2. What occupational health safety and environmental practices have been adopted by TOPP to ensure safe working environment for the stakeholder?
3. What are the levels of capacity of the stakeholders in managing hazards and risks to ensure OHSEM?

Significance of the study

The study is deemed significant considering the importance of environmental issues to the sustainable development of every geographical unit. In addition, the critical role of human resource to the growth of businesses makes it imperative for organisations to occasionally ascertain the effectiveness of their safety practices in addressing the operational and environmental risks employees and other stakeholders are exposed to. Most studies on occupational

health and safety focus on employees of organisations, however, the inclusion of community residents in this study would enable the management of TOPP to ascertain the larger impact and risks they expose the communities to.

Such a report could empower the management of TOPP to adopt a wider policy to address the environmental and economic challenges of the communities resulting from the operations of the company to maintain cordial relationship with them. It was also expected that findings from the study would lay the foundation for government, EPA, District Assemblies and other stakeholders to enact policies to regulate the large scale use of agrochemicals to promote occupational health, safety and environmental practices. The findings of the study would also serve as a body of knowledge in the field of safety, environmental protection, agriculture, sustainable livelihood and health.

Scope of the study

The study focused on occupational health, safety and environmental practices and how such practices are contributing to minimise environmental damage and ensuring safe working environment for all stakeholders. The practices involve the safety and protective gears made available to employees, training and sensitisation programmes given to community residents and employees, monitoring the implementation system to ensure compliance, and applying sanction mechanisms. Others are risks stakeholders are exposed to and the commitment of the management of TOPP in minimising the risks to ensure safe working environment. The geographical scope focused on the communities whose jurisdictions fell under the area of operation and catchment area of the activities of TOPP in the Hemang-Lower Denkyira District.

Organisation of the study

The study was organised under five chapters. The first chapter is the introduction. The chapter presents the background to the study, statement of the problem, research objectives and research questions. Chapter Two is a review of literature related to occupational health safety and environmental practices in the agricultural sector. Some of the issues considered under the chapter include concept of occupational health and safety, theories explaining occupational health and safety, and importance of occupational health and safety. The third chapter is on the methodology. The chapter considers issues such as the research design, sources of data, and data analysis. Chapter Four focuses on the results and discussion of the gathered data, whereas the fifth chapter presents the summary of major findings of the study, conclusions and recommendations.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

This chapter reviewed literature related to occupational health, safety and environmental practices. It included theoretical, conceptual and empirical issues surrounding the study topic. Some of the issues considered under the chapter were the concept of OHSEM, and environmental practices in the agricultural sector.

Theoretical perspectives

The study was guided by the Domino, Danger Factor, Stakeholder and Green Theories. This section explains the theoretical perspectives influencing the researcher's conceptualisation of occupational health, safety and environmental practices.

Domino Theory

The domino theory was the first scientific approach to accident prevention. Heinrich, Peterson and Roos (1980) presented a set of theorems known as the axioms of industrial safety. The first axiom dealt with accident causation, stating that the occurrence of an injury invariably results from a complicated sequence of factors, the last one of which is the accident itself (Heinrich *et al*.,1980). Alongside, Heinrich et al. presented a model known as the 'Domino theory' as this accident sequence was likened to a row of dominoes knocking each other down in a row. The theory explains that accidents result from a chain of sequential events. When one of the dominoes fall, it triggers the

next one, and the next. But removing a key factor (such as an unsafe condition or an unsafe act) prevents the start of the chain reaction or breaks the chain of the reaction (Forastieri, 2001). This means that establishing safety standards and policies and motivating workers to adhere to them are the most critical elements in ensuring occupational health and safety.

According to Bird and Germain (1986), all incidents directly relate to unsafe conditions and acts, such as standing under suspended loads, horseplay and removal of safeguards as well as exposure to mechanical or physical hazards such as unguarded gears and insufficient light. Heinrich et al posit five metaphorical dominoes labelled with accident causes. They are social environment and ancestry; fault of person; unsafe act or mechanical or physical hazard (unsafe condition); accident; and injury.

Social environment and ancestry as the first domino in the sequence deals with worker personality. Geller (2004) explains that undesirable personality traits, such as stubbornness, greed, bad cultural practices and recklessness can be passed along through inheritance or develop from a person's social environment, and that both inheritance and environment (i.e. nature and nurture) contribute to faults of persons. In other words, the appropriateness of one's cultural and personal values to safety rules is imperative in upholding occupational health and safety practices in an organisation.

Fault of person as the second domino deals with worker personality traits. Heinrich et al (1980) explain that inborn or obtained character flaws such as bad temper, inconsiderateness, ignorance, and recklessness contribute to accident causation. According to Bird and Germain (1986), natural or environmental flaws in the worker's family or life cause these secondary

personal defects, which are themselves contributors to unsafe acts, or the existence of unsafe conditions.

Unsafe act and/or unsafe condition as the third domino deals with Heinrich et al.'s (1980) direct cause of accidents. Heinrich at al. felt that unsafe acts and unsafe conditions were the central factor in preventing incidents, and the easiest causation factor to remedy, a process which was likened to lifting one of the dominoes, normally the middle one or unsafe act, out of the line. Heinrich et al. define four reasons why people commit unsafe acts – improper attitude, lack of knowledge or skill, physical unsuitability, and improper mechanical or physical environment. Cooper (2007) subdivided these categories into "direct" and "underlying" causes. For example, a worker who commits an unsafe act may do so because he or she is not convinced that the appropriate preventative measure is necessary, and because of inadequate supervision. The former is classified as a direct cause, the latter as an underlying cause. This combination of multiple causes create a systematic chain of events leading to an accident.

Accident is the fourth domino. According to Cooper (2007), the occurrence of a preventable injury is the natural culmination of a series of events or circumstances which invariably occur in a fixed and logical order. Aryeetey (2004) indicates that events such as falls of persons or striking of persons by flying objects are typical accidents that cause injury.

Injury, as the fifth domino, results from accidents, and some types of injuries are cuts and broken bones. According to Ngowi (2003), the responsibility lies first of all with the employer to ensure the safety of workers. Jorma (2004) specifies that truly safety-conscious managers will make sure their workers do as they are told, and exercise their prerogative and obtain

compliance, follow through and see that unsafe conditions are eliminated. Heinrich et al.'s (1980) remedy for such non-compliance is strict supervision, remedial training, and discipline.

The Domino model has, however, been criticised as a one-dimensional sequence of events. Accidents are usually multi-factoral and develop through relatively lengthy sequences of changes and errors. This has led to the principle of multiple causation. According to Peterson (1978), behind every accident there lies many contributing factors, causes and sub-causes. These factors combine, in random fashion, causing accidents. So, during accident investigations, there is a need to identify as many of these causes as possible, rather than just one for each stage of the domino sequence.

Danger Factor Theory

The Danger Factor Theory is one of the theories of accident and accident prevention. According to the Danger Factor Theory, an accident happens when a worker and a danger factor meet so that the worker injures himself or herself. Adams (1976) posited that there should be clear barriers between the danger factors and workers to ensure organisational health and safety. According to Adams (1976), the most critical danger factors are those with the highest energy content.

The Danger Factor Theory looks at the role of organisational management in ensuring occupational health, safety and environmental practices (Goestsch, 2005). According to Mendeloff and Gray (2005), the lack of control by management begins the process that eventually results in incidents. Manuele (2008) stresses that if managements do their job as in planning, organising,

leading, and controlling, they can prevent accidents from happening at all. If managements do not do their job, however, it creates certain basic causes from which accidents arise. The theory considers the critical role of humans as a factor in the process of causing or preventing accidents in an organisational environment. It attributes the causes of accidents to three main factors, including personal failure (conscious or unconscious), systems failure (peoples failure to adhere to safety standards), and management failure (failure to provide safe environment for workers and train workers on safety standards). The opposite for the three factors is also valid and necessary for ensuring safety in a business environment. The above factors also show that both managers and workers play essential roles in ensuring occupational health, safety and environment.

The exchange of information between workers and their environment is a precondition to the promotion of occupational health and safety (Seong & Mendeloff, 2004). As a result, information about the various hazards and danger factors in an organisation should carefully be assessed and well communicated to all stakeholders to avoid accidents. Chaturvedi (2006) suggested that where training is required, organisational managers should train their staff on measures to prevent accidents and how they should conduct themselves during accidents or disasters. In addition, newly recruited employees should be oriented in the safety practices of the company to avoid their direct confrontation with the danger factors that cause accidents. Nevertheless, Constantin (2012) emphasises that all stakeholders should be committed to adhering to the safety rules in an organisation to avoid accidents.

The danger factor theory was criticised by Matzinger (2002). According to him an immune response is triggered against all foreign ("nonself") entities,

whereas no immune response is triggered against the organism's own constituents ("self"). For Matzinger, despite the evolution of the non-self-theory between the 1960s and the 1990s, today's immunologists still think of the immune system within this framework, even though this theory may be interpreted as fundamentally flawed.

Stakeholder Theory

The Stakeholder Theory is a theory of organizational management and business ethics that addresses morals and values in managing an organization. It was originally detailed by R. Edward Freeman in the book Strategic Management in 1984. According to Roberts and Mahoney (2004), a stakeholder approach identifies and models the groups which are stakeholders of a corporation, and both describes and recommends methods by which management can give due regard to the interests of those groups. In the traditional view of a company, the shareholder view, only the owners or shareholders of the company are important, and the company has a binding fiduciary duty to put their needs first, to increase value for them (Miles, 2012).

Stakeholder Theory instead argues that there are other parties involved in every process and events, including employees, customers, suppliers, financiers, communities, governmental bodies, political groups, trade associations, and trade unions. The stakeholder is defined as any group or individual who can affect or is affected by the achievement of the organization's objectives (Freeman, 1984). Freeman (2004; 37) defines stakeholders as "those groups who are vital to the survival and success of the corporation". Freeman (2004) adds a new principle, which reflects a new trend in stakeholder Theory. In this

principle, the consideration of the perspective of the stakeholders themselves and their activities is also very important to be taken into the management of companies.

Friedman and Miles (2006) state that the organisation itself should be thought of as a grouping of stakeholders and the purpose of the organisation should be to manage their interests, needs and viewpoints. Thus, the managers should, on the one hand, manage the corporation for the benefit of its stakeholders in order to ensure their rights and the participation in decision making and on the other hand, management must act as the stakeholder's agent to ensure the survival of the firm to safeguard the long term stakes of each group (Roberts & Mahoney, 2004). According to Miles (2012), the whole argument of the Stakeholder's Theory is that organisations should identify the interests of all categories of people who could influence or are influenced by their activities and manage them in their processes of delivery.

However, Blattberg (2004) criticises the Stakeholder's Theory that not all persons who can affect or be affected by the activities of an organisation could be identified. In addition, Mansell (2013) posited that it is not practically possible to identify all the interests of every stakeholder as some may be having conflicting interests and personal aspirations.

Green Theory

Green Theory is one of the environmental justice theories. The theory emerged as a result of the movement to establish a balance between globalisation and environment. Carter (2013) observed socially unequal environmental risks and negative effects of industrialization on people who were

not directly engaged in manufacturing processes. While 'at-risk' communities had experienced the problem for much of the 20th century, documentation of environmental injustice as a legacy of industrialization only started in the 1980s. The green movement in the 1960s and 1970s helped to push environmental issues from the margins to the mainstream of public policy agendas, regarding the roles and responsibilities of industrial establishments to the environment.

The cardinal principle of the green theory is that economic actors should be made accountable to the environment by instituting measures to enable biodiversity to regenerate itself within the shortest possible time to guarantee quality life to humankind (Newell, 2008). Thus, the theory postulates that environmental development goals should be incorporated into economic activities and business development goals. The theory advocates for responsible agricultural activities, where only manures and organic fertilisers are proportionately applied to avoid the creation of imbalances in the ecosystem. The green theory and the type of politics associated with it have several specific characteristics, among which are the ecocentric ethics, limits to growth and the decentralization of power (Patterson, 2009).

The first principle of the green theory is on ecocentrism. According to Giddens (2009), ecocentrism should be interpreted as the rejection of an anthropocentric world-view which places independent value only on humans in favour of one which places independent value also on ecosystems and all living beings. Thus, the world is ontologically composed of inter-relations rather than individual entities. All beings are fundamentally embedded in ecological relationships. Consequently, there are no convincing criteria which can be used to make a hard and fast distinction between humans and non-humans. All actors

should, therefore, attach much importance to environmental sustainability in their bid to meet their economic needs (Barry, 2007).

The second principle of the green theory suggests the need to shift authority from international institutions to local organizations (Carter, 2013). Environmental management powers and responsibilities should be decentralised to involve local stakeholders who are either involved in the activities that cause environmental damage or are affected by the environmental degradation and pollution. The third principle of the green theory is that of the need to limit the proportions of growth in order to create a sustainable society and ensure security (Dobson, 2011). The economic growth of wealthier states is not necessarily related to the security which its citizens feel (ILO, 2004). For this reason, green theorists have suggested the shifting of focus from economic growth towards sufficiency and income security (Barry, 2007).

However, Sylvan (1996) criticises the theory that the pivotal issue for green theory is the greater value assumption. Human interests, though always important, do not necessarily always win out. He argues that that is a concern when there is a shift in the frame of reference for ethical consideration from humans to the biotic community.

Concept of occupational health, safety and environment

Occupational health, safety and environment is a concept with a broad scope involving many specialised fields. Jorma (2004) described workplace health, safety and environment as a multidisciplinary field concerned with the safety, health, environmental protection and welfare of people at work and in the community within which companies operate. The goals of OHSE programmes include: the promotion and maintenance of the highest degree of physical,

mental and social well-being of workers in all occupations, and residents living around the business setups; the prevention, among workers and residents, of adverse effects on health caused by working and environmental conditions; the protection of workers and community residents in their employment from risks resulting from factors adverse to health; the placing and maintenance of workers and community residents in an occupational environment adapted to physical and mental needs; the adaptation of work to humans; and the protection of co-workers, family members, employers, customers, and many others who might be affected by the workplace environment (Alfers, 2009).

In other words, OHSE encompasses the social, mental and physical well-being of workers and community residents that is the "whole person" or the total wellbeing of people whose activities are affected by an organisation (Mock, Adjei, Acheampong, Deroo & Simpson, 2005). According to Kelloway and Day (2005), such a system motivates and gives workers total peace of mind to concentrate on their job, thereby increasing their performance. As a result, Mock et al. indicated that every business organisation has the duty to ensure that employees and any other person who may be affected by the organisation's activities remain safe at all times. Successful OHSE practice requires the collaboration and participation of employers, workers and other stakeholders in health and safety programmes, and involves the consideration of issues relating to occupational medicine, industrial hygiene, toxicology, education, engineering safety, ergonomics, and psychology, among others (Harter, Schmidt & Keyes, 2003).

According to Campolieti and Hyatt (2006), OHSE deals with all aspects of health and safety in the workplace and has a strong focus on primary prevention of hazards. OHSE is a multidisciplinary field of healthcare and environmental concern which enables individuals to undertake their occupation, in the way that causes least harm to their health (Mendeloff & Gray, 2005). The enjoyment of these standards at the highest levels is a basic human right that should be accessible by each and every worker (ILO, 2005b). Regardless of the nature of their work, Goestsch (2005) posits that workers should be able to carry out their responsibilities in a safe and secure working environment, free from hazards. These rights are set out in legislation to ensure that employers are clear about the obligations and the consequences for neglecting them.

OHSE is generally defined as the science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment (Manuele, 2008). An OHSEM system is the integrated set of organisational elements involved in the continuous cycle of planning, implementation, evaluation, and continual improvement, directed toward the abatement of occupational hazards in the workplace (Campolieti & Hyatt, 2006). According to Manuele (2008), such elements include, but are not limited to, organisations' OHSE relevant policies, goals and objectives, decision-making structures and practices, technical resources, accountability structures and practices, communication practices, hazard identification practices, training practices, hazard controls, quality assurance practices, evaluation practices, and organisational learning practices.

The domain of occupation health, safety and environmental management system is necessarily vast, encompassing a large number of disciplines and numerous workplace and environmental hazards. As a result, Alfers (2009) specifies that a wide range of structures, skills, knowledge and analytical capacities are needed to coordinate and implement all of the "building blocks" that make up occupational health and safety management systems so that protection is extended to both workers and the environment.

To address occupational health and safety, Mundy (2003) reported that businesses should identify the workplace hazards. A hazard refers to a circumstance that has the potential to cause harm (Rosenman et al., 2006). It may indicate a physical situation or it may indicate the omission of necessary preventative measures. An example of a physical situation would be exposure to equipment with sharp edges that could cause lacerations, while an example of an omission would be the failure to provide a guard to prevent injury from the sharp edges on the equipment. Modern occupational health and safety legislation usually demands that a risk assessment be carried out prior to making an intervention (Mendeloff & Gray, 2005). According to Seong and Mendeloff (2004), risk management within occupational health and safety management systems requires risk to be managed to a level that is as low as is reasonably practical. This assessment should detect the hazards, identify all affected by the hazards, evaluate the risk, and offer and prioritise appropriate control measures (Manuele, 2008).

Risk evaluation in an occupational health and safety management system is based on the likelihood or probability of the harm being realised and the severity of the consequences (Zaloshnja, Miller & Waehrer, 2006). This can be

expressed mathematically as a quantitative assessment by assigning integers to denote low, medium, or high likelihood, and assigning integers to indicate the severity of the consequences. The integer assigned for likelihood and the one assigned for severity can be multiplied to obtain a risk factor (Vike, 2007). According to Seong et al. (2004), risk can also be evaluated qualitatively by describing the circumstance in which the harm could arise. Alfers (2009) suggests that the ultimate aim of occupational health and safety management systems is to lower risks associated with the execution of tasks and their associated impacts on the environment.

Risk increases as the seriousness of resulting harm increases, and as the likelihood increases that the circumstance will occur (Goestsch, 2005). Ideally, all risks would be mitigated; however, this is usually not feasible. Implementing an occupational health and safety management system, which can be carried out in-house or by specialized consultants, is a reliable way of improving occupational health and safety performance in the workplace (Campolieti & Hyatt, 2006). These health and safety systems promote, facilitate, and enable consistency throughout workplace activities and processes. Manuele (2008) noted that the system alone will not produce safe behaviour or a safe workplace.

Pre-requisite factors for targeting occupational health, safety and environment

According to Health and Safety Executive (2009), new businesses sometimes fail to include occupational health and safety within their management priorities. Since management may not carry out early identification and proper assessment of health and safety risks, Constantin (2012) emphasises

that it cannot make its employees aware of the workplace risks, and training programmes may not be properly established. Paton (2008) recommends that new businesses should begin addressing health and safety from the very beginning by taking stock of the work-related risks and hazards. Chaturvedi (2006) also specifies that open communication with the employees is crucial to the success of an occupational health and safety system. The employees' cooperation depends on their understanding of the system's goals, why it is important to them, and how it affects their work. As a result, the European Agency for Safety and Health at Work (2007) stated that it is very necessary for organisational management to involve employees and all other stakeholders in the risk assessment and occupational health and safety management system.

Additionally, documentation of the activities in all elements of the safety and health programme is important. Essential records, including those legally required for workers' compensation, insurance audits, and government inspections, must be maintained as long as the actual need exists or as required by law (Zaloshnja, Miller & Waehrer, 2006). In other words, keeping records of all activities, such as policy statements, training sessions, safety and health meetings, information distributed to employees, and medical arrangements made, is greatly encouraged. According to Campolieti and Hyatt (2006), maintaining essential records will demonstrate sound business management as supporting proof for credit applications, for insurance and other audits. Such record keeping systems enable stakeholders to hold organisational management accountable over negligence in putting measures in place to reduce the severity of a threat or risk (Goestsch, 2005).

Furthermore, such records help in the review of ongoing safety and health activities for better control of current operations and to plan improvements. Records of accidents, related injuries, illnesses, and property losses are essential to developing procedures to prevent recurrence (Vike, 2007). Manuele (2008) argues that any good management system requires periodic review to determine what is working well and what changes are needed. According to Alfers (2009), a widely accepted way to identify hazards is to conduct safety and health inspections. Using checklists is a good way to get an indication of where to begin taking action towards a safer and more healthful business (Health & Safety Executive, 2009).

Key principles in occupational health safety and environmental management

A number of key principles underpin the field of occupational health, safety and environmental management. These principles are all designed to achieve the goal that work should take place in a safe and healthy environment. Occupational health, safety and environment is an extensive multidisciplinary field, invariably touching on issues related to, among other things, medicine and other scientific fields, law, technology, economics and concerns specific to various industries. Despite this variety of concerns and interests, the European Agency for Safety and Health at Work (2007) indicates that certain basic principles can be identified.

One of the principles is that all workers have rights. Workers, as well as employers and governments, must ensure that these rights are protected and foster decent conditions of labour (Forastieri, 2001). The International Labour

Conference stated in 1984 that work should take place in a safe and healthy working environment; conditions of work should be consistent with workers' well-being and human dignity; and work should offer real possibilities for personal achievement, self-fulfilment and service to society.

The European Agency for Safety and Health at Work (2007) posited that occupational health, safety and environmental policies must be established to serve as a point of reference for monitoring and evaluating the commitment of business organisations in ensuring work place and environmental safety. Such policies must be implemented at both governmental and enterprise levels. Thus, governments should establish laws to regulate and promote occupational health, safety and environment in various business setups. The laws and policies must be effectively communicated to all parties concerned.

There is need for consultation with social partners i.e. employers, workers, communities and other stakeholders in agreeing to the tenets of the workplace and environmental safety policies. According to Cooper (2007), this should be done during formulation, implementation and review of such policies. Geller (2004) argues that prevention and protection must be the aim of occupational health, safety and environmental programmes and policies. Efforts must also be focused on primary prevention at the workplace level. In other words, workplaces and working environments should be planned and designed to be safe and healthy.

Information is vital for the development and implementation of effective programmes and policies for workplace and environmental safety. The collection and dissemination of accurate information on hazards and hazardous materials, surveillance of workplaces, monitoring of compliance with policies

and good practices, and other related activities are central to the establishment and enforcement of effective policies for workplace safety and environmental safety (Puplampu & Quartey, 2012). Cooper (2007) asserted that health promotion is a central element of occupational health, safety and environmental practice. As a result, efforts must be made to enhance workers' and communities' physical, mental and social well-being.

Occupational health and environmental safety services covering all stakeholders, including workers and communities, should be established. Ideally, all workers and inhabitants within the catchment areas of businesses in all categories of economic activity should have access to such services, which aim to protect and promote the health of workers and communities, and improve their working conditions (Clarke, 2005). Annah (2004) emphasises that compensation, rehabilitation and curative services must be made available to workers and community members who suffer occupational injuries, accidents and work-related diseases. Action must be taken to minimise the consequences of occupational hazards.

Education and training are vital components of safe, healthy working environments. Workers, employers and community members must be made aware of the importance and the means of establishing safe working procedures (Constantin, 2012). Trainers must be trained in areas of special relevance of different industries, which have specific occupational health, safety and environmental concerns. According to Cooper (2007), workers, employers, community members and competent authorities have certain responsibilities, duties and obligations. For example, workers and community members must follow established safety procedures; employers must provide safe workplaces

and ensure access to first aid; and the competent authorities must devise, communicate and periodically review and update occupational health and safety policies. A system of inspection must also be in place to secure compliance with occupational health, safety and environmental practices, and other labour legislation.

Clearly, some overlap exists among these general principles. For example, the gathering and dissemination of information on various facets of occupational health, safety and environment affect all the activities. Information is needed for the prevention as well as the treatment of occupational injuries and diseases. Information is also needed for the creation of effective policies and to ensure that they are enforced. Education and training demand information. While these key principles inform occupational health, safety and environmental programmes and policies, the above list is by no means exhaustive. More specialised areas also have corresponding principles. Moreover, ethical considerations regarding such matters as individuals' rights to privacy must be taken into consideration when devising policies (Puplampu & Quartey, 2012).

Evolution of occupational health, safety and environment

The research and regulation of occupational safety and health are a relatively recent phenomenon. In the late 19th and early 20th centuries, employers ran their businesses as they saw fit to make profit. Employee safety and health were not their concern. In fact, in official terms, these things were nobody's concern. In the United States of America, injured employees had to litigate to obtain compensation for their injuries (European Agency for Safety and Health at Work [EASHW], 2007). The cost of doing so effectively

prevented employees from going to court. Besides, employees were rarely successful since, under common law, if the employee knew of the hazards the job entailed or if the injuries were brought about as a result of the negligence of the employee or a co-worker, the employer was not liable (Pathak, 2008).

As labour movements arose in response to worker concerns in the wake of the industrial revolution, worker's health entered consideration as a labour-related issue (Binch & Bell, 2007). In the United Kingdom, the Factory Acts of the early nineteenth century (from 1802 onwards) arose out of concerns about the poor health of children working in cotton mills: the Act of 1833 created a dedicated professional Factory Inspectorate (EASHW, 2007). According to Health and Safety Executive (2009), the initial remit of the Inspectorate was to police restrictions on the working hours in the textile industry of children and young persons introduced to prevent chronic overwork, identified as leading directly to ill-health and deformation, and indirectly to a high accident rate.

In 1840 a Royal Commission published its findings on the state of conditions for the workers of the mining industry that documented the appallingly dangerous environment that they had to work in and the high frequency of accidents (Binch & Bell, 2007). The Commission sparked public outrage which resulted in the Mines Act of 1842. On the urging of the Factory Inspectorate, a further Act in 1844 giving similar restrictions on working hours for women in the textile industry introduced a requirement for machinery guarding, but only in the textile industry, and only in areas that might be accessed by women or children (Health & Safety Executive, 2009). The act set up an inspectorate for mines and collieries which resulted in many prosecutions and safety improvements, and by 1850, inspectors were able to enter and inspect

premises at their discretion. The first social insurance legislation was inaugurated in 1883 and the first worker's compensation law in 1884 – the first of their kind in the Western world (Guldenmund, 2010). Similar acts followed in other countries, partly in response to labour unrest.

From these origins, there has emerged an approach and practice with regard to health, safety and welfare issues. Waichman et al. posited that the national safety council had been established in 1913 in the U.S. after safety conscious managers and engineers spearheaded its founding (major disasters led to changes in thinking). Significantly, the ILO provided that occupational health services should be established in or near a place of employment for the employee welfare (ILO, 2005a). This helped to advance the acceptance and implementation of occupational health, safety and environmental management policies in business setups. Thus, the ratification by member countries of the ILO's policies and standards on occupational health and safety compelled factories and all business organisations in the countries to abide by them to prevent workplace accidents and protect workers from harm.

The inclusion of environmental issues in occupational health and safety started through confrontations between young, liberal and highly educated non-Hispanic Whites, and factory managers in the United States of America in the 1960s. The first Earth Day for recognising the need to reduce environmental pollution in occupational health and environmental strategies was marked on Sunday, April 22, 1970 in the United States of America. The aim was to recognise community residents as stakeholders in environmental health and safety in occupational activities. The outcome of such collaboration led to the

creation of community relations officers in business organisations to address the needs and concerns of communities to ensure peaceful coexistence.

The movement also led to the creation of the US Environmental Protection Agency and the passage of the National Environmental Policy Act and about a dozen other laws that promised to control emissions from factories, cars, power plants, and other sources and to better protect the health of workers in the 1970s and 1980s. The results of these policies included the reduction of emissions into water bodies and air from sewage treatment systems, factories, electricity-generating stations, and motor vehicles, and the clean-up and control of some of the nation's worst hazardous waste sites.

Occupational health, safety and environmental management systems

A number of businesses manage the health and safety function in their businesses by carrying out health and safety activities aimed at minimising or eliminating the risk of hazards on their sites (Jorma, 2004). Essentially, a health and safety management system has four primary elements: planning, implementing the plan, reviewing the plan, and evaluating and taking measures to improve strategy (WHO, 2003). Despite the popularity of literature on health, safety and environmental management systems, a commonly accepted definition is lacking due to the variable nature of the elements often composing them. Alfers (2009) found that health and safety management lack a common definition and reported on health, safety and environmental management systems having up to 27 elements. Harter et al. (2003) reported on the adoption

of a simple, non-bureaucratic health, safety and environmental management system by businesses in Finland which proved effective in bringing down the numbers of workplace accidents experienced by workers.

Approaches to health, safety and environmental management reported in most industrial setups hardly qualify as health, safety and environmental management systems because they lack some of the critical elements (Campolieti & Hyatt, 2006). For instance, Manuele's (2008) 3Es suggested that achieving high safety performance comprises; safety engineering, safety education and safety rule enforcement. This health and safety management system involves planning as part of the safety engineering process but lacks clear elements or procedures on how to continuously improve health and safety performance.

The effectiveness of health and safety management systems in the agricultural sector has not been clearly assessed (Schnall, Dobson & Rosskam, 2009). At best, it is only the individual elements that make up the system which have been shown to be associated with improved health and safety performance. The adoption of comprehensive health and safety management systems in the agricultural sector has been shown to be a difficult task (Sorensen & Barbeau, 2004). Some reasons as to why agricultural industrial establishments find it difficult adopting such systems include lack of adequate resources, the fusion of poor cultural practices into agricultural activities, and operating under relatively informal management procedures (Robson et al., 2007).

Research suggests that integrating the health and safety management function of a business with other management functions could enhance the overall performance of the business (Noblet & Lamontagne, 2006). Besides the

benefits to be derived from such an integrated management system, Schnall et al. (2009) have pointed out client pressure, cost reduction, legislation and total project management as factors promoting their adoption. According to the National Institute for Occupational Safety and Health (2008), many management systems, especially health and safety, environment and quality have many identical elements. For instance, policy, training of personnel, auditing, responsibility for task and controls are common elements in all three areas of management. This, therefore, makes it possible to integrate them as a single management system, especially for the agricultural sector.

Proponents of integrated systems for occupational health and safety argue that such an integrated system will lead to management effectiveness, reduced duplication, elimination of conflicting responsibilities and harmony of objectives (Mathiason, 2007). Based on the similarities in many areas of these management functions, Moss and Kincl (2007) proposed that a model of integrated management system for the agricultural industry will be effective. Arguing that environmental issues are safety issues, Mathiason (2007) suggests a single administrative procedure for safety and environment via an environmental safety plan in the agricultural sector. The benefits of such a procedure include fewer processes involved in regulatory agency reviews and workers benefiting from training in both environmental and safety aspects of their work environment.

Behavioural approaches to health, safety and environmental management

According to Hanson (2007), between 70 to 90 per cent of all accidents are caused by unsafe behaviour. A number of theories have linked accidents to

the failure of persons (by their actions or omissions) in the accident chain to avert accidents (Cadieux, Roy & Desmarais, 2006). These explanations have, therefore, formed the basis of psychological approaches to health and safety management which have as their aim, the modification of behaviour so as to break the chain of events leading to most accidents. Binch and Bell (2007) reported on behavioural modification procedures used in improving construction site and farm safety.

Pathak (2008) used a combination of goal-setting and feedback to influence the behaviour of site operatives. The findings of the study suggest goal setting and feedback can greatly enhance health and safety performance. Schnall et al. (2009) has pointed out that behavioural methods should not be restricted to site or farm operatives but could be extended to include site or farm management staff and senior corporate management. Hanson (2007) examined the effectiveness of the goal-setting and feedback approach in the Honk Kong construction industry. It was found that labour commitments to the group and to the organisation are intervening variables in the application of behavioural techniques.

Workers need to behave on site in a manner that will not expose them or their colleagues to hazards. Particularly, workers need to report incidences to their employers; take care of their own health and safety; abstain from alcohol and drugs that would otherwise increase their exposure to hazards; take care to avoid adversely affecting the health and safety of fellow workers and persons likely to be adversely affected by their actions and omissions; follow health and safety rules on site; and use protective gears when provided.

Higashi and Inui (2006) reported that communities surrounding the operations of a major factory or a large agricultural estate where pesticides or herbicides are applied on a very large scale should be educated on how to take preventive and precautionary measures to avoid contamination. Prior information should be given to the communities before the mass scale application of pesticides to enable members to prepare against any environmental contaminants (Moss & Kincl, 2007). Cooper (2007) also posited that a buffer area should be established around such farms to avoid contamination with the water systems and communities' environment. A community complaint section should be established to enable the communities to lodge their grievances regarding the health, safety and environmental repercussions from the activities of major factories and large scale agricultural farms. According to Husman (2006), community protection mechanisms are very crucial in the operations of large agricultural estates as their activities have direct health, safety and environmental consequences on surrounding communities.

Behaviour-Based Safety (BBS) is also an approach used to reduce workplace accidents and fatalities. It is set on the premise that safety in the workplace is a combination of three measurable components: personality, environment, and behaviour (Husman, 2006). According to Higashi and Inui (2006), it is only when these three elements are combined that the workplace can be "accident free." Geldart et al.(2010) argue that by observing and analysing the interactions between people's behaviour and the work environment, it is possible to identify factors that support safe or unsafe behaviour. Constantin (2012) also maintains that by changing the environment

to support safe behaviour and implementing proven behavioural safety processes, a business can dramatically reduce the number of lost time and injuries.

Advocacy for behaviour-based safety has also stimulated controversy, with some arguing that behavioural focus puts excessive responsibility on the workers, and that BBS is too limiting and management should aim for a more holistic or culture-focused approach (Noblet & Lamontagne, 2006). In any case, behavioural safety has provided a platform for constructive debate, and the conflicting opinions have provided the opportunity to learn more about the psychology of injury prevention (Cooper 2007; Geller 2004). To be successful, Moss and Kincl (2007) suggest that the BBS programme must include all employees from top management to the most basic job position, since the changes needed cannot be accomplished without buy-in and support from all involved in making those decisions. Central elements of a BBS programme include common goals for the employees and the managers; behavioural observation and feedback processes; formal review of observation data; improvement goals; and reinforcement for improvement and goal attainment (Higashi & Inui, 2006).

Other aspects that can contribute to a BBS programme's success include (a) multilevel teams for the assessment phase, the observation and the review phases, or for all three phases; (b) placing the focus on site observation; and (c) recognising that BBS is not a quick fix, but rather a commitment to a safer environment and injury reduction (Fernandez-Muniz, Montes-Peon & Vázquez-Ordas, 2008).

Risk assessment in occupational health, safety and environment

Risk assessment is recognised as an integral part of occupational health, safety and environmental management practice. According to Makin and Winder (2008), risk assessment is an interactive process consisting of steps, which, when undertaken in sequence, enable continual improvement in decision making. Risk assessment is the term applied to a logical and systematic method of establishing the context, identifying, analysing, treating, monitoring and communicating risks associated with any activity, function or process in a way that will enable organisations to minimize losses and maximize opportunities (Higashi & Inui, 2006). Husman (2006) indicated that risk assessment is as much about identifying opportunities as avoiding or mitigating losses.

According to Makin and Winder (2008), adequate record keeping of the risk assessment process will help demonstrate to the divisions of workplace health and safety, and environmental protection agencies about the commitment of an organisation towards environmental health and safety for workers and other stakeholders. Such records also assist companies during litigations on occupational health, safety and environmental management. Records on risk assessment should show that the process has been conducted properly including information about the hazards, associated risks and the control measures that have been implemented (Sammalisto & Brorson, 2006). Paton (2008) suggests that information on risk assessment should include hazards identified, assessment of the risks associated with those hazards, decisions on control measures to manage exposure to the risks, how and when the control measures are implemented, and evidence of monitoring and review of the effectiveness of the controls.

Rights and duties of stakeholders in occupational health, safety and environmental management

It is increasingly recognised that the protection of life and health at work is a fundamental workers' right; in other words, decent work implies safe work. Furthermore, workers have a duty to take care of their own safety, as well as the safety of anyone who might be affected by what they do or fail to do. This implies a right to know and to stop work in the case of imminent danger to health or safety. In order to take care of their own health and safety, Noblet and Lamontagne (2006) suggest that workers need to understand occupational risks and dangers. They should, therefore, be properly informed of hazards and adequately trained to carry out their tasks safely. To make progress in occupational health and safety within enterprises, workers and their representatives have to cooperate with employers, as well as to participate in elaborating and implementing preventive programmes (Mathiason, 2007).

According to Zaloshnja et al. (2006), the responsibilities of governments, employers and workers should be seen as complementary and mutually reinforcing to promote occupational health and safety to the greatest extent possible within the constraints of national conditions and practice. Because occupational hazards arise at the workplace, it is the responsibility of employers to ensure that the working environment is safe and healthy (Rosenman et al., 2006). This means that they must prevent, and protect workers from, occupational risks. But employers' responsibility go further, entailing a knowledge of occupational hazards and a commitment to ensure management processes promote health and safety at work (Vike, 2007). For example, an

awareness of health and safety implication should guide decisions on the choice of technology or work organisation.

Mendeloff and Gray (2005) remarked that training is one of the most important tasks to be carried out by employers. Workers need to know not only how to do their jobs, but also how to protect their lives and health and those of their co-workers while working. Within enterprises, managers and supervisors are responsible for ensuring that workers are adequately trained for the work that they are expected to undertake (Goestsch, 2005). Such training should include information on the health and safety aspects of the work, and on the ways to prevent or minimise exposure to hazards (Campolieti & Hyatt, 2006). On a wider scale, Alfers (2009) recommended that employers' organisations should instigate training and information programmes on the prevention and control of hazards, and protection against risks. Where necessary, employers must be in a position to deal with accidents and emergencies, including providing first-aid facilities. Adequate arrangements should also be made for compensation of work-related injuries and diseases, as well as for rehabilitation and to facilitate a prompt return to work (Manuele, 2008). In short, the objective of preventive programmes should be to provide a safe and healthy environment that protects and promotes workers' health and their working capacity.

Governments are responsible for drawing up occupational health and safety policies and making sure that they are implemented. Policies will be reflected in legislation, and legislation must be enforced. But legislation cannot cover all workplace risks, and it may also be convenient to address occupational health and safety issues by means of collective agreements reached between the social partners (Vike, 2007). According to Paton (2008), policies are more likely

to be supported and implemented if employers and workers, through their respective organisations, have had a hand in drawing them up. This is regardless of whether they are in the form of laws, regulations, codes or collective agreements. A competent authority should issue and periodically review regulations or codes of practice; instigate research to identify hazards and to find ways of overcoming them; provide information and advice to employers and workers; and take specific measures to avoid catastrophes where potential risks are high (Constantin, 2012).

The occupational health and safety policy should include provisions for the establishment, progressive extension and operation of occupational health services. A competent authority should supervise and advise on the implementation of workers' health surveillance system and its link with programmes of prevention, protection and promotion of workers' health at the enterprise and national levels (Schnall et al., 2009). The information provided by surveillance will show whether occupational health and safety standards are being implemented, and where more needs to be done to safeguard workers.

Occupational health, safety and environment in the agricultural sector

Agricultural safety and health specifically addresses the health and safety of farmers, farm workers, and their families. Agriculture workers are often at risk of work-related injuries, lung disease, noise-induced hearing loss, skin disease, as well as certain cancers related to chemical use or prolonged sun exposure (Boin & Schulman, 2008). On industrialised farms, the Food and Agricultural Organisation [FAO] (2005), reported that injuries frequently involve the use of agricultural machinery. The most common cause of fatal

agricultural injuries in the United States is tractor rollovers, which can be prevented by the use of roll over protection structures which limit the risk of injury in case a tractor rolls over (United Nations, 2009).

According to WHO (2004b), pesticides and other chemicals used in farming can also be hazardous to worker health, and workers exposed to pesticides may experience illnesses or birth defects. As an industry in which families, including children, commonly work alongside their families, agriculture is a common source of occupational injuries and illnesses among younger workers (Sammalisto & Brorson, 2006). Common causes of fatal injuries among young farm workers include drowning, machinery and motor vehicle-related accidents (Robson et al., 2007).

The agriculture industry is one of the most dangerous occupations and has led to thousands of deaths due to work-related injuries across the globe. In 2011, the fatality rate for farmworkers was Seven times higher than that of all the workers in the manufacturing industry, a difference of 24.9 deaths for every 100,000 people as opposed to 3.5 deaths for every 100,000 people in the private industry in the United States of America (USA) where agricultural technology and worker protection and operational regulations are expected to be at its peak (Constantin, 2012). The total number of work-related farm fatalities on United States farms in 2008 as reported by the US Bureau of Labour Statistics (2009) was 661.

The National Institute for Occupational Safety and Health (NIOSH) in the USA estimated that 374 farmers and farmworkers died due to a work-related injury in 2012 (International Fund for Agricultural Development, 2008). US Bureau of Labour Statistics (2009) also reported that an average of 113 youth

between the ages of 16-19 years died annually from agriculture related injuries in the USA between 1995 and 2002. In addition, about 167 farmworkers each day in the USA are affected by a lost-work-time injury in which five per cent of them suffer from permanent damage (Health & Safety Executive, 2009). In several European countries and the United States, the fatal accident rate in agriculture is double, or more than double, the average for all other industries (Forastieri, 2001).

Non-fatal injuries that farmworkers are at high risk include work-related lung problems, hearing loss due to noise, skin diseases, various cancers due to exposure to certain chemicals as well as prolonged exposure to the sun (Husman, 2006). Unlike other industries that impose labour laws and occupational safety and health regulations in the workplace, agriculture deals with diverse production, large labour force and an array of environmental conditions that makes it difficult to address (Zaloshnja et al., 2006). Occupational protection laws often apply generally to all sectors of the economy, including agriculture. The general objectives are often very abstract and the rules have only limited effect, unless they are accompanied by more practical implementing regulations. Problems also arise from the fact that legislation often only covers employees, whereas there are no protective provisions for self-employed farmers and their family members (Health & Safety Executive, 2009).

In the context of occupational safety and health, the term ‘agriculture’ is generally used in a broad sense including all activities directly related to cultivating, growing, harvesting and primary processing of agricultural products, animal and livestock breeding including aquaculture, and agroforestry (National

Institute for Occupational Safety & Health, 2008). The term also refers to all agricultural undertakings, irrespective of size. A somewhat open question is whether subsistence farming should be included in agriculture. ILO does not include subsistence farming in agriculture but the International Social Security Associations (ISSA) more or less includes it (Makin & Winder, 2008).

Agriculture is covered by different kinds of legal instruments such as international and national laws, regulations and rules, technical standards and similar documents. More than 20 ILO Conventions and Recommendations concern health and safety issues relevant to agriculture or deal with aspects of agricultural workers' working conditions (Fernandez-Muniz et al., 2008). Geldart et al. (2010) argue that it seems that agriculture is not highly prioritised by the ILO member countries, as only Five countries out of One Hundred and Eighty-Seven have so far ratified ILO Convention 184, published in 2001, on Safety and Health in Agriculture, while Convention 129, published in 1969, on Labour Inspection in Agriculture has so far been ratified by 43 member countries.

According to Pathak (2008), all those working on a farm, employees and self-employed, permanent and seasonal workers, should enjoy the same level of safety and health protection. Enforcement is not always the best way of improving occupational health and safety in agriculture, as the number of safety inspectors is generally small compared with the number of farms (Paton, 2008). Constantin (2012) posits that the effect of enforcement is limited by the fact that legislation often covers only employees, whereas there are no protective provisions for self-employed farmers and their family members.

Forastieri (2001) reported that the scale on which agricultural activities are practised have different implications on the environment. Thus, plantation agriculture mostly requires large scale application of pesticides on a regular basis which has serious implications on the environment. On the other hand, small holder farmers apply pesticides on irregular bases, in less-controlled environment which also have negative implications on the environment (Zaloshnja et al., 2006). Pathak (2008) also posited that the types of crop under cultivation and production stages of crops partly determine the extent of pesticides application. Vegetables and legumes require frequent application of pesticides, while tree crops require pesticide application prior to flowering or fruition (Paton, 2008).

Pesticides management

The use of pesticides has become an indispensable factor of agricultural production. Nearly all pesticides are toxic and can be potentially dangerous to humans if exposure is excessive (FAO, 2005). However, Health and Safety Executive (2009) opined that pesticides could be used safely if the necessary information is provided and adhered to in the handling chain. According to the European Agency for Safety and Health at Work (2007), the first line of information for ensuring safe management of pesticides is contained in the manufacturer's label. Pesticide labels can be defined as visual aid and support for concise, practical, easy-understood information on the procedure for using product and for protecting the user and the environment from risk of accident (European Agency for Safety & Health at Work 2007).

Per the FAO guidelines on the management of pesticides, certain kinds of information must appear on a pesticide label and applicators have the legal responsibility to read, understand and follow the label directions (FAO, 2005). 'Keep out of reach of children' precaution statement is required to be on all pesticide containers. Accidental poisonings and deaths can be prevented by observing this precaution.

Occupational health, safety and environmental management in Ghana

In Ghana, occupational health and safety legislation was inherited from a British legal and institutional framework at the time when Ghana was a British dependency. The health and safety of workers in the mining and wood processing industries of Ghana prior to independence, was protected by the Factories Ordinance of 1952. According to Puplampu and Quartey (2012), the Factories Ordinance of 1952 remained the main occupational health and safety legislation in force until its repeal by the Factories, Offices, and Shops Act of 1970. Regulations made under the Factories Ordinance of 1952 which remained enforced include: the Factories (Woodworking) Regulations, 1959; The Food Factories (Welfare) Regulations, 1959; and The Factories (Docks Safety) Regulations, 1960.

Ghana's occupational health and safety legislation is influenced by the ILO. Principal ILO conventions relating to occupational health and safety which have been ratified by Ghana include: Underground Work (Women) Convention 1935 (No. 45); Radiation Protection Convention 1960 (No. 115); Guarding of Machinery Convention 1963 (No. 119); Hygiene (Commerce and Offices)

Convention 1964; Working Environment (Air Pollution, Noise and Vibration) Convention, 1977; and Labour Inspection Convention 1947.

According to Clarke (2005), existing occupational health and safety legislation in Ghana is fragmented and limited in coverage. Some key economic sectors are not covered by the country's occupational health and safety laws. A notable example is the agricultural sector, although it employs over 60 per cent of the country's workforce, there is no form of occupational health and safety laws regulating the activities of the sector (Aryeetey, 2004). This situation can be traced back to colonial rule in Gold Coast (Ghana), where the colonial government placed more emphasis on labour relations in sectors of the economy where formal employment relations existed (Agyeman et al., 2012). The mining and manufacturing sectors of the economy are examples of such economic sectors. Collective bargaining agreement was employed, prior to the various legislative instruments, to ensure OHSEM (Aryeetey, 2004). This was an agreement between stakeholders and manufacturing companies to ensure safe working environment for all.

Commenting on the shortcomings of occupational health and safety legislation of Ghana, Tettey, Ogoe and David (2009), noted that health and safety statutes evolve without due regard to existing ones, resulting in fragmentation, overlapping areas of jurisdiction and inconsistencies. Afrane and Ntiamoah (2011) emphasise that Ghana lacks a policy defining the responsibilities of stakeholders, namely; government, employers and employees. Without engaging stakeholders in the management of occupational health, safety and environment, workers' rights to a decent work environment will be denied

in the informal sector of the economy which employs temporary labour. Contractors in Ghana rely on a temporary workforce, invariably, such workers are illiterate, do not belong to any form of labour unions and are not covered by insurance schemes (Agyeman et al., 2012).

Government institutions responsible for ensuring that occupational health, safety and environmental standards are maintained at workplaces fall under five ministries; the Ministry of Employment and Social Welfare, Ministry of Environment, Science and Technology, Ministry of Health, Ministry of Roads and Highways, and Ministry of Lands and Forestry (Yeboah & Appiah-Yeboah, 2009). The ministries are responsible for policy formulation and, departments under them implement the policies.

The Factory Inspectorate Department under the Ministry of Employment and Social Welfare has sole responsibility for occupational health, safety and environment. Other public departments and agencies with some health and safety responsibilities include the Labour Department, the Environmental Protection Agency, Occupational Health Services Unit, and the Attorney General's Department (Osei-Tutu, Nketiah, Kyereh, Owusu-Ansah & Faniyan, 2010). Efforts at establishing other institutions, namely the National Commission on Occupational Safety and Health (NACOSH) and the Ghana Society of Occupational Health (GSOH) have not been successful (Afrane & Ntiamoah, 2011).

According to Mock et al. (2005), close collaboration, networking, and coordination in respect of the health and safety functions of these institutions have been poor, resulting in health and safety being accorded a low profile within occupations in the country. Alfers (2009) reported that there are no

consultations with employers' organisations, trade unions, and health and safety stakeholders on policy issues affecting occupational health and safety at national level. This may continue for some time unless the stake these bodies have in health and safety is stimulated. Public institutions responsible for health, safety and environmental protection have failed in their duties as enforcers and promoters of workplace health, safety and environment because of lack of resources, logistical problems, low capacity levels, and small number of human resource (Tettey et al., 2009).

The Occupational Health Service Unit of the Ministry of Health has the responsibility for providing curative care, first aid, worker education on health issues, health surveillance of workplaces and conducting risk assessments (Yeboah & Appiah-Yeboah, 2009). Ghana's health ministry is proactively engaged in ensuring descent work environment for workers. Unfortunately, the Occupational Health Unit faces constraints similar to the Factory Inspectorate Department. Clarke (2005) estimates the proportion of Ghanaian workers receiving comprehensive occupational health services to be in the region of 1-2 per cent, with the number of staff of the Occupational Health Unit in 2003 comprising four physicians and one qualified occupational health nurse. This shows the quantum of workload these staff are confronted with in their daily activities across the country. The problem is compounded by low budgetary support and lack of logistical support for monitoring and enforcement of occupational health and safety laws and policies in the country.

The Labour Department is responsible for labour administration in Ghana. Accordingly, issues affecting labour, including workers' health and safety, fall within its jurisdiction. The department implements labour standards

in conformity with the country's labour laws and International Labour Conventions ratified by Ghana. Two national labour laws are implemented by the Department; the Workmen's Compensation Law and the Labour Act. Kwankye, Anarfi, Tagoe and Castaldo (2007) have noted that forty-six ILO conventions have been ratified by Ghana. Where an employer persistently abuses rights of workers with regards to their health and safety, he or she will be liable on summary conviction to a fine or imprisonment or to both. According to Yeboah and Appiah-Yeboah (2009), the Labour Department has 10 regional offices, 36 district labour offices and 62 employment centres countrywide.

The EPA is under the Ministry of Environment, Science and Technology. The agency was established by the Environmental Protection Council Decree, 1974, charged with the responsibility of implementing the environmental laws of the country. The Environmental Protection Council was converted to EPA in 1994 by Act 490 (1994). The agency is highly aware of the dangers posed by some bad farming practices on the environment, including the flora and fauna. However, the widespread or dotted nature of agricultural activities across the country makes it virtually impossible for the agency to fully monitor and regulate the environmental laws and policies in farms in the country (Mock et al., 2005).

Occupational health and safety legislation is a means by which the work environment can be controlled to ensure the safety, health and welfare of employees and persons likely to be adversely affected by the work environment are protected (Tettey et al., 2009). As a result, the Government of Ghana has over the years enacted certain laws to protect workers and prevent workplace

accidents some of which are the Labour Act, and Workmen's Compensation Law.

The Labour Act

The Labour Act, 2003 (Act 651) was established to assist unemployed and employed persons to find suitable employment and assist employers to find suitable workers from among such persons as well as protect the interests and concerns of both the employer and employee to ensure a harmonious working environment. Part XV of the Labour Act, 2003 (Act 651) concerns the health and safety and environment of workplaces. Under this Act, it is every employer's duty to ensure employees work under satisfactory, healthy and safe conditions. Other sections of the Labour Act which impact on health and safety include: protection of employment relationship; general conditions of employment; protection of remuneration; unions; employers' organisations and collective bargaining agreements; National Tripartite Committee; and, labour inspection. The Act sets out modalities for calculation of the earnings of workers and payments of compensations to workers who sustain injuries. Ghana's Labour Act of 2003, Act 651 states that an employer shall; Provide and maintain at the workplace, plant and system of work that are safe and without risk to health. Ensure the safety and absence of risks of health in connection with use, handling, storage and transport of articles and substances. Provide the necessary information, instructions, training and supervision having regard to the age, literacy level and other circumstances of the worker to ensure, so far as reasonably practicable, the health and safety at work of those other workers engaged on the particular work.

The Act again states that an employer who, without reasonable excuse, fails to discharge any of the obligations listed above commits an offence.

The Workmen's Compensation Law

The Workmen's Compensation Act 1987 was enacted to compel employers to ensure safe working environment for workers. Thus, the Act imposes employer liability to pay compensation to employees incapacitated by accidents arising out of and in the course of their employment. Compensation payment to accident victims is independent of negligence on the part of employer or fellow-worker. The employer is also required to bear the hospital expenses of the injured worker. In cases where the injured worker only requires treatment, he/she is entitled to his/her earnings while undergoing treatment for injuries he/she sustained through an accident arising out of, and in the course of his/her employment.

There are exceptions to employers' liability to pay compensation. These exceptions are: where the injury is due to the workman having been under the influence of intoxicating liquor or drugs at the time of the accident or where the injury was deliberately self-inflicted or where the workman knowingly misrepresented to the employer that he/she was not suffering or had not previously suffered from that or similar injury. The law applies to persons employed by both public and private organisations.

It is clear from the above review that laws on occupational health, safety and environment in Ghana are silent on the environmental impact of some factories or business establishments on the macro-environmental habitat, where non-workers reside. Thus, the laws were silent on the responsibilities of business

organisations in maintaining environmental quality standards and ensuring the activities and sources of livelihood of other people are not negatively affected by the operations of the companies. The laws are, rather, more concerned about the micro-environmental habitat of the businesses in terms of the risks and safety mechanisms established for workers. This could easily lead to community-company confrontations to have some of their concerns addressed. Such actions could also disrupt operations of companies.

Empirical review

This section reviews literature on previous studies conducted on occupational health and safety. The aim is to examine the common issues of interest for researchers under occupational health, safety, and environment, methodological approaches adopted in analysing occupational health and safety and the major findings.

Lundqvist (2001) conducted a study on occupational health, safety and environment of workers in agriculture and horticulture in Sweden. Lundqvist posited that working in agriculture and horticulture gives considerable job satisfaction. The tasks are often interesting; as one can see the result of his or her own work, watch the crops grow and mature; develops an affinity for nature and can follow the changes in the seasons. However, agriculture is becoming a dangerous work environment fraught with occupational injuries and diseases due to hazardous situations and to physiological, physical, biological, chemical, psychological, and sociological factors. The study adopted a quantitative research design. The researcher adopted questionnaire as the instrument for collecting data. A total of 218 respondents were engaged by the study. Stratified

sampling was used to sample the respondents. Descriptive statistics and regression were used to analyse the data.

The study found that large-scale operations with fewer family-operated agricultural businesses recorded fewer injuries among children and older farmers. A consequence of large-scale operations was found to be better regulation of working conditions than smallholder farmers. The greater use of automation technology were found to be eliminating many harmful working postures and movements in agricultural activities. Information technology also offered people the opportunity to gain more knowledge about their work and responsibilities. The researcher recommended that food and drugs authorities should label foods produced in a worker-friendly work environment to give consumers the chance to be involved in the process of ensuring OHSEM in the agricultural sector.

A study by Crouchman in 2010 focused on gender, occupational health and safety practices, and injury among Saskatchewan farm adolescents. The study was conducted on the assumption that the underlying determinants of farm injury are not well understood among adolescent populations, particularly from a gender lens. The research objectives were to evaluate the association between gender and occupational health and safety practices reported for hazardous work among working adolescent farm children; and evaluate the association between use of such practices and time to farm injury, and also whether such associations vary by gender.

Survey data from an existing farm injury cohort were used for the analysis. Occupational health and safety practices were: non-use of personal protective equipment, non-use of training and supervision for work with heavy

equipment, non-use of training and supervision for work in large farms, and conduct of hazardous tasks. Logistic regression was used to examine associations between gender and use of safety practices, and Cox regression was used to examine relationships between occupational health and safety practices and time to first injury.

The study found that girls reported increased odds for the non-use of personal protective equipment. There was no evidence of an association between gender and the conduct of hazardous tasks. Gender patterns surrounding non-use of training and supervision for work with equipment in farms were not significant. Use of personal protective equipment did not significantly reduce the risk of farm injury, neither did use of training and supervision during equipment work, nor during farm work or the conduct of hazardous tasks. Further, there was no significant modification of these associations and injury by gender.

Among adolescents, farm occupational health and safety practices appeared to vary by gender. Girls on farms reported fewer exposures to hazards, and received less training and supervision and less use of personal protective equipment, consistent with assigned tasks. While gender appeared to play a role in the assignment of farm tasks and occupational health and safety practices, these practices did not reduce the likelihood of subsequent injury. As well, the latter associations did not appear to vary by gender.

Baksh, Ganpat and Narine in 2015 conducted a study on farmers' knowledge, attitudes and perceptions of occupational health and safety hazards in Trinidad, West Indies and implications for the agricultural sector. The writers indicated that Trinidad had an aged farming population. Young persons were not

entering the sector. As such, older farmers would continue to be the backbone of Trinidad's agricultural sector. There was, therefore, urgent need for focus to be placed on improving the state of occupational health and safety within this sector. The study sought to determine farmers' knowledge, attitudes and perceptions towards occupational health and safety issues in agriculture and recommend actions to reduce/prevent health and safety hazards in agriculture.

A total of 100 small-scale commercial-oriented vegetable farmers from 10 of the most populated agricultural pockets across Trinidad were surveyed as part of this study. Simple random sampling was used to sample the respondents for the study. The questionnaire comprised four sections with questions related to: demographics and job information; farmers' knowledge on the health and safety hazards in agriculture; farmers' attitudes towards safety; and farmers' perceptions of occupational health and safety. Likert scale type of questions were employed by the study. The data obtained from the questionnaires were numerically coded and statistically analysed using SPSS version 17. To determine the knowledge, attitude and perception of the sample population, total scores were obtained by summating the scores of all questions within each of the sections.

Results regarding knowledge, attitude and perception were reported based on frequencies. One-way ANOVA tests with the associated post-hoc test (Tukey's b) were also performed to examine significant differences among means of knowledge, attitude and perception levels with the independent variables being age, gender, job role, whether or not farmers were visited by extension officers, the frequency of visits by extension officers, and farmers' familiarity with health and safety issues in agriculture. Cronbach's alpha (α) was

used as a measure of internal consistency scales. With respect to the perception scale, $\alpha = 0.72$, suggesting a fairly good level of reliability; for the attitude scale, $\alpha = 0.61$, suggesting an acceptable level of reliability and; knowledge, $\alpha = 0.67$, also an acceptable level of reliability.

The results of the study indicated that farmers had overall good knowledge, fairly positive attitudes but strong negative perceptions towards occupational health and safety issues in agriculture. Gender was not a significant factor on knowledge, attitude or perception levels. Additionally, attitude varied significantly based on characteristics of farmers (age and job type) and communication efforts by extension. The study validated the need for more emphasis to be placed on occupational health and safety within Trinidad's agricultural sector, which can be achieved through directed programmes, policies and practices by government and its related agencies.

A study into pesticide exposure, risk factors, and neurobehavioral performance among vulnerable populations was conducted in the Gambia by Butler-Dawson in 2015. In a fruit orchard community, dust was collected from households and analysed for four types of organophosphorus pesticides (OPs). Various factors such as housing characteristics and resident behaviours were evaluated to examine their relationships with the OP concentrations in the home dust. Relationships between participants' knowledge, characteristics, and practices were examined.

A cross-sectional study was carried out to identify rural residents' knowledge about pesticide hazards and practices while handling pesticides. A total of 472 respondents were engaged by the study. Simple random sampling was used to sample respondents for the study. Occupational exposure scores

were developed to quantify participants' chronic pesticide exposures using the study's questionnaire. In addition, participants provided information on neurological symptoms associated with pesticide use and a neurobehavioral test battery was administered to assess cognitive function. The relationships between occupational exposure scores and neurological symptoms and neurobehavioral performance were examined.

In the orchard community, OP detection frequencies and concentrations were higher in agricultural households compared to non-agricultural households. Significant associations were found between higher OP concentrations in dust and the following: (1) homes with a parent working in an agricultural field and/or orchard, (2) homes with greater than or equal to 2 agricultural workers living in the home, and (3) homes located in close proximity to an agricultural field or orchard. Having air conditioning in the home had a protective effect on OP concentrations. The results suggested that deficits in learning, or less improvement, on the neurobehavioral tests from the first visit to the second visit were found in agricultural children compared to non-agricultural children.

The majority (62.4%) of participants reported risky practices, while handling pesticides such as: not wearing any protective clothing or equipment; mixing with bare hands; applying with their bare hands, plastic bags, or leaves; storing pesticides in the home; inadequately disposing of empty pesticide containers; and wearing shoes into the home after working with pesticides. They also reported having concerns about the adverse effects of pesticides on their health. Participants having had farm or pesticide safety training reported having less risky pesticide handling practices and behaviours. Participants with high occupational exposure scores experienced more symptoms and had worse

performance on several of the neurobehavioral tests, including tests of motor function and dexterity, compared to participants with low exposure scores. Results from these studies suggest neurobehavioral impairments were found in participants with higher pesticide exposures compared to participants with lower exposures in the two populations.

Stave in 2005 conducted a study into safety processes and risk perceptions in agricultural activities in Sweden. According to the researcher, the frequency of occupational accidents in the Swedish food industry and agriculture was high. The study explored the 'process of safety' in order to detect and analyse factors that either hindered or facilitated safety activity and to further develop intervention methods towards increased safety activity. The first study was based on in-depth interviews with 54 injured food-industry operators and their supervisors, exploring preconditions of accidents, using the qualitative method of grounded theory. Snowball sampling was used to sample the respondents for the study

The results showed that accidents due to occupational health, safety and environment occurred without any warning. Preconditions of accidents were technical and organisational deficiencies such as insufficient communication and learning, high responsibility in combination with low control, conflicting goals, and a gap between procedures and practice. These factors influenced the safety culture toward risk acceptance and a normalisation of accidents.

The second study tested a hypothetical model of the casual relationship between risk perception and safety activity as well as risk acceptance. An evaluative study design was adopted for the study. The results were based on a cross-sectional questionnaire exploring the attitudes towards risk and safety of

315 farmers and farm workers. The study adopted a multi-stage sampling procedure in sampling respondents for the study. The results mainly confirmed two paths, one mediated by risk manageability and one by work stress, which counteracted each other.

The third study was an evaluation of a safety intervention methodology based on group discussions with three levels of structure. The study adopted the evaluative study design. Eighty-eight farmers and farm workers divided into nine groups gathered on seven occasions during one year. Stratified sampling was adopted to sample respondents for the study. A pre-post questionnaire was used to evaluate the effects. The results showed a significant increase in safety activity. Stress as well as risk acceptance were reduced, but risk perception and perceived risk manageability did not change.

The fourth study evaluated the process of the intervention. Qualitative research design was adopted for this study. A total 47 respondents were sampled for the study. Purposive sampling was used to sample respondents for the study. The results indicated good feasibility of the method. The social network was stated to be most beneficial and a time span was needed. The author concluded that the process of safety might benefit from reflecting and discussing incident experiences, detecting hindrances/facilitators to ensure safety. Risk acceptance and normalisation of accidents may be influenced by focusing on work stress and the priority of safety, supporting a participative process of change with an honest climate.

Finnegan in 2007 conducted an examination of the status of health and safety on Irish farms. In the context of the number of people employed, farming in Ireland accounts for a disproportionate level of workplace fatalities. However,

there remains an insufficient understanding of the status of health and safety of Irish farms. In the competitive and challenging farm landscape, health and safety is in real danger of being further over shadowed by other farm business issues. The study provided a comprehensive understanding of the status of health and safety on Irish farms from which a farm health and safety strategy can be developed.

Mixed methods research design was used by the study. Quantitative techniques were used to examine the existing health and safety situation on Irish farms, whereas qualitative techniques were used to examine the interaction between farmer characteristics, the farm environment and farm technology.A sample size of 283 was used for the study. Simple random sampling was used to sample respondents for the study. The research established that there was a dynamic relationship between person, environment and technology in farming which is fundamental to health and safety on the farm.

The findings of the research suggest that farm injuries in Ireland were increasing. There was a significant disconnect between farmers reported concern regarding farm safety and their actual farm safety behaviour. Evidence from the research suggests that those farmers who were effective farm managers brought this to bear on their management of farm health and safety. Size and system of farming had a significant association with injury occurrence. Not all hazards present on farms were perceived as hazards by the farmers, this had implications for farmers conducting risk assessments of their own farms. Frequently, farm technology posed risk of injury as a result of the interaction protocol determined by those employed on the farm. Stress had a significant impact on the dynamics that existed between people, technology and the farm environment.

Conceptual framework

This section presents a framework for analysing the effectiveness of occupational health, safety and environmental practices. Figure 1 presents the conceptual framework for the study. Figure 1 shows that the quest to achieve effective occupational health, safety and environmental management system begins from the establishment of a policy to regulate the activities of stakeholders in terms of employers, employees and community members within the catchment area of businesses whose activities are likely to be impacted by the operations of the company. This is very critical since it is the policy that dictates the operational issues about occupational health, safety and environmental issues. Boin and Schulman (2008) indicate that occupational health, safety and environmental policy for business organisation should contain three basic elements i.e. risks assessment, hazard mitigation mechanisms, and role definition in a holistic manner.

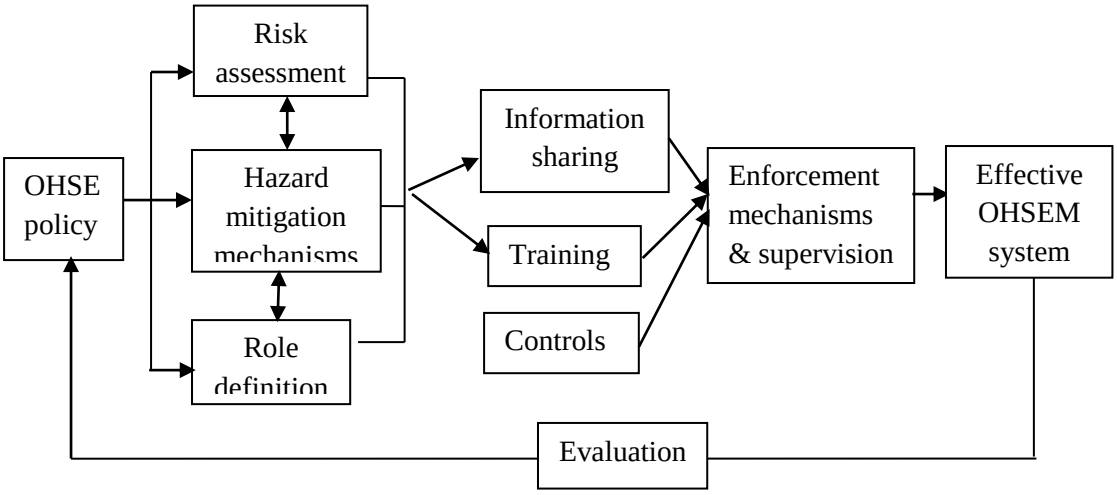

Figure 1: Framework for analysing the effectiveness of occupational health and safety environmental management practices

Source: (Robson et al., 2007; Subramaniam, 2007; Makin & Winder, 2008)

According to Robson et al., (2007), occupational health, safety and environmental management system should begin by identifying all the internal and external risks and hazards associated with the operations of business organisations. Risks and hazards' assessment enables organisational management to be abreast with the likely accidents, injuries and disasters likely to happen in the course of operation as well as the likely impact of the activities of the company on other stakeholders and the environment. This enables organisational managers to institute appropriate hazard mitigation mechanisms to avoid the triggering of any of the identified risks and hazards into disasters. As a result, Makin and Winder (2008) recommended that hazard mitigation mechanisms should match with the identified risks and hazards to ensure safe working environment.

Fernandez-Muniz et al. (2008) posit that a critical element in the preparation of occupational health, safety and environmental policy is role definition. This involves defining roles for management and subordinate staff, various departments and different categories of employees as well as external stakeholders such as community members. This enables each stakeholder to be responsible for the overall safety of the working environment. Role definition also enables stakeholders in an organisational environment to hold each other responsible for something to be done to preserve the safety of the workplace and the environment. According to Schnall et al. (2009), the effectiveness in the implementation of occupational health, safety and environment is sharing information about the tenets of the policy with all stakeholders as well as training each stakeholder to effectively administer its roles and responsibilities to ensure safe working environment.

As a result, Zaloshnja et al. (2006) recommended that all stakeholders should be involved in the policy formulation process in occupational health, safety and environmental practices. It is also imperative for workers and all other stakeholders to be trained on new and improved practices to enable them appreciate safety and environmental issues in their operations. Subramaniam (2007) emphasises that it is always necessary for enforcement mechanisms to be instituted in policy implementation. This involves sanctions and rewards for stakeholders to ensure that everyone adheres to the core health, safety and environmental principles in the policy. Nonetheless, Manuele (2008) cautions about the possibility of relaxing enforcement mechanisms when accidents do not occur in a workplace over a long period of time. In such situations, Constantin (2012) recommends that stakeholders should be rewarded in various forms to motivate them to continuously abide by the health, safety and environmental mechanisms in an organisation. It is believed that when stakeholders are trained and well-informed about the tenets of occupational health, safety and environmental policy as well as adhere to safety standards in the implementation of the policy, it would help to ensure effective occupational health, safety and environmental management system in an organisation. Lessons from the evaluation of the level of success of achieving occupational health, safety and environmental management system will be fed into the policy.

Summary of Literature reviewed

The literature describes the concepts of occupational health, safety and environmental practices and how it has been managed since its evolution. Conclusions from the various areas of OSHE reviewed indicate that there should

be a policy to regulate the activities of stakeholders in terms of employers, employees and community members within the catchment area of businesses whose activities are likely to be impacted by the operations of the company. In addition, roles should be defined for management and subordinate staff, various departments and different categories of employees as well as external stakeholders such as community members. This enables each stakeholder to be responsible for the overall safety of the working environment.

The domino theory by Heinrich, Peterson and Roos (1998), danger-factor theory by Adams (1976, stakeholder theory by Robert and Mahoney (2004) and the green theory by Carter (2013) were reviewed in the literature. The theories examined how accidents and fatalities could be prevented and the ethics that addresses morals and values in managing organisations.

CHAPTER THREE

METHODOLOGY

Introduction

This chapter presents the methodology of the study. It shows the processes by which the findings of the study were arrived at. The chapter is critical to ensure replication of the study, which is a major principle in research. Some of the issues considered under the chapter are the research design, study population, sample and sampling procedure, data collection method, ethical consideration and data analysis.

Research design

Creswell (2002) explains that research design is used to structure the research, thereby showing how all the major parts work together to address the central research question. According to Sarantakos (2005), research design is an important aspect of research and must be the most appropriate to approximately measure what is being measured and obtain the data that will validly lead to a conclusion that is also valid. Nonetheless, Neuman (2006) reports that the selection of a research design is determined by the philosophical paradigm underpinning the study. Pragmatism was the philosophical paradigm explaining the study. According to Neuman (2006), pragmatist researchers perceive social research as multifaceted which requires multiple approaches i.e. quantitative and qualitative research techniques. The study adopted pragmatic philosophical paradigm because the researcher intended to use multiple approach to obtain data (both qualitative and quantitative) from different stakeholders either influencing or are being influenced by the OHSEM practices of TOPP.

Sarantakos (2005) emphasises that pragmatic philosophical paradigm lends itself to mixed methods research design. As a result, the study adopted a mixed method research design. This involves the use of both quantitative and qualitative research techniques to gather data, sample respondents and analyse data.

Description of the study organisation

Twifo Oil Palm Plantations Limited was registered as a limited liability company on 23rd February, 1977 and issued with a certificate to commence business on 2nd June, 1977. Twifo Oil Palm Plantations Limited can be located at Twifo Ntafrewaso near Twifo Praso, in the Central Region of Ghana with a nucleus oil palm planted area of 4234 ha and a 30T/hr palm oil mill. The nucleus planted area stretches about 10 kilometers in the north-south direction and about six kilometers in the east to west direction. TOPP also provides extension services to 1,894 ha Smallholder Plantation and 3,300 ha Outgrower Projects. TOPP buys about 50 percent of its palm fruits from 1,241 farmers on these two schemes. The company is involved in engaging people in the nursery and planting of palm trees, weed control through weeding, chemical applications to palm trees to avoid pests, palm fruits harvesting, and processing of palm oil and palm kernel. Figure 2 presents a map of Twifo Hemang Lower Denkyira District showing the location of TOPP.

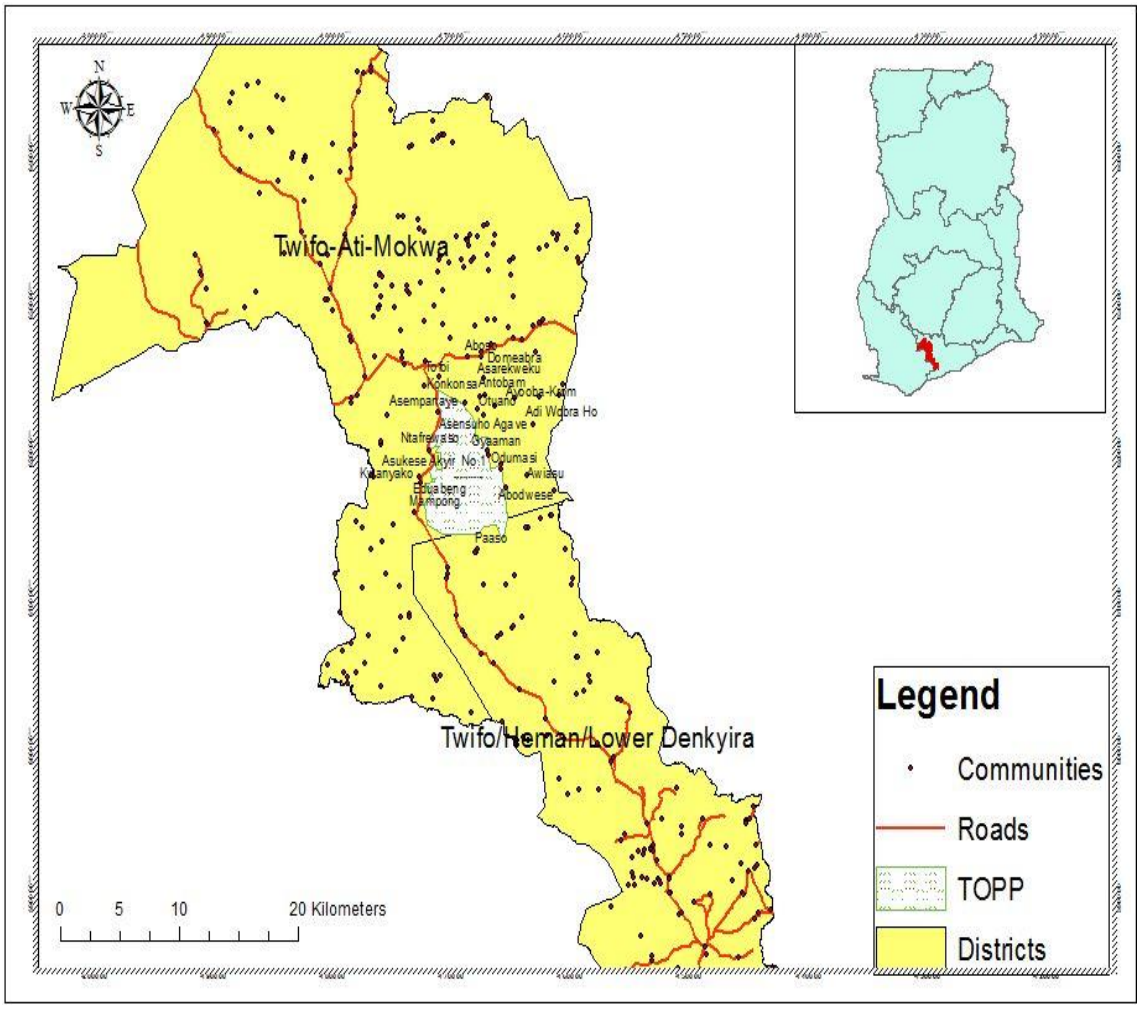

Figure 2: Map of Twifo Hemang Lower Denkyira District showing the location of TOPP

Source: Department of Geography and Regional Planning, University of Cape Coast (2017)

The vision of TOPP is to become a world class vegetable oil business by producing and delivering high quality oil to the fast moving consumer goods business and remaining committed to the protection of the environment and sustainable development. The social commitment of the company is to impact on societal development to create an innovative friendly business environment within its location (TOPP, 2018).

Within the scope of its operation, the social commitment of the company is geared towards six thematic areas which include; environmental protection, health promotion, safety, education, community development, and support for the national socio-economic development (TOPP, 2018).

Study design

The study adopted a cross sectional descriptive study design. According to Neuman (2006), a cross-sectional study design entails observation of a subset of a population, description of the current nature and conditions that exists, studying of the relationship between different variables at a single point in time and showing how variables affect each other. Cross sectional study design was adopted because the researcher wanted to gather data from the respondents at a single point in time. Thus, issues about the occupational health, safety and environmental practices established by the company, stakeholders' awareness and perceptions on the practices, level of compliance with the practices and the challenges encountered by the stakeholders were gathered once without tracking variations over time as certain conditions changed.

Sarantakos (2005) defines a descriptive study design as a design that involves compromise or contrast and attempts to discover relationships between existing variables. The study adopted the descriptive study design with the aim of describing the effectiveness of the occupational health safety and environmental practices established by TOPP to ensure safe working environment for both employees and community residents.

Sources of data

Data was sourced from both primary and secondary sources. Primary data was obtained through the administration of the research instruments. Secondary data was obtained from journals, articles, and books related to occupational health, safety and environmental management systems.

Study population

There were two sets of study population. The first was the institutional related population which comprised 384 staff of TOPP (management staff – 49 and unionised workers – 334), 1,490 contract workers, 1,241 smallholder farmers or out-growers and workers in the Regional Office of the EPA. The second set of population included the 16,452 community residents (18years and above) within the catchment area of TOPP not having direct employment in the operations of the company. The study population was distributed across 11 communities in the Twifo Hemang-Lower Denkyira District. The communities are Hemang, Apenkro, Mampong, Paaso, Pepekrom, Atwereboanda, Ankaako, Ntafrewaso, Afeaso, Bukrusu and Antwikwaa.

Sample and sampling procedure

According to Krejcie and Morgan's (1970) sample size determination table, a population of 19,567 requires a sample size of 377 to ensure statistical representativeness. The sampling frame for the study was a list of adult population (18 years and above) in the 11 communities within the catchment area of TOPP. Adult population was chosen as the sampling frame because it is

assumed that such category of people are old enough to have independent decisions and perceptions about issues as well as the legal right to engage in economic activities which could affect or be affected by the operations of TOPP. Purposive sampling technique was used to sample three management staff of TOPP (Heads of Safety, training and development, pest and disease control) and a representative from the EPA for the qualitative aspect, while stratified random sampling was used to sample the community respondents (out-growers and ordinary community residents), and simple random sampling for the unionised workers of TOPP for the quantitative aspect.

With the stratified random sampling of the community respondents, the lists of the adult population were obtained for each community from the Regional Office of the Electoral Commission. In addition, the lists of out-grower farmers for the various communities were obtained from the management of TOPP. The large differences in population sizes between the big communities and the small ones made it less realistic to use proportionate sampling to determine the sample sizes of the various communities. Thus, some of the small communities were to have less than two respondents, which could not be said to be representative of their population. As a result, equal proportions of 30 respondents were sampled across all the 11 communities. Out of the 30 community respondents, 15 were for out-growers and the other 15 were for ordinary community residents. This means that a total of 330 respondents were sampled from the communities, comprising 165 out-growers and 165 ordinary community residents.

In sampling the community respondents, the out-growers lists for the various communities were extracted from the adult population lists of the

communities from the Electoral Commission. That was to help avoid double sampling at the community level because the out-growers were also part of the communities' population.

The extracted names of out-growers per each community were entered into Microsoft Excel. The Random function in Microsoft Excel was used to shuffle the names and the first 15 names were sampled for the community. The process was repeated for the ordinary community residents to sample another 15 names. The process was further repeated to sample respondents from the other communities. The remaining 43 respondents on the sample size was randomly sampled from the unionised workers of TOPP. Thus, the list of the unionised workers, as obtained from the Management of TOPP, was entered into Microsoft Excel. The Random function in Excel was used to shuffle the names. The first 43 names was sampled for the study. Table 1 presents the distribution of the sample size among the various categories of the study population.

Table 1: Distribution of sample size among the categories of respondents

Category	**Sample size**
Representative of EPA	1
Management of TOPP	3
Unionised workers of TOPP	43
Out-growers	165
Ordinary community residents	165
Total sample size	**377**

Source: Author's construct (2017)

Data collection method

Interviewing questionnaire administration and focus group discussion were used as the data collection methods for the study. Interviewing was adopted because some of the interviewees were perceived to be illiterate who could not read, understand and self-administer the research instrument without the assistance of the researcher. This necessitated the adoption of interview guide and interview schedules as instruments for gathering data. The interview guide was used for the qualitative aspect, while interview schedule or structured interviews were used for the quantitative aspect. The study also used focus group discussion to gather detailed information about some of the quantitative responses. This was done by accidentally sampling three of the out-growers and three community residents from each community to provide further explanations on some of the responses provided through the interviewing.

Instrument design

The study employed interview guide and interview schedules. The interview guide was used to gather data from the Management of TOPP and representative of EPA, while three separate interview schedules were used to obtain data from community residents, out-growers and unionised workers of TOPP. All the research instruments were largely organised under the occupational health, safety and environmental practices adopted by TOPP, level of awareness and perception on the occupational health safety and environmental practices, occupational health, safety and environmental risks communities were exposed to, level of compliance to the occupational health, safety and environmental practices, and challenges encountered in the

implementation of the occupational health safety and environmental practices. Whereas the interview guide was mainly open-ended questions, the interview schedules employed both close-ended and open-ended questions. Five-point Likert scale type questions was employed in the interview schedules.

Pre-testing

The research instruments were pre-tested at the Benso Oil Palm Plantation and some of the communities under its catchment area, comprising Benso, Dominase, Adum-Banso, and Manso. The aim was to ascertain the relevance of the questions, their clarity and sensitivity. Experiences from the pre-testing exercise were used to improve the instruments for the actual data collection exercise. Some of the questions were taken out, while new ones were added to make them more reflective of their activities.

Fieldwork

The fieldwork was organised between July 3, 2017 and August 26, 2017. The researcher employed the services of four research assistants to aid the data collection exercise. The research assistants were trained on the expected conduct of an interviewer. They were also taken through the research instruments to ensure uniform understanding and interpretation during the data collection exercise. The researcher introduced herself and the purpose of the study to the management of TOPP. Interview appointment dates were scheduled with the selected management staff. The appointment times were honoured to interview

the selected management staff of TOPP. Permission was sought from the Human Resource Manager to interview the sampled staff. After permission was granted, the researcher proceeded to the sampled staff during break time. The research team sought the consent of the sample staff before going ahead to interview them.

At the community level, the research team reported to either the Assembly person or the Unit Committee chairperson for introduction. The Assembly person led the research team to the traditional leaders for introduction and to explain the purpose of the team in the communities. The research team sought the permission of the community leaders to engage the community residents for interviewing. Upon the granting of such request, the research team identified the sampled community members for interviewing. However, their consent were sought first before embarking on the data collection exercise.

Ethical consideration

The researcher presented an introductory letter from the Institute for Development Studies to the management of TOPP and community leaders to clear doubts and fast track the data collection process. Some of the ethical considerations were securing the consent of respondents before carrying out the data collection exercise, ensuring the anonymity of the respondents. As a result, the study did not obtain data on the personal identities, such as names and house numbers, of the respondents.

Field challenges

Some challenges which confronted the data collection exercise were difficulty in locating the respondents, relocation of some of the sampled respondents to other areas, and lack of interest of some people to participate in the study. Other challenges were bad roads which made it difficult for the research team to gain access to some of the communities, and continuous rainfall which sometimes disrupted the data collection exercise.

Data analysis

The data were first cleaned to correct all grammatical errors and inconsistencies. The quantitative data were processed with Statistical Product for Service Solutions (SPSS) version 21. The qualitative data were transcribed and organised under major thematic areas alongside the research objectives. Descriptive statistics such as frequencies and percentages were used to analyse the quantitative data across all the three research objectives. Content analysis were used to analyse the qualitative data. The analyses and discussions of both qualitative and quantitative data were done concurrently to support each other.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter presents the results and discussion of the data collected from the field exercise. The chapter was organised under the background characteristics of respondents, OHSE risks employees and community residents are exposed to through the operations of TOPP, OHSE practices adopted by TOPP to ensure safe working environment for both employees and community residents, and capacity levels of stakeholders in managing the hazards and risks they are exposed to in ensuring OHSEM.

Background characteristics of respondents

This section presents the background characteristics of respondents. Some of the background issues presented under the section are sex, level of education, size of oil palm plantation, and average annual income from farm. Some of the background issues pertained to particular group(s) of respondents, and as a result the total frequencies were varied to reflect the situation. Table 2 presents results on the background characteristics of respondents and shows that the majority (59.2%) of the respondents were males. The majority (76.4%) of respondents had received various levels of formal education. With respect to the type of occupation for the community residents, the majority (57.6%) were into farming, while 11 per cent were engaged in other economic activities such as trading, mining and driving. Among the community residents who were farmers, all of them were into the cultivation of grains and tubers, whereas 51.6 per cent were into vegetables.

Table 2: Background characteristics of respondents

Variables	Sub-categories	Frequency	Percentage
All categories of respondents			
Level of education	None	88	23.6
	Basic	173	46.4
	SHS	71	19.0
	Tertiary	41	11.0
Total		373	100.0
Size of oil palm plantation	5 acres and below	55	33.3
	6 – 10 acres	46	27.9
	11 – 15 acres	27	16.4
	16 – 20 acres	21	12.7
	Above 20 acres	16	9.7
Total		*165	100.0
Average annual income from oil palm plantation (GH¢)	5000 and below	47	28.5
	5001 – 10000	69	41.8
	10001 – 15000	32	19.4
	15001 – 20000	12	7.3
	Above 20000	5	3.0
Total		*165	100.0
Ownership of oil palm plantation	Self-owned	98	59.4
	Family	30	18.2
	Contract	37	22.4
Total		*165	100.0
Frequency of spraying farm in a year	1 – 3	98	59.4
	4 – 6	64	38.8
	Above 6	3	1.8
Total		165	100.0
Unionised workers of TOPP			
Category of staff	Junior staff	25	58.1
	Senior staff	13	30.2
	Management staff	5	11.7
Total		*43	100.0

Source: Field survey (2017)

Among the out-growers or smallholder farmers, one-third (33.3%) had oil palm plantation size of 5acres and below, while 27.9 per cent had an oil palm plantation size of 6 – 10 acres. The mean income generate annually from the oil palm plantation was GH¢6.057.9 with a standard deviation of 753.2. Afrane and

Ntiamoah (2011) posited that the amount of income generated from agriculture largely determines the frequency and quantity of agro-chemicals applied on the farms. Ngowi (2003) also found a strong positive correlation between the amount of income generated from farms and the extent of protection given to sprayers. This suggests that the frequency of chemical applications on the farms will largely be dependent on the level of adequacy of the incomes generated from the farms. The majority (59.4%) of the out-growers owned the oil palm plantations, while 22.4 per cent operated the farms on contract. Table 2 further shows that the majority (59.4%) of the smallholder farmers applied between one and three agro-chemicals on their farms in a year, whereas 38.8 per cent sprayed between four and six times in a year. The majority (58.1%) of the unionised workers of TOPP were junior staff, while 30.2 per cent were senior staff.

OHSE risks out-growers, community residents and employees are exposed to through the operations of TOPP

The first research objective of the study sought to examine the OHSE risks out-growers, community residents and employees are exposed to through the operations of TOPP. Some of the issues considered under the section were increased skin diseases after spraying, respiratory difficulties during spraying, and burning of eyes during spraying. The section was organised under the three respondents' categories.

Community residents

Community residents were important stakeholders in the operations of TOPP. This was due to the aerosolised attribute of agro-chemicals, and the reliance of community residents on the environment. In other words, the

aerosolised nature of agro-chemicals makes it possible for the chemicals to contaminate the air and also travel beyond the targeted area to contaminate community environment, including crops. Table 3 presents results on the OHSE risks community residents were exposed to through the activities of TOPP.

Table 3: OHSE risks community residents were exposed to through the activities of TOPP

OHSE risks	SA (%)	A (%)	DK (%)	D (%)	SD (%)	Total (%)
Increased skin diseases after spraying	11.5	39.4	6.7	29.7	12.7	100.0
Respiratory difficulties during spraying	8.5	33.3	10.9	30.3	17.0	100.0
Burning of eyes during spraying	12.1	41.8	3.7	32.1	10.3	100.0
Increased birth defects in community	–	9.1	23.6	46.7	20.6	100.0
Increased death of livestock	13.3	35.8	9.1	27.9	13.9	100.0
Destruction of farm crops after spraying	10.9	30.3	4.2	40.0	14.6	100.0
Driving pests to individual farms	9.1	22.4	15.2	38.8	14.5	100.0
Chemical contamination of water bodies	17.6	41.2	2.4	29.7	9.1	100.0
Indiscriminate disposal of pesticide containers	7.9	16.4	12.1	42.4	21.2	100.0

Source: Field survey (2017)
n = 165
Key: SA = Strongly Agree, A = Agree, DK = Don't Know, D = Disagree, SD = Strongly Disagree

The community residents were requested to indicate their experiences of skin diseases after the application of chemicals on the plantations by TOPP. This was important because the aerosolised chemicals makes it possible for the chemicals to spread to the surrounding communities which could cause some

skin infections and allergies. From Table 3, about half (50.9%) of the respondents agreed that they experienced skin diseases after the application of chemicals on the oil palm plantations by TOPP. The skin issues reported by the community residents included dryness of the skin, and rashes. The results are in consonance with the finding of Stave (2005) that the aerosolised character of agro-chemicals makes it difficult to contain them within the targeted area during spraying, leading to the contamination of non-targeted space and elements to create unintended risks and hazards. The community residents, however, reported that these were not serious skin conditions, and the application of shea butter easily corrected the skin problems. One of the management representatives of TOPP indicated that more education was given to the communities within its catchment area to inform them about the operations of the company as well as some measures community members could adopt to reduce their exposure to the OHSE risks associated with its operations.

Another issue considered under the OHSE risks for community residents was respiratory difficulties during spraying. Table 3 shows that many (47.3%) of the sampled community residents denied experiencing respiratory difficulties during spraying. One of the management representatives of TOPP, however, explained that community residents could smell the chemicals but the residues in the air were not high enough to cause any harmful respiratory effects on them. Even though the residuals in the air might not be high to cause general respiratory problems for community residents, there could be health implications for people who have allergic reactions to the chemical elements.

According to Waichman et al. (2007), people with allergies living around plantations have peculiar health concerns which are mostly not detected.

One of the management representatives of TOPP, however, reported that the company had not recorded any cases of allergic reactions from its operations. Thus, the study found that the company had a community complaint desk, where all reactions from its operations are reported to. Nonetheless, Tettey et al. (2009) opine that community residents living around plantations in rural areas in developing countries are unable to associate certain allergic reactions or diseases with pollutions from nearby factories. This may have been the reason why the community residents do not report some of their observations in relation to health complications associated with the operations of TOPP to the management of the company.

The community residents were asked to indicate their experience with burning of the eyes during spraying. From Table 3, a little over half (53.9%) of the community residents agreed to experiencing burning of the eyes during spraying. However, the study found that such experiences occurred most with people who were on their farms during the application of chemicals by the company. This suggests that proximity of the community residents to the targeted areas of the chemical applications on the plantations contributed to their experiences with the burning of eyes. The proximity factor was also detected as communities closer to the plantations, such as Mampong and Apenkro, had most of their residents complaining about the burning of eyes compared to the other communities which were relatively far from the plantations. The result corroborates the assertion of Schnall et al. (2009) that the distance between commercial farms and communities is essential to avoid unintended risks and contamination to community residents. Schnall et al. (2009), therefore, suggested that a buffer zone should be created between communities and

commercial farms to prevent pollution and contamination. However, the nature of the oil palm plantations of TOPP is such that the communities (e.g. Abodwese, Otuano Camp, and Nyamebekyere) are dotted in and around the farms since they existed before the establishment of the company and offered parts of their land to the company. Such communities have their sources of water passing through the plantations of TOPP.

Pathak (2008) stipulates that exposure to chemical pollution could result in birth defects and as such, systematic efforts should be made by companies to detect and address such issues. The community residents were requested to indicate their experiences with birth defects. As presented in Table 3, the majority (67.3%) of the community residents disagreed that there had been increased birth defects in the communities resulting from the contamination of the operations of TOPP. This could imply that the level of exposure of the community residents to environmental risks associated with the operations of the company might not be high as stated by one of the management representatives of TOPP or the people were not in a position to determine birth defects in children.

Another issue considered under the OHSE risks community residents were exposed to through the activities of TOPP was increased death of livestock. This was imperative because of the free range system of animal keeping in the communities within the catchment areas of TOPP. From Table 3, 49.1 per cent of the community residents admitted to experiencing increased death of livestock. The negative experience of the community residents was largely attributed to the extensive or free range system of animal husbandry as the animals fed on contaminated plants.

One of the management representatives of TOPP indicated that the company provides education to the community members on measures to avoid most of such environmental contaminants. However, the interactions with the community residents revealed that the extensive animal husbandry system was a cultural practice and would be very difficult for them to change due to time and resource constraints. In other words, fencing the animals and providing them with food daily would require additional resources which the community residents perceived to be unnecessary. This suggests that the community residents had not properly understood the need for changing such traditional farming practices to protect their animals. It could also be due to the difficulties naturally associated with cultural change of people.

The community residents were also requested to indicate their experiences with the destruction of farm crops after spraying activities from TOPP. Table 3 shows that the majority (54.6%) of the community residents disagreed of having their farm crops destroyed after spraying activities of TOPP. Even though the majority of the community residents denied having their farm crops destroyed through the operations of TOPP, however, 41.2 per cent experiencing farm crop destruction is quite significant that demands attention. This was because the community residents were largely crop farmers and depended on the crops for their livelihood. As a result, any activity that causes destruction of the crops implied a loss of the sources of livelihood of the community residents. Nonetheless, the community residents admitted that making such complaints to TOPP are quickly investigated and compensations paid. It was revealed from a focus group discussion with some of the community members that if it does not rain within a week after spraying by TOPP, farms

close to the plantations begin to have their cocoyam, tomato, beans, pepper, and okro leaves withering or drying up. They added that such situations affected the yield from such crops. It was also revealed that some pests move from the plantations to adjourning farms destroying some of their crops. As a result, the respondents reported that they are sometimes compelled to also spray their farms following that of TOPP to avoid total destruction of their farms.

Manuele (2008) reports that the mass chemical applications on agricultural plantations sometimes drive pests to individual farms adjourning the plantations. The study, therefore, inquired from the community residents about their experiences with the driving of pests into their farms from the chemical applications of TOPP. The study found that the majority (53.3%) of the community residents denied having experienced the infestation of pests on their farms through the activities of TOPP (see Table 3).

Another issue considered under the section was chemical contamination of water bodies. This was quintessential because the community residents rely on such water bodies for their domestic activities and as a result, any chemical contamination of the water bodies could pose health risk to them. Table 3 shows that the majority (58.8%) of the community residents agreed to having experienced chemical contamination of their water bodies. Through a focus group discussion with community members, they detected such pollution when the colour of the water changes or when they see dead fishes in their streams, following chemical applications of TOPP on its plantation. They indicated some of such cases were reported to TOPP for actions to be taken. However, interviewing one of the representatives of TOPP revealed some of such complaints were not chemical pollution but through some activities of

community members. He recounted that investigations into one of such complaints with the EPA and Water Research Institute revealed that the colour change of the water body was as a result of a dye someone washed into the stream in one community that moved to another community. Further, investigations into complaints about dead fishes by TOPP revealed that most of them were coming from chemical applications of farmers in the communities. He added, *"because of the land fragmentation among family members, they are unable to leave enough buffers to prevent their chemicals from getting into water bodies, especially when it rains immediately after spraying"*. The results showed that none of the stakeholders wanted to accept responsibility for the pollution of water bodies.

One of the management representatives of TOPP added that the company had established a buffer area (20 metres) on both sides of the streams that flowed through the oil palm plantations to avoid or reduce contamination. Even though the 20 metres was within the approved standard by the 2011 Riparian Buffer Zone Policy for managing freshwater bodies in Ghana by the Ministry of Water Resources, Works and Housing of within 10 and 50 metres of buffer zone, the results showed that the size of the buffer was less effective in preventing contamination of water bodies. That could be attributed to the aerosolised nature of the chemicals and as such, environmental factors such as speed and direction of wind during the application of chemicals would play critical roles in ensuring the effectiveness of the buffer area in preventing the contamination of water bodies.

One of the management representatives of TOPP further stated, *"Our buffer demarcations with the water bodies are in accordance with international*

best practices and standards (10 – 50 metres)". Nonetheless, the complaints of chemical pollution of the water bodies by some of the community residents implied that the buffer areas were probably not adequate. One of the management representatives of TOPP explained that such contamination happens when it rains during or immediately after the application of chemicals on the plantations. The management representative added that immediately such reports were made by the communities, the company brought in the EPA and the Ghana Water Company Limited to take samples of the water to the laboratory for testing and advice. In addition, the company had sunk boreholes for communities which were so close to the plantations and frequently encounter the problem of chemical contamination of their water bodies. The aim was to reduce the dependence of the communities on the water bodies by giving them alternatives and also ensuring that the communities had other sources of water to depend on in times of such contamination.

The community residents were also asked to indicate their exposure to indiscriminate disposal of pesticide containers. This was necessary because the poor handling of such containers posed major OHSE risks to people. As presented in Table 3, the majority (63.6%) of the community residents disagreed with experiencing indiscriminate disposal of pesticide containers. One of the management representatives of TOPP indicated that the company had a designated room where all empty pesticides containers were stored after spraying and later sent to Zoil Ghana Limited, which is a waste management company in Takoradi. This means that the company had an effective system of handling or disposing off its pesticide containers.

The study, however, found that the experiences of the various OHSE risks were largely dependent on the distances between the communities and the oil palm plantations of TOPP. In other words, the closer the communities, the more people experienced the OHSE risks from the operations of TOPP. This suggests that the creation of buffer zones between plantations and communities is important to reduce the OHSE risks communities close to or surrounded by the plantations are exposed to. Lundqvist (2001) emphasises that the creation of buffers between commercial farms and communities are very important to reduce unintended exposures of communities to OHSE risks associated with large scale application of chemicals and pollution from agro-processing establishments.

Out-grower/smallholder farmers

This section examines the OHSE risks out-grower and smallholder farmers were exposed to through the activities of TOPP. According to Osei-Amponsah, Visser, Adjei-Nsiah, Struik, Sakyi-Dawson and Stomph (2012), Ghana produces about 2,000,000 metric tons of oil palm fruits annually, and about 60 per cent of such output comes from smallholder and out-grower farmers. The OHSE risks associated with the operations of this category of respondents were very imperative as they played critical role in the operations of TOPP. The oil palm produce of out-grower/smallholder farmers are directly sold to TOPP through negotiated prices and as a result, the farmers were occasionally trained by TOPP in best farming practices to minimise their exposure to OHSE risks. The aim of such training programmes was to ensure that the out-grower/smallholder farmers operated within the operational safety standards of

TOPP to minimise their exposure to OHSE risks. The assessment of the OHSE risks associated with the operations of the out-grower/smallholder farmers is, therefore, an indirect assessment of the effectiveness of the training programmes in exposing farmers to best practices to minimise OHSE risks. Some of the issues considered under the section were increased skin disease after spraying, respiratory difficulties during spraying, and burning of eyes during spraying. The total number for this category of respondents was 165. The results are presented in Table 4.

Table 4: Perception of OHSE conditions out-grower/smallholder farmers were exposed to through the activities of TOPP

OHSE risks	SA (%)	A (%)	DK (%)	D (%)	SD (%)	Total (%)
Increased skin diseases after spraying	15.8	46.7	4.2	24.8	8.5	100.0
Respiratory difficulties during spraying	20.0	41.2	–	26.7	12.1	100.0
Burning of eyes during spraying	22.2	44.2	–	25.5	8.1	100.0
Increased birth defects among out-growers	0.6	10.9	21.9	51.5	15.1	100.0
Increased death of livestock	7.3	23.6	23.6	28.5	17.0	100.0
Chemical contamination of water bodies	13.3	41.8	6.1	26.7	12.1	100.0
Contamination to food and other household items	7.9	13.3	19.4	40.6	18.8	100.0

Source: Field survey (2017)
n = 165
Key: SA = Strongly Agree, A = Agree, DK = Don't Know, D = Disagree, SD = Strongly Disagree

From Table 4, the majority (62.5%) of the sampled out-grower/smallholder farmers agreed to be experiencing increased skin diseases after spraying their farms. The results show that the majority of the out-grower/smallholder farmers were exposed to the chemicals during spraying. This further suggests that the majority of the out-grower/smallholder farmers poorly protected themselves during the application of chemicals on their farms. The results also imply that the majority of out-grower/smallholder farmers did not comply with the best practices in spraying introduced to them by the management of TOPP. This was because one of the management representatives of TOPP indicated that the company occasionally trained and educated the farmers on best practices to protect themselves during chemical applications on their farms to reduce the OHSE risks associated with farming and their associated health implications. The implication is that the decision to comply with the best practices in minimising OHSE risks by farmers, after they have been introduced to, lies on them.

The farmers were also asked to indicate whether they experienced respiratory difficulties during the application of chemicals on their farms (see Table 4). From Table 4, the majority (61.2%) of the out-grower/smallholder farmers agreed that they experienced respiratory difficulties during spraying. The results further confirmed that the farmers did not properly protect themselves during the application of chemicals on their farms. The poor protection of the farmers during the application of chemicals on their farms posed a major risk to the sustainability of smallholder oil palm plantation as their continuous exposure could cause serious deterioration in their health and also discourage others from engaging in their farming. According to Husman

(2006), the continuous exposure of farmers to agro-chemicals poses major health risk to farmers and sustainability issues to agriculture and food security.

Another issue discussed under the OHSE risks to the out-grower/smallholder farmers was burning of the eyes during spraying of chemicals on the farms. Table 4 shows that the majority (66.4%) of the sampled out-grower/smallholder farmers agreed that they experienced burning of the eyes when applying chemicals on their farms. The results show that the majority of the farmers poorly protected their eyes during the spraying of chemicals on their farms. It was revealed from the interaction with the smallholder farmers that some of them did not wear goggles to protect their eyes resulting in burning of eyes, whereas others were using ordinary spectacles. These might have contributed to the burning of the eyes during spraying.

The respondents were requested to indicate their experiences with increased birth defects. Results from Table 4 show that the majority (66.7%) of the out-grower/smallholder farmers disagreed that there was increased birth defects among out-grower/smallholder farmers.

The study further inquired from the farmers about increased death of livestock resulting from their application of chemicals on their farms. The results, as presented in Table 4 show that 45.5 per cent of the farmers disagreed that there was increased death of livestock in the communities resulting from hazards presented by the application of chemicals on their farms. Some of the smallholder farmers, however, attributed the increased death of livestock to drinking contaminated water from the streams. The results suggest that some of the chemicals applied on the farms extended beyond the targeted areas to the communities. It also suggests that the buffer areas between the farms and some

of the communities were not extended enough to prevent the chemicals from contaminating community environment to cause death to livestock. Health and Safety Executive (2009) reports that the aerosolised nature of agro-chemicals requires that extended buffer zone be established between farms and communities to prevent unsuspected contamination to cause injury or destruction to people, flora and fauna.

Another OHSE risk considered under the section was chemical contamination of water bodies resulting from the application of chemicals on the farms. From Table 4, the majority (55.1%) of the out-grower/smallholder farmers agreed that they experienced chemical contamination of water bodies when they applied chemicals on their farms. One of the management representatives of TOPP, however, reported that the company had established a complaint desk for the communities to report such contamination for immediate redress to prevent harm and injury to people and animals. The study found that the management of TOPP engaged the services of the Water Research Institute, Ghana Water Company Limited and the EPA in cases of suspected chemical contamination to water bodies to address the situation. From the study, the out-grower/smallholder farmers detected chemical contamination of water bodies when their colour change or found more dead fishes in the streams.

The respondents were further requested to indicate whether they experienced contamination of food and other household items after applying chemicals on their farms. The results, as presented in Table 4, show that the majority (59.4%) of the out-grower/smallholder farmers disagreed to experiencing contamination of food and other household items after applying chemicals on their farms. The results suggest that the majority of the out-

grower/smallholder farmers handled themselves and the protective gears used in the spraying exercises properly to avoid such contamination. Nonetheless, the contamination to food and other household items as admitted by some of the respondents implies that some of them were still either ignorant or had not appreciated the need to adopt best practices after the application of chemicals on farms to avoid contamination to food and household items. The farmers detected chemical contamination to food when they smell it in their meals and other household items after applying chemicals on their farms.

Unionised workers

This section assesses the OHSE risks unionised workers were exposed to through the activities of TOPP. A total of 43 unionised workers of TOPP were engaged by the study. The results are presented in Table 5.

Table 5: Perception of OHSE conditions unionised workers were exposed to through the activities of TOPP

OHSE risks	SA (%)	A (%)	DK (%)	D (%)	SD (%)	Total (%)
Increased skin diseases after spraying	4.7	18.6	7.0	46.5	23.2	100.0
Respiratory difficulties during spraying	13.9	25.6	–	44.2	16.3	100.0
Burning of eyes during spraying	7.0	37.2	–	34.9	20.9	100.0
Tractor rollovers	–	–	–	69.8	30.2	100.0
Faulty machines causing injuries	4.7	16.3	11.6	48.8	18.6	100.0
Poor state of safety gadgets	–	13.9	–	62.8	23.3	100.0

Source: Field survey (2017)
n = 43

Key: SA = Strongly Agree, A = Agree, DK = Don't Know, D = Disagree, SD = Strongly Disagree

Table 5 shows that the majority (69.7%) of the unionised workers disagreed that they experienced increased skin diseases following the application of chemicals on the farms. This could be attributed to the strict measures instituted by the management of TOPP during the spraying of chemicals on the farms. Management of TOPP had established standard operating procedures, including the wearing of protective gears to avoid direct skin contact with the chemicals to prevent harm and injuries. However, the complaints by some of the respondents about skin diseases following the application of chemicals on the farms suggests that either some of the workers did not properly use the protective gears or the instituted standard operating procedures were not adequate enough to prevent skin contamination.

The unionised workers were further requested to indicate whether they experienced respiratory difficulties during spraying of chemicals on the farms. Results from Table 5 show that the majority (60.5%) of the unionised workers disagreed that they experienced respiratory difficulties during the application of chemicals on the farms.

Another issue considered under the section was the burning of eyes during spraying of chemicals on the farms. From Table 5, the majority (55.8%) of the sampled unionised workers of TOPP disagreed to experiencing the burning of eyes during the application of chemicals on the farms. The results showed that the majority of the unionised workers properly protected their eyes during the application of chemicals on the farms. Nonetheless, 44.2 per cent of the respondents complaining about burning of the eyes during the application of

chemicals on the farms is quite significant, which further suggested that the standard operating procedures for the company might be less adequate in protecting the unionised workers. One of the management representatives reported that they had noticed that some of the workers remove the goggles and nose masks some distance away from the targeted spraying areas to take fresh air and wash their faces, which could be the cause of such complaints. He, however, continued that management is in the process of educating workers to avoid such practices.

The study found that some of the workers removed their nose masks and goggles after the spraying when they had not moved beyond the buffer zone to ensure complete protection. This could explain the complaints of some of the workers about respiratory difficulties and burning of eyes following the application of chemicals on the farms.

With respect to tractor rollovers, results from Table 5 show that all (100%) the unionised workers disagreed that they encountered such a risk in their operations.

The respondents were further requested to indicate whether they experienced faulty machines causing injuries as one of the risks in their operations. Table 5 shows that the majority (67.4%) of the sampled unionised workers disagreed that they encountered faulty machines leading to injuries. Table 5 further shows that the majority (86.1%) of the sampled unionised workers of TOPP disagreed that they experienced poor state of safety gadgets as risks in their operations. The results showed that TOPP paid particular attention to its machines and safety gadgets to ensure the safety of workers. The management of TOPP paid particular attention to safety gadgets and

maintenance of machines because they were part of the basic indices used by the EPA and external auditors of the company to ascertain the effectiveness of the OHSE management practices of TOPP. Ensuring the maintenance of machines and proper conditions of safety gadgets are processes of eliminating the third domino of unsafe working condition, as described by Cooper (2007) in the Domino theory, to prevent the occurrence of accidents in the operations of workers. The negative experiences of some of the workers could, therefore, be attributed to non-proper use of the safety gadgets.

The management representatives from TOPP reported that the major OHSE risks the unionised workers were exposed to in their operations were snake bites, cuts resulting from the use of Malaysian knives for harvesting palm fruits, and harvesting palm fruits close to high tension poles on the farms. Others were slippery floors resulting from oil spillages, bee stings, and contaminated air from various activities of the company such as application of chemicals, and smoke from its furnaces. However, one of the management representatives indicated that some of the OHSE risks such as snake bites and bee stings were occupational hazards that were difficult to eliminate or control in their natural habitats.

Comparing the results on the OHSE risks among the three categories of respondents showed that the out-grower/smallholder farmers were more exposed to OHSE risks than the community residents and unionised workers. This could be attributed to the direct involvement of the out-grower/smallholder farmers in the application of chemicals on the farms as against the community residents who were some distance away from the targeted areas for spraying. This corroborates the assertion of Gilden et al. (2010) that farmers experience direct

OHSE risks associated with the application of chemicals on farm, whereas the larger community of stakeholders experience the residual risks.

It could also be deduced from the above analysis that the EPA and the management of TOPP did not monitor the activities of the out-grower/smallholder farmers to ensure their compliance to best practices in the application of chemicals on the farms. Thus, the EPA was more concerned about the direct operations of TOPP on the farms by the unionised workers, in terms of their compliance to the approved standards to reduce OHSE risk, but not on the out-grower/smallholder farmers who also contributed to the operations of TOPP. The weak supervisory role by the EPA on the out-grower/smallholder farmers could explain the weak monitoring system by TOPP over the farmers after education on OHSE risks had been provided. The weak monitoring system could also explain the high exposure of out-grower/smallholder famers to OHSE risks.

One of the management representatives of TOPP reported that the company is mandated as part of its certification requirements to educate the out-growers about best farm practices, however, they are not mandated to enforce the adoption of such practices. He added that TOPP had employed the services of agricultural extension workers to support and educate the out-growers to ensure OHSE practices. The responsibility is on the farmers to comply with the standards as they have been taught. He explained that

> "*the difficulty in monitoring compliance is partly due to the scattered nature of the out-grower farms across many communities and the fact that individual farmers apply chemicals and perform*

other functions on the farms as and when they have money… the best we can do is to continue to educate them".

It should also be noted that some of the contamination were happening in the homes of the out-grower farms instead of the farms. Thus, some of them were using chemical containers as household items, while others forgot to wash down properly before touching things in their houses after applying chemicals on the farms.

OHSE practices adopted by TOPP to ensure safe working environment for both employees and community residents

The second research objective sought to assess the OHSE practices adopted by TOPP to ensure safe working environment for all major actors such as community residents, out-grower/smallholder farmers, and unionised workers. This was necessary to ascertain how the OHSE risks were being managed by TOPP to ensure the safety of all stakeholders. From the study, the management representatives from TOPP reported that the OHSE practices adopted by the company to ensure safe working environment for all major actors included the establishment of buffer zones from rivers to avoid chemical contamination, recruitment of extension officers for out-grower/smallholder farmers to ensure compliance to technical standards, and the establishment of standard operating procedures for workers to check safety elements and identify hazards in relation to their operations.

One of the management representatives from TOPP indicated that the company had a hazard spotting form, which workers who identified any hazards in their lines of operation had to fill and submit to the safety and compliance

unit for immediate attention. The statement suggested that the management of the company were aware that they could not exhaust identifying all the OHSE risks associated with their operations as described by Fernandez-Muniz et al. (2008) that OHSE risks are unlimited in manufacturing and large scale agricultural activities as new hazards and risks emerge as processes evolve. The use of the hazard spotting form to identify hazard was to help create barriers between danger factors and workers to prevent accidents as explained in the danger factor theory by Kelloway and Day (2005). Another management representative of TOPP reported that the engagement of agricultural extension officers for the out-grower/smallholder farmers by the company was to guide their activities to reduce their exposure to hazards and risks as well as guide farmers to adopt best practices. The high exposure of the out-grower/ smallholder farmers to OHSE risks show that some of them were not adopting the best practices introduced to them by the agricultural extension officers. With reference to community residents, one of the management representatives stated that:

> *'the company organises weekly safety talk programme on Arise FM, a local radio station at Praso, to educate them on measures to reduce their exposure to hazards and risks… we also use such educative programmes to build good community relations and gather local information to act on to avoid large scale disaster'.*

The above statement showed that community engagement was essential in managing OHSE risks associated with the operations of TOPP. It enabled all parties to get the concerns of others and address them amicably. The OHSE practices adopted by the management of TOPP were in line with the central

principle of the domino theory that when hazards are identified and attended to, it helps to reduce the occurrence of accidents as when a domino (hazard) is dealt with, it creates a break in the accident chain in organisational processes (Forastieri, 2001).

The study further examined the views of the various stakeholders on OHSE practices adopted by TOPP to ensure safe working environment. The remaining section is organised under the views of community residents, out-grower/smallholder farmers, and unionised workers.

Community residents

This section examined the views of community residents on the OHSE practices adopted by TOPP to ensure safe working environment. From Table 6, all the sampled community residents agreed that TOPP educated the communities on safety mechanisms. The awareness of all the respondents on the educative programmes on safety programmes could expose stakeholders to best practices to reduce their contact with hazards and danger factors to cause accidents or disasters directly or indirectly through the operations of TOPP.

Table 6 also shows that the majority (58.2%) of the sampled community residents disagreed that TOPP informed them before their mass application of chemicals on the farms. The results showed that the majority of the community residents did not hear any announcement about impending chemical application on the farms of TOPP. This could cause some discomfort to the community residents as reported by Crouchman (2010) that the lack of prior information about large scale application of chemicals by agro-based firms to residents within the catchment areas of operation could have dire consequences on the

activities of residents as they would have to plan their activities and adjust their lives to avoid getting into contact with some of the hazards and dangers associated with the mass spraying of chemicals.

Results from Table 6 further showed that 47.2 per cent of the community residents agreed that TOPP had provided alternative sources of water for them. One of the management representatives of TOPP reported that the provision of boreholes to communities such as Ntafrewaso, Eduabeng, Abodwese, Otuano Camp and Nyamebekyere was based on those who had their sources of drinking water (rivers) passing through the oil palm plantation or within the buffer areas established around the farm. The study, however, found that even though some of the communities had boreholes, some of the residents, staying close to the streams, still depended on the streams for household activities because of distance. This suggested that TOPP should adopt strict measures to its buffer zone practice along water bodies to avoid any disaster as described by Newell (2008) in the green theory that economic actors should always institute measures to maintain the sanctity of the environment within which they operate.

Table 6: OHSE practices adopted by TOPP to ensure safe working environment for community residents

OHSE practices	SA (%)	A (%)	DK (%)	D (%)	SD (%)	Total (%)
Educate communities on safety mechanisms	47.9	52.1	-	-	-	100.0
Inform communities before spraying	10.9	24.8	6.1	43.0	15.2	100.0
Provided alternative sources of water	9.1	38.2	7.8	37.6	7.3	100.0
Created avenues for people to lodge	26.7	50.3	8.5	14.5	-	100.0

complaints						
Created buffers between farms and communities	13.9	25.5	12.7	35.8	12.1	100.0
Provided medical aid to residents experiencing symptoms of chemical pollution	23.6)	36.4	4.9	22.4	12.7	100.0
Having common time table for out-growers in the various communities to do spraying	-	-	-	61.8	38.2	100.0

Source: Field survey (2017)
n = 165
Key: SA = Strongly Agree, A = Agree, DK = Don't Know, D = Disagree, SD = Strongly Disagree

Another issue considered under the section was the creation of avenues for people to lodge complaints. Results as presented in Table 6 showed that the majority (77%) of the community residents agreed that TOPP had created avenues for people to lodge complaints. The results showed that the majority of the community residents were aware of the avenues instituted by TOPP to lodge complaints. This could enable them to lodge complaints to the company if they experienced any OHSE risks resulting from the operations of TOPP.

The respondents were also requested to indicate whether TOPP had created buffers between the farms and the communities. From Table 6, 47.9 per cent of the respondents disagreed that the company had created buffers around the farms to protect the communities. From the results, some of the community residents (especially from Ntafrewaso and Pepekrom communities) felt less protected from the activities of TOPP. The study, however, found that the low awareness about the buffer areas established by TOPP to protect the communities was due to the fact that people entered the buffer areas for hunting

and fetching of non-timber forest products (including snails, mushrooms and medicinal plants), and as such did not consider them as protective zones for the communities. This could explain parts of the OHSE risks complained by some of the community residents as they did not consider the buffer zones as prohibitive areas to avoid their exposure to some of the OHSE risks associated with the operations of TOPP.

Another issue considered under the section was provision of medical aid to residents experiencing symptoms of chemical pollution. Table 6 showed that the majority (60%) of the sampled community residents agreed that TOPP provided community members with medical aid when they experienced symptoms of chemical pollution. The awareness by the majority of the respondents about such a facility could enable them to seek early medical attention to avoid any major disaster in the communities resulting from the OHSE risks associated with the operations of TOPP.

One of the representatives of TOPP reported that such a facility was adopted due to feedbacks the company had from their interactions with community members. This corroborates the assertion of Friedman and Miles (2006) in the systems theory that effective collaboration among stakeholders and sections of a system enables organisations to identify their concerns and institute measures to address them to maintain cohesiveness and cordiality. As a result, the provision of medical aid to community residents was likely to improve the cordiality between them and TOPP. Nonetheless, the about 35 per cent who were not aware of such provision was quite serious since their unawareness could deprive them of benefiting from the provision of medical aid to people who experienced symptoms of chemical contamination. There is, therefore, the

need for the management of TOPP to increase education and sensitisation of its OHSE practices in relation to the communities to help ensure increased protection to community residents.

Table 6 further showed that all the sampled community residents disagreed that TOPP had a common time table for out-grower/smallholder farmers in the various communities to apply chemicals on their farms. The implication was that there was no order or control in the application of chemicals on farms by the out-grower/smallholder farmers. This could increase the OHSE risks for the community residents as they had their farms adjourning these oil palm plantations and could easily get exposed to the chemicals as they were applied. The study found that some community residents passed through the oil palm plantations of out-growers to their farms, and as a result, the absence of any prior information about chemical application on the farms could easily get ordinary citizens exposed to the chemicals as they might not wear protective gears to prevent contact. This could also partly explain the skin diseases, burning of the eyes and respiratory difficulties reported by some of the community residents, irrespective of the buffer zones established between the farms and the communities.

Out-grower/smallholder farmers

This section examined the OHSE practices adopted by TOPP to ensure safe working environment for out-grower/smallholder farmers. This was necessary considering the important role of the out-grower/smallholder farmers in the entire operations of TOPP. The results were presented in Table 7. From Table 7, all the out-grower/smallholder farmers admitted that TOPP organised

safety training programmes for them. This practice could expose the out-grower/smallholder farmers to best practices to reduce OHSE risks associated with their activities. One of the management representatives of TOPP indicated that the aim of management was to replicate the best practices in the company in the operations of out-grower/smallholder farmers to ensure their safety and the protection of the environment.

The results showed the commitment of the management of TOPP to ensure compliance to safety and environmental standards not only in their operations but also with the operations of the out-grower/small holder farmers. Another representative of the company attributed the commitment of TOPP to both local and international certifications that enabled them to operate and sell their products on the international market. This suggested that certification to operate in certain markets was important in ensuring the adoption of practices to ensure safe working environment. The result agreed with the assertion of Patterson (2009) about the green theory that licensing and certification could be used to compel companies to incorporate environmental cost and protective measures in their economic activities.

Table 7: OHSE practices adopted by TOPP to ensure safe working environment for out-grower/smallholder farmers

OHSE practices	SA (%)	A (%)	DK (%)	D (%)	SD (%)	Total (%)
Organise safety training programmes	40.6	59.4	-	-	-	100.0
Provide safety equipment	7.9	20.0	13.3	40.0	18.8	100.0
Provide technical assistance on farm management	43.6	56.4	-	-	-	100.0

Having common timetable for out-growers to do spraying	-	-	-	51.5	48.5	100.0
Created platform for out-growers to interact with management to address issues	43.0	53.3	3.7	-	-	100.0

Source: Field survey (2017)
n = 165
Key: SA = Strongly Agree, A = Agree, DK = Don't Know, D = Disagree, SD = Strongly Disagree

Table 7 further shows that the majority (58.8%) of the out-grower/smallholder farmers disagreed that the company provided them with safety equipment. The results showed that the majority of the out-grower/smallholder farmers had to acquire their own safety equipment in their operations. This could partly explain the high OHSE risks the out-grower/smallholder farmers were exposed to even though they regularly received education on best practices to reduce their exposure to such hazards. The study found that some of the out-grower/smallholder farmers used old and tattered protective gears. The results suggested that training programmes on best practices alone were not adequate to ensure the adoption of best practices among the out-grower/smallholder farmers.

From Table 7, all the out-grower/smallholder farmers agreed that TOPP provided them with technical assistance on their farms. This was through the engagement of extension officers for the farmers to enable them adopt best farming practices. The extension officers assisted farmers in ensuring the right spacing of oil palm trees during planting, suggested appropriate treatment for handling particular issues on the farm, and taught them any new and improved

methods in farming. The extension officers, therefore, played a critical role in the operations of out-grower/smallholder farmers.

Another OHSE practice considered under the section was having a common timetable for out-grower/smallholder farmers to apply chemicals on their farms. This was important as it helps to enable other farmers to prepare themselves to avoid getting themselves exposed to any risks associated with the application of the chemicals on the farms. Results from Table 7 showed that all the sampled out-grower/smallholder farmers disagreed that they had adopted a common time table for the application of chemicals on their farms. This suggested that chemical applications on the farms were done indiscriminately without any order. This could increase the OHSE risks for other farmers who accessed their farms through the farms of out-grower/smallholder farmers.

The respondents were asked to indicate whether they had a platform to interact with the management of TOPP to address their issues. This was important because such a platform could be used to address some of the OHSE risks associated with their activities. From Table 7, the majority (96.3%) of the out-grower/smallholder farmers agreed that TOPP had created the platform for both parties to interact to address their differences and common issues. This constituted platform or avenue to lodge complaints, educate farmers, and negotiate for prices for the produce of farmers and other technical issues such as extension services. The platform was also used to evaluate the activities of the partnership. Part of the platform was on the local radio station to engage farmers and community residents, while TOPP has also created community complaints desk. Further, there was price fixing committee which negotiated with the

leadership of out-grower/smallholder farmers to fix prices of the harvested palm fruits.

Unionised workers of TOPP

This section examined the OHSE practices adopted by TOPP to ensure safe working environment for workers. This was necessary to ascertain the mechanisms adopted by TOPP to manage the OHSE risks associated with its operation and to ensure the safety of its workers. The results are presented in Table 8. Table 8 showed that all the sampled unionised workers agreed that the company trained employees on safety practices to reduce the risks associated with its operations. According to Geldart et al. (2010), the training of employees on occupational safety exposes them to the operational standards of a company and best practices to reduce accidents and risks associated with its operations. This suggested that the management of TOPP trained its employees to enable them to appreciate safety procedures of the company and the need to comply with them to reduce the risks associated with its operations.

Table 8: OHSE practices adopted by TOPP to ensure safe working environment for employees

OHSE practices	SA (%)	A (%)	DK (%)	D (%)	SD (%)	Total (%)
Train employees on safety practices	65.1	34.9	-	-	-	100.0
Provide safety gears	76.7	23.3	-	-	-	100.0
Having routine maintenance of equipment	72.1	27.9	-	-	-	100.0
Provide prompt medical services	93.0	7.0	-	-	-	100.0

Create buffers between TOPP's operations and communities to avoid contamination	32.6	67.4	-	-	-	100.0

Source: Field survey (2017)
n = 43
Key: SA = Strongly Agree, A = Agree, DK = Don't Know, D = Disagree, SD = Strongly Disagree

Another issue considered under the section was the provision of safety gears to employees. From Table 8, all the respondents admitted that the company provided them with safety gears to reduce the risks associated with their operations. It included the supply of safety boots, overall coats, helmets, goggles, nose masks, and hand gloves. One of the management representatives of TOPP reported that the goal of the company was to provide maximum protection to its workers to ensure safety. This implied that the management of TOPP was committed to ensuring the safety of workers. This partly could explain the low OHSE risks reported by the unionised workers as associated with their operations.

Table 8 further showed that all the sampled unionised workers agreed that the company had routine maintenance for all equipment. This was very imperative as Geller (2004) reported that poor maintenance culture poses serious OHSE risks in most manufacturing companies. The commitment of the management of TOPP towards the planned maintenance of equipment implied that they were committed to reducing OHSE risks associated with their operations as well as ensuring the safety of workers. The study, however, found that the commitment of the management of the company towards the safety of its workers and management of OHSE risks was partly due to the regular monitoring from the EPA and occasional monitoring by its external auditors

from Malaysia. From the study, the EPA conducted quarterly monitoring exercises of the activities of the company to ascertain the extent of their compliance to the safety standards that guarantee the renewal of their operational license and international certification. The finding suggested that effective or regular monitoring from licensing agencies as well as the incorporation of OHSE practices into the licensing and certification processes could compel manufacturing firms to comply with OHSE standards to ensure safety and environmental sanctity for workers and all other stakeholders.

From Table 8, all the respondents admitted that the company provided prompt medical services to workers to reduce or avoid any complications associated with their operations. One of the management representatives of TOPP indicated that the company had established a well and fully-functioning health facility to attend to the health needs of workers. Another management representative of TOPP stated,

> "*workers are made to go through compulsory medical check-up every six months… in addition, workers are made to go for medical check-ups prior to going for their leave and after resumption to ensure their full safety*".

The statement above shows that the management of TOPP had established structures and systems to promptly address the medical needs of workers. This could help to reduce the likely degeneration of medical issues into complications among the workers.

Another issue considered by the study was the creation of buffer areas between the farms and the estates within which they lived. Table 8 shows that all the sampled unionised workers of TOPP agreed that the company had created

buffers between the farms and residential areas of the workers. The buffers were aimed at reducing OHSE risks associated with its operations on workers and their families.

A further analysis on the OHSE practices for all the stakeholders showed that the unionised workers had the highest level of protection against OHSE risks. This was due to the direct control of management of the company over the activities of the workers. With respect to the other stakeholders (community residents and out-grower/smallholder farmers), the company had instituted safety measures to reduce the OHSE risks on them. However, the onus lied on them to comply with the OHSE measures to reduce their exposure to OHSE hazards associated with the operations of the company. The result showed that having a monitoring mechanism to check people's compliance with the safety guidelines was necessary to enhance their protection against OHSE risks.

Capacity levels of stakeholders in managing the risks and hazards they were exposed to in ensuring OHSEM in the catchment area of TOPP

The third research objective sought to examine the capacity levels of the various stakeholders in managing the risks and hazards they were exposed to in ensuring effective OHSEM in the catchment area of TOPP. It is imperative to assess the capacity levels of the stakeholders in addressing their operational challenges, while complying with the tenets of safety principles and mechanisms to suppress the risks and hazards surrounding the operations of TOPP to promote OHSEM.

From the study, one of the management representatives of TOPP indicated that the organisation of safety talk on radio programmes were aimed at

equipping stakeholders with the necessary information, knowledge and skills to effectively manage the hazards and risks associated with the oil palm industry in the company's catchment area. The result showed that information sharing on risks and hazards was imperative in building the capacities of stakeholders to effectively manage occupational and environmental risks and hazards. This was in line with the assertion of Constantin (2012) that exposing workers and other stakeholders to methods of risk identification and mitigation mechanisms contribute significantly to build their capacities and empower them to gain mastery over occupational and environmental risks associated with their operations.

The study also found that new recruits of the company were taken through safety training and standards to ensure their adherence to the operational standards of the company. Such training programmes were considered as a platform to build the capacities of workers to identify hazards and risks associated with their operations as well as mechanisms of management to ensure safe working environment. As part of the efforts in managing OHSE risks and hazards associated with the internal operations of the TOPP, the management had empowered workers to fill hazard spotting forms anytime they identified hazards in their operations. Safety stewards made follow ups on the descriptions on the hazard spotting form to either address the situation or advice management and staff on the issue. Thus, the ability of workers to independently identify hazards and risks associated with their operations was considered as a form of capacity building. This suggested that the system for managing OHSE risks and hazards associated with the operations of a particular company should involve everyone who influences or whose activities are influenced by the activities in

the company. The result corroborates the assertion of Subramaniam (2007) that capacity building training programmes should be organised for all stakeholders to effectively manage the risks and hazards they are exposed to ensure successful OHSEM.

Another management representative of TOPP reported,

> "*we have trained safety stewards in every department or section who are mandated to ensure that people comply with the safety standards of the departments to suppress risks and hazards associated with our operations… a safety steward has the capacity to halt operations, compel workers to adhere to safety standards or sanction workers who fail to adhere to safety standards in the company*"

The statement above showed that the management of the company had built the capacity of some workers to ensure compliance to safety standards to effectively manage the risks and hazards workers were exposed to in their operations. Thus, the power and authority ceded to the safety stewards increased their capacity to compel workers to adhere to safety standards of the company. The implication was that capacity building of stakeholders towards OHSEM should go along with some levels of structures with clear mandate, power and authority to regulate people's activities and control their actions in a well-coordinated manner. The study found that the company had a disciplinary code for violating safety procedures. This included query and cautioning, suspension and dismissal.

Apart from the safety stewards, the company had also trained safety marshals particularly for vehicular operations. The role of the safety marshals

was to ensure that people wore seat belts, drove within the speed limit and checked conformance with loading capacities of vehicles. From the study, the safety marshals also subjected defaulters of safety standards to the disciplinary code. The disciplinary powers given to the safety marshals enabled them to administer their roles effectively as they were able to compel workers to adhere to vehicular standards in the company. The result confirmed the need to have structures with power and authority to back people's capacity to effectively ensure compliance and manage hazards and risks associated with the OHSEM.

A management representative from TOPP also reported that the company had invested in machinery and technology to enhance its capacity to effectively manage the risks and hazards associated with their operations in ensuring OHSEM. This involved the deployment of machinery and technology in some critical stages which were considered highly risky for workers or posed major environmental threats to the surrounding communities. The study found that the effluent or waste water from the production processes of the company went through a lot of treatment stages without the addition of chemicals to enable it break down through organic processes. The last stage was rich in potash and was pumped into the farm for irrigation. Investment in these processes was to enhance the capacity of the company to reduce its impact on the environment. The result showed that increasing capacity levels to effectively manage hazards and risks associated with OHSE partly required investment in technology. This agreed with the assertion of Constantin (2012) that increasing logistics and technological capacity in manufacturing processes were pre-requisites to effectively manage hazards and risks associated with OHSE.

However, one of the management representatives of TOPP reported that one of the main challenges confronting the company with respect to OHSEM in the communities was its inability to regulate the activities of the community members and out-grower/smallholder farmers in line with safety principles. Thus, even though the company provided regular information to the communities with the aim of building their capacities in managing the risks and hazards associated with the oil industry, some of the community members, smallholder farmers or out-growers did not comply with the set standards leading to their exposure to OHSE risks and hazards. This confirmed the finding that capacity building without control structures and authority to compel stakeholders to comply with safety standards could not effectively manage OHSE risks and hazards.

With respect to the capacity of the EPA in managing hazards and risks associated with the operations of TOPP, the representative reported that the EPA was mandated by law to maintain occupational health and environmental safety in Ghana. As a result, the EPA had the legal backing and mandate to recommend, monitor, regulate and sanction people in accordance with environmental standards. The representative from EPA further indicated that the agency had the human resource and logistics capacity to execute this mandate. He, however, reported that the inability of the EPA to decentralise all of its operations to the district level sometimes stretches their human and logistics capacity to effectively manage the risks and hazards people were exposed to in the region. Thus, the operational structure of the EPA was constraining its effectiveness in managing OHSE risks and hazards.

From the study, the EPA paid quarterly monitoring visits to TOPP to assess the state of occupational health and environmental safety in the company. As a result, quarterly reports on OHSEM were generated on TOPP. The reports were fed into the EPA online safety system for analysis. The analysis showed the extent of deviation or conformity to the expected safety standard from TOPP. Information from such analysis were used to determine the decision on the environmental renewal license for TOPP. Thus, TOPP was made to prepare annual environmental management plans subject to the approval or renewal by the EPA. Accordingly, the performance of the company from the previous year determined the decision for renewal or revocation of its environmental license.

This showed that the legal backing and mandate given to the EPA empowered it to institute checks and controls to ensure enforcement of environmental standards and regulations at TOPP. The result further confirmed the earlier finding that capacity building should be complemented by some levels of authority and controls to compel stakeholders to abide by occupational and environmental standards. As part of the process of building the capacity of TOPP to ensure occupational and environmental safety, the EPA provided regular training for the safety department of the company. The aim was to empower the internal structures of TOPP to provide daily monitoring activities over occupational and environmental safety standards. This was in consonance with the assertion of Subramaniam (2007) that establishing multiple stages of monitoring and evaluating occupational and environmental safety standards is necessary to ensure effective control system for stakeholders to abide by the set standards and regulations.

The study further assessed the views of the various stakeholders on their capacity to manage the risks and hazards they are exposed to in ensuring OHSEM. The remaining part of the chapter was organised under the views of community residents, out-grower/smallholder farmers, and unionised workers.

Community residents

This section assessed the capacity of the community residents in managing risks and hazards they were exposed to through the activities of TOPP. Some of the issues considered under the section were buying protective clothes for farm to avoid contamination, identifying buffers created around TOPP farms to avoid chemical contamination, and avoiding going to farms during the spraying days of TOPP. The results are presented in Table 9. Table 9 shows that the majority (56.3%) of the community residents described their capacity to buy protective gears for farms to avoid physical contamination as high. The results showed that the majority of the sampled community respondents had the capacity to secure protective clothes to prevent their exposure to the hazards and risks associated with the operations of TOPP. However, the study found that many of the community residents were using long sleeve shirts and trousers as their protective clothes instead of proper overall gowns with relatively heavy fabric for proper protection. Thus, the use of trousers and shirts could expose certain parts of their bodies to contamination on their skins. This could partly explain the complaints of skin diseases in the communities following the application of chemicals on the farms of TOPP. Further, the 43.7 per cent of the community residents with low capacity to secure proper protective clothes for farms was quite significant. This could

increase the risks community residents were exposed to through the activities of TOPP. According to the European Agency for Safety and Health at Work (2007), improvisation of safety gears could sometimes be risky as they could fail at any point in time thereby exposing people to the hazards associated with their operations.

Another issue considered under this section was the capacity, that is, lack of knowledge of the community residents to read or identify the buffer zones around the farms of TOPP to avoid accidental contamination and pollution (see Table 9). From Table 9, 44.9 per cent of the community residents reported having high capacity of identifying the buffers around the farms of TOPP to avoid accidental contact with the chemicals applied on the farms. The results showed that many of the community residents were unable to read the warning signs or identify the buffer zones established between the farms of TOPP and community lands. This was likely to accidentally expose some community members to the hazards associated with the operations of TOPP. Carter (2013) indicated that one of the main functions for the establishment of buffer zones was to prevent people from accidentally getting into contact with hazards associated with the operations of a business entity, and as a result, clear and visible demarcations should be made to prevent unsuspecting people from exposing themselves to the dangers. Carter (2013) also suggested that extensive education is required within the catchment areas of businesses about the buffer demarcation to enhance the functionality of buffer zones in communities.

Table 9: Capacity of community residents in managing risks and hazards they are exposed to through the activities of TOPP

OHSE practices	VH (%)	H (%)	DK (%)	L (%)	VL (%)	Total (%)
Buy protective clothes to farms to avoid contamination	16.4	27.3	-	44.2	12.1	100.0
Identify buffers around TOPP farms to avoid chemical pollution	18.8	26.1	7.2	30.3	17.6	100.0
Avoid going to farm during the spaying days of TOPP	11.5	24.2	-	38.8	25.5	100.0
Stop drinking from streams some day after TOPP's spraying exercise	24.2	39.4	-	25.5	10.9	100.0
Stop eating fish from streams some days after TOPP's spraying exercise	41.2	58.8	-	-	-	100.0

Source: Field survey (2017)
n = 165
Key: VH = Very High, H = High, DK = Don't Know, L = Low, VL = Very low

Table 9 further shows that the majority (64.3%) of the community residents indicated that they had no knowledge to avoid going to their farms during the spraying days of TOPP to escape getting exposed to the chemicals of the company. From the results, the majority of the community residents could not stay away from their farms during the application of chemicals on the oil palm plantation of TOPP to avoid getting exposed to chemicals. This was partly attributed to the subsistence nature of the farming practice adopted by the community residents as well as the long number of days used by TOPP to apply chemicals on its farms. In other words, the community residents were unable to fetch or store much farm produce in their houses to feed themselves and their families over some number of days. As a result, they were compelled to attend

to their farms to fetch more foodstuffs to feed themselves. In addition, some of the farmers reported that some stages in the farming process required daily attention which could not be obscured by the activities of TOPP. This could increase the risk and exposure of the community residents to chemical pollutions from TOPP. The situation could, however, be minimised if the buffer zone was large, secured and adhered to by the community residents as described by Butler-Dawson (2015) that a well-engineered buffer zone contributes significantly to prevent pollutants from factories to get into the adjourning communities.

The study inquired from the community residents about their alternative sources of water after TOPP had embarked on its spraying program. Results from Table 9 show that the majority (63.6%) of the community residents reported having the knowledge to avoid drinking from streams for some days following the application of chemicals by TOPP on their farms. The community residents who had the capacity to avoid drinking from streams during the spraying exercise of TOPP were those with alternative sources of water such as boreholes, hand-dug wells, and pipe-borne water in their communities. However, communities without alternative sources of water had their residents reporting of not having the capacity to avoid drinking from streams to avoid possible contamination from chemical pollutants from the activities of TOPP. This suggested that the provision of alternative sources of water could boost the capacity of some of the communities to effectively manage the risks and hazards associated with the operations of TOPP.

From Table 9, all the respondents admitted to having the ability to avoid eating fish from the streams for some days following the application of

chemicals on the farms of TOPP to prevent their possible exposure to chemical pollutants. This was because most of the community residents did not depend on the local streams for their fish requirements.

Out-grower/smallholder farmers

This section focuses on the capacity of the out-grower/smallholder farmers in managing the risks and hazards associated with their activities. This was important because many risks are associated with their activities. Some of the issues considered under the section were putting on protective gears during spraying to prevent contamination, ability to detect original and approved chemicals, and capacity to store chemicals away from children in the house. The results are presented in Table 10.

From Table 10, the majority (67.2%) of the out-growers reported having knowledge to secure protective gears during the spraying of their farms. The results show that the majority of the smallholder farmers had the capacity to protect themselves from chemical pollutants during the application of chemicals on their farms. From the study, some of the farmers with low capacity to wear protective gears during the spraying of chemicals on their farms attributed it to the relatively small size of their farms which required few bottles of agro-chemicals, while others reported not feeling comfortable in the protective clothes. This suggested that some of the out-growers had not fully appreciated the risks and dangers associated with the handling and use of agro-chemicals.

Table 10: Capacity of out-grower/smallholder farmers in managing risks and hazards they are exposed to

OHSE practices	VH (%)	H (%)	DK (%)	L (%)	VL (%)	Total (%)
Secure protective gears during spraying to avoid contamination	23.0	44.2	3.7	21.2	7.9	100.0
Ability to detect original and approved chemicals	15.2	37.0	13.3	24.2	10.3	100.0
Safe disposal of chemical containers	18.2	40.6	9.1	21.2	10.9	100.0
Storing chemicals away from children in the house	21.2	39.4	-	24.8	14.5	100.0

Source: Field survey (2017)
n = 165
Key: VH = Very High, H = High, DK = Don't Know, L = Low, VL = Very low

The respondents were also asked to indicate their capacity to detect original and approved chemicals on the market. This was necessary because the approved and original chemicals had undergone field trials to ascertain their impact and hazardous elements in them as well as how one could manage such hazards. Results from Table 10 show that a little over half (52.2%) of the smallholder farmers indicated that they had the ability to detect original and approved chemicals. Even though most of the out-growers claimed to have the capacity to identify original chemicals, the proportion who could not make such distinction was quite significant. This could expose such farmers to additional risks and hazards associated with the use of agro-chemicals. The study, however, found that some of the out-growers who claimed to have the knowledge or experience to identify original chemicals relied on the trust and confidence they had in the sellers of the agro-chemicals to give them original products. In the situation where the agro-chemical sellers sold fake products to

such smallholder farmers, they could also experience higher risks and hazards with their use.

Another issue considered under the section was the capacity of the smallholder farmers to dispose of their chemical containers safely. The study found that the majority (58.8%) reported to have the knowledge to safely dispose chemical containers off after their usage. From the study, some of the safe modes, described by the out-growers, for disposing of chemical containers after applying chemicals on farms were throwing them on refuse dumps, burning and leaving them on the farms. These showed that some of the methods considered to be safe modes of disposing of chemical containers were indeed unsafe if not handled properly. For instance, the burning of the chemical containers could be very hazardous when some of the chemicals are left in them. It is also hazardous when the person burning the containers and people within the adjourning farms were not properly protected since the aerosolised elements in the chemicals and the containers could be harmful to people, especially children. Others also disposed of the containers by washing them and using them to fetch water in the house. The results show that much education was required in the appropriate means of disposing of chemical containers after use.

According to the 2011 pest management plan by the Ministry of Food and Agriculture, the management of pesticides containers is under the responsibility of resellers and farmers because of the retail system. The idea was to promote after-usage sale of pesticides containers for reuse. However, the response has been slow leading to the situation where many farmers have to make their own decisions as to how to handle pesticide containers. However, with big commercial farms, management of the containers are expected to be

clearly stated in the environmental management plans to the EPA for approval. This shows that the focus on the management of pesticide containers has largely been on the large scale commercial farms.

The out-growers were further requested to indicate their capacity to store chemicals away from children in the house. This was important as any negligence on the part of farmers could expose their entire household to risks and hazards. Table 10 shows that the majority (60.6%) of the smallholder farmers reported to have high capacity to store chemicals away from their children in the house. Some of the methods for storing chemicals away from children were keeping them in a separate room under lock, keeping them under beds without the knowledge of children, keeping them on top of huts where children could not reach, sending chemicals straight to the farms, and keeping them in the room with strict warning to children not to touch them. The above showed that some of the perceived safe modes of storing chemicals away from children could pose serious risk implications to the entire household of smallholder farmers. The results showed that proper education was required among out-growers on safe storage of agro-chemicals away from children in the house.

Unionised workers of TOPP

This section assessed the capacity of the unionised workers of TOPP in managing risks and hazards associated with their operations. Some of the issues considered under the section were using safety gears in operations, engaging management for improved OHSEM, and repairing faulty equipment before use. From Table 11, all the sampled unionised workers of TOPP reported to be

having the skill to use safety gears in operations. This was attributed to the strict safety procedures employees had to adhere to in their lines of duty as well as the constant monitoring from safety stewards and safety marshals. This suggested that frequent monitoring and sanction systems compelled people to abide by safety measures and guidelines, which made it simple to manage risks and hazards associated with business operations.

Table 11: Capacity of unionised workers of TOPP in managing risks and hazards they are exposed to

OHSE practices	VH (%)	H (%)	DK (%)	L (%)	VL (%)	Total (%)
Using safety gears in operations	40.6	59.4	-	-	-	100.0
Engage management for improved OHSEM	33.3	44.8	6.1	15.8	-	100.0
Repair faulty equipment before use	46.7	53.3	-	-	-	100.0
Detect hazards and risks associated with operations	42.4	57.6	-	-	-	100.0

Source: Field survey (2017)
n = 43
Key: VH = Very High, H = High, DK = Don't Know, L = Low, VL = Very low

The unionised workers of TOPP were also requested to indicate their capacity to engage the management of the company for improved OHSEM. The results, as presented in Table 11, showed that the majority (78.1%) of the respondents indicated to be having high capacity to engage the management of the company for improved OHSEM. The results showed that the majority of the unionised workers had access to a common platform to engage management for effective management of hazards and risks. This was partly attributed to the commitment of management towards occupational health and safety of workers.

The representative of EPA also added that the commitment of the management of TOPP towards occupational and environmental safety was due to their international certification and licensing to sell their products on the international market.

Another issue considered under the section was the capacity of the unionised workers of TOPP to repair faulty equipment before use. From the study, all the sampled unionised workers of TOPP indicated that they had the skill to repair faulty equipment before using them in their operations. In addition, all the respondents under the section admitted to have the capacity to detect hazards and risks associated with their operations. This was largely attributed to the safety training programmes workers were routinely taken through by the management of the company. Thus, training stakeholders in hazard management helped to build their capacities to effectively manage hazards and risks in their activities. This corroborates the assertion of Blattberg (2004) that training is central in the process of building the capacities of people to take charge of their environment.

Chapter summary

The study found that the out-grower/ smallholder farmers were more exposed to OHSE risks especially with respect to Personal Protective Equipment (PPE) during spraying on the farms than the community residents and unionised workers. This was because the EPA and the management of TOPP could not monitor the activities of the out-grower/smallholder farmers to ensure their compliance to best practices in the application of chemicals on the farms. With respect to OHSE practices adopted to ensure safe working environment, the

unionised workers had the highest level of protection against OHSE risks than workers of the smallholders/outgrowers. This was due to the direct control of management of the company over the activities of the workers. The management of TOPP had the capacity to manage the OHSE risks associated with their activities.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter presents a summary of the major findings and the overall conclusion of the study. The study sought to assess the effectiveness of OHSEM practices at TOPP in the Twifo Hemang-Lower Denkyira District. The study was guided by the domino, danger factor, stakeholder, and green theories. A mixed method research design was adopted for the study. A total of 377 respondents were sampled from a population of 19,657. The chapter also makes recommendations on measures to improve OHSEM practices at TOPP.

Summary

The main findings of the study are:

1. Stakeholders were exposed to varying degrees of OSHE risks in TOPP operational area. Out-growers/smallholder farmers and community residents experienced burning of the eyes during the application of chemicals, increased skin diseases and respiratory difficulties during and after spraying on the farms of TOPP. The unionised workers were also exposed to snake bites, cuts resulting from the use of Malaysian knives for harvesting palm fruits, and harvesting palm fruits close to high tension poles on the farms. Others were slippery floors resulting from oil spillages, bee stings, and contaminated air from various activities of the company such as application of chemicals, and smoke from its furnaces.
2. TOPP had created avenues for people to lodge complaints, organises safety training programmes for their staff and exposed farmers to best

practices such as providing staff with PPE's to reduce OHSE risks associated with their activities.

3. TOPP had empowered workers to fill hazard spotting forms anytime they identify hazards in their operations, Safety stewards made follow up on the descriptions on the hazard spotting form to either address the situation or advice management and staff on the issue. Thus, the ability of workers to independently identify hazards and risks associated with their operations was considered as a form of capacity building. Out-growers reported to have high capacity to safely dispose of chemical containers after their usage. Some of the safe modes for disposing of chemical containers were throwing them on refuse dumps, burning, and leaving them on the farms.

Conclusions

All occupational health, safety and environmental programmes aim to foster is a safe work environment, including the protection of employers, employees, nearby communities, and other members of the public who could be affected by a company's operations. Thus, business organisations are not only responsible for their workers but the community at large. The study concludes that the out-grower/smallholder farmers were more exposed to OHSE risks than the community residents and unionised workers because of the weak monitoring system by EPA and TOPP to control the use of chemicals among smallholder farmers.

All the three categories of respondents had adopted a number of practices to reduce their exposure to the contaminants from the application of

chemicals. However, some of the practices, such as burning of pesticide containers and improvising long sleeve shirts and trousers as PPEs were not effective in providing complete protection. As a result, some of the respondents experienced symptoms of getting contaminated with chemicals.

The study concludes that staff of TOPP had higher capacity than the other stakeholders in managing hazards and risks because of the direct control and strict supervision management of TOPP had over its internal operations as against the activities of smallholder farmers and community residents.

Recommendations

Based on the findings and conclusions the following recommendations are made to improve the effectiveness of the OHSEM practices of TOPP among all stakeholders.

1. The study suggests that TOPP should continue to build strong linkages with the various stakeholders to ensure free flow of information to effectively manage the hazards and risks associated with their operations.
2. The study further recommends that the Management of TOPP should as part of its informational sharing and training programmes on the radio inform community residents about the company's spraying schedules on the farms.
3. It is recommended that the unionised workers should educate its members about the need to keep to the standard safety protocols during the application of chemicals on the farms to reduce the OHSE risks associated with their activities. Safety Marshalls should also ensure workers do not remove their safety gadgets on the farm after chemical applications.

4. The study recommends that the Management of TOPP through the extension officers should connect the out-growers to pesticides containers reuse companies as described in the pesticides management plan of Ghana. This will help to reduce the hazards and risks associated with the management of chemical containers within the operational areas of TOPP.

Suggestion for further studies

The study suggests that further studies should assess the factors influencing the OHSE hazards and risks associated with the operations of TOPP.

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INTERVIEW GUIDE FOR THE MANAGEMENT OF TOPP

Dear Sir/Madam,

This interview guide is designed to assess occupational health, safety and environmental (OHSE) practices at the Twifo Oil Palm Plantation. It aims at examining the OHSE risks employees and community residents are exposed to through the operations of TOPP, OHSE practices adopted by TOPP to ensure safe working environment for both employees and community residents, level of compliance of stakeholders to the OHSE practices of TOPP, and challenges management encounters in the implementation of OHSE practices at TOPP. This is in partial fulfilment for the award of a Master of Philosophy degree at the University of Cape Coast. As a result, any information given will be treated with utmost confidentiality.

Thank you

Section A: OHSE risks employees and community residents are exposed to through the operations of TOPP

1. What OHSE risks are employees of TOPP exposed to?
2. What OHSE risks are communities around TOPP exposed to?
3. What OHSE risks are the out-growers of TOPP exposed to?
4. How did you identify the risks associated with the operations of employees?
5. How did you identify the risks associated with the community residents?
6. How often do you conduct risk assessment in your operations?
7. At what period in the production processes do you do risk assessment?
8. What hazards are employees exposed to in their operations?
9. What hazards are the communities exposed through the operations of TOPP?

10. Who are the stakeholders involved in the company's risk assessment?
11. Please explain the risk assessment process of the company
12. How often do you encounter injuries in your organisation?
13. What forms are injuries are recorded in your operations?
14. What do you think are the causes of such injuries?

Section B: OHSE practices adopted by TOPP to ensure safe working environment for both employees and community residents,

15. How do you monitor the operational hazards and risks to guarantee OHSE?
16. What practices have been established by the company to ensure OHSE at the workplace?
17. What practices have been established by the company to ensure OHSE among the out-growers?
18. What practices have been established by the company to ensure OHSE in the communities surrounding the operations of the company?

Section C: Level of compliance of stakeholders to the OHSE practices of TOPP

19. What measures have the company instituted to ensure the compliance of workers to the OHSE practices?
20. What measures have the company instituted to ensure the compliance of out-growers to the OHSE practices?
21. What measures have the company instituted to ensure the compliance of community residents to the OHSE practices?
22. How do you see the commitment of stakeholders in ensuring compliance of OHSE practices established by the company?

23. How does the company handle stakeholders who do not comply with the OHSE practices?

Section D: Challenges management encounters in the implementation of OHSE practices at TOPP

24. What challenges does the company encounter with the workers at TOPP in the implementation of OHSE practices?
25. What challenges does the company encounter with the out-growers in the implementation of OHSE practices?
26. What challenges does the company encounter with the communities in the implementation of OHSE practices?
27. How is the company managing these challenges?
28. Any addition information

Thank you

INTERVIEW GUIDE FOR EPA

Dear Sir/Madam,

This interview guide is designed to assess occupational health, safety and environmental (OHSE) practices at the Twifo Oil Palm Plantation. It aims at examining the OHSE risks employees and community residents are exposed to through the operations of TOPP, OHSE practices adopted by TOPP to ensure safe working environment for both employees and community residents, level of compliance of stakeholders to the OHSE practices of TOPP, and challenges management encounters in the implementation of OHSE practices at TOPP. This is in partial fulfilment for the award of a Master of Philosophy degree at the University of Cape Coast. As a result, any information given will be treated with utmost confidentiality.

Thank you

1. How would you describe the operations of TOPP in relation to OHSE practices?
2. What are the roles of the EPA in ensuring OHSE in the operations of TOPP?
3. How do you monitor the operations of TOPP to ensure OHSE for workers of TOPP?
4. How do you monitor the operations of TOPP to ensure OHSE for communities within the catchment area of TOPP?
5. How would you describe the compliance levels of TOPP to OHSE standards in their operations?

6. What are the risks and hazards workers and communities are exposed to in the operations of TOPP?
7. What sanctions and rewards are available to the EPA to compel TOPP to comply with OHSE practices?
8. What challenges do you encounter in your monitoring activities over the operations of TOPP?
9. How do you think such challenges could be addressed?
10. Any additional information?

Thank you

INTERVIEW SCHEDULE FOR COMMUNITY RESIDENTS

Dear Sir/Madam,

This interview guide is designed to assess occupational health, safety and environmental (OHSE) practices at the Twifo Oil Palm Plantation. It aims at examining the OHSE risks community residents are exposed to through the operations of TOPP, OHSE practices adopted by TOPP to ensure safe working environment for community residents, level of awareness and perception of community residents on OHSE practices implemented by TOPP, level of compliance of stakeholders to the OHSE practices of TOPP, and challenges community residents encounter in the implementation of OHSE practices at TOPP. This is in partial fulfilment for the award of a Master of Philosophy degree at the University of Cape Coast. As a result, any information given will be treated with utmost confidentiality.

Thank you

Section A: Background characteristics of respondents

1. Sex: [1] Male [2] Female
2. Level of education: [1] None [2] Basic [3] SHS [4] Tertiary
3. Type of occupation: [1] Farming [2] Artisanry [3] Civil service [4] Others …….
4. If crop farming, types of crops: [1] Vegetables [2] Legumes [3] Grains [4] Tubers [5] Tree crops [6] Others ……

Section B: OHSE risks community residents are exposed to through the operations of TOPP

5. How do you agree to the following as OHSE risks community residents are exposed to? Using 1 = strongly agree, 2 = agree, 3 = don't know, 4 = disagree, 5 = strongly disagree

OHSE risks	**1**	**2**	**3**	**4**	**5**
Increased skin diseases after spraying					
Respiratory difficulties during spraying					
Burning of eyes during spraying					
Increased birth defects in community					
Increased death of livestock					
Destruction of farm crops after straying					
Driving pests to individual farms					
Chemical pollution of water bodies					
Indiscriminate disposal of pesticide containers					

Section C: OHSE practices adopted by TOPP to ensure safe working environment for community residents

6. How do you agree to the following as OHSE practices adopted by TOPP to ensure safe working environment for community residents? Using 1 = strongly agree, 2 = agree, 3 = don't know, 4 = disagree, 5 = strongly disagree

OHSE practices	**1**	**2**	**3**	**4**	**5**
Educate communities on safety mechanisms					
Inform communities before spraying					

Provided alternative sources of water					
Created avenues for people to lodge complaints					
Created buffers between farms and communities					
Provided medical aid to residents experiencing symptoms of chemical pollution					
Having common time table for out-growers in various communities to do spraying					

Section D: Level of awareness and perception of community residents on the OHSE practices implemented by TOPP

7. How do you perceive the following about the OHSE practices implemented by TOPP? Using 1 = very effective, 2 = effective, 3 = don't know, 4 = less effective, 5 = least effective

Perceptions	**1**	**2**	**3**	**4**	**5**
Community education services					
Practices to avoid water pollution					
Practices to avoid air pollution					
Medical aid for residents affected by the activities of TOPP					
Timeliness of response to community complaints					

8. To what extent are you made aware anytime TOPP is going to embark on mass spraying of its farms? [1] Always [2] Sometimes [3] Never
9. What medium is used to inform community members about spraying exercises by TOPP? [1] Radio [2] Information vans [3] Community gathering [4] Community leaders [5] Others ……

10. Awareness of buffer areas around farms to avoid contamination and pollution to people? [1] Yes [2] No

Section E: Level of compliance of stakeholders to the OHSE practices of TOPP

11. To what extent do you comply with the OHSE guidelines to ensure safe working environment for all? Using 1 = very high, 2 = high, 3 = don't know, 4 = low, 5 = very low

Issues of compliance	**1**	**2**	**3**	**4**	**5**
Wearing protective clothes to farms to avoid contamination					
Respecting buffers around TOPP farms to avoid chemical pollution					
Not going to farm during the spraying days of TOPP					
Stop drinking from streams some days after TOPP's spraying exercise					
Stop eating fish from streams some days after TOPP's spraying exercise					

Section F: Challenges community residents encounter in the implementation of OHSE practices at TOPP

12. To what extent do the following issues pose challenge to community residents in the implementation of OHSE practices at TOPP? Using 1 = very high, 2 = high, 3 = don't know, 4 = low, 5 = very low

Challenges	**1**	**2**	**3**	**4**	**5**
Low commitment by TOPP in addressing community issues					
Poor information circulation to prevent accidents					

Excessive pollution to water bodies					
Unable to drink from streams					
Experiencing symptoms related to chemical pollution from the activities of TOPP					

13. How do you think such challenges could be addressed?

……

……

14. Any additional information:

……

……

Thank you

INTERVIEW SCHEDULE FOR OUT-GROWERS/SMALLHODERS

Dear Sir/Madam,

This interview guide is designed to assess occupational health, safety and environmental (OHSE) practices at the Twifo Oil Palm Plantation. It aims at examining the OHSE risks out-growers are exposed to through the operations of TOPP, OHSE practices adopted by TOPP to ensure safe working environment for out-growers, level of compliance of stakeholders to the OHSE practices of TOPP, and challenges out-growers encounter in the implementation of OHSE practices at TOPP. This is in partial fulfilment for the award of a Master of Philosophy degree at the University of Cape Coast. As a result, any information given will be treated with utmost confidentiality.

Section A: Background characteristics of respondents

1. Sex: [1] Male [2] Female
2. Level of education: [1] None [2] Basic [3] SHS [4] Tertiary
3. Size of oil palm plantation: [1] 5 acres and below [2] 6 – 10 acres [3] 11 – 15 acres [4] 16 – 20 acres [5] Above 20 acres
4. Average annual income obtained from the farm: [1] GH¢5000 and below [2] GH¢5001 – 10000 [3] GH¢10001 – 15000 [4] GH¢15001 – 20000 [5] Above GH¢20000
5. Ownership status of farm: [1] Self-owned [2] Family [3] Contract
6. Number of times of spraying farm in a year: ……

Section B: OHSE risks out-growers are exposed to through the operations of TOPP

7. How do you agree to the following as OHSE risks out-growers are exposed to? Using 1 = strongly agree, 2 = agree, 3 = don't know, 4 = disagree, 5 = strongly disagree

OHSE risks	**1**	**2**	**3**	**4**	**5**
Increased skin diseases after spraying					
Respiratory difficulties during spraying					
Burning of eyes during spraying					
Increased birth defects among out-growers					
Increased death of livestock					
Chemical pollution of water bodies					
Causing contamination to food and other household items					

Section C: OHSE practices adopted by TOPP to ensure safe working environment for out-growers

15. How do you agree to the following as OHSE practices adopted by TOPP to ensure safe working environment for out-growers? Using 1 = strongly agree, 2 = agree, 3 = don't know, 4 = disagree, 5 = strongly disagree

OHSE practices	**1**	**2**	**3**	**4**	**5**
Organise safety training programs for out-growers					
Provide safety equipment for out-growers					
Provide technical assistance to out-growers on farm management					

Established operational guidelines for out-growers					
Having common time table for out-growers in various communities to do spraying					
Created platform for out-growers to interact with management to address operational challenges					

Section D: Level of compliance of stakeholders to the OHSE practices of TOPP

16. To what extent do you comply with the OHSE guidelines to ensure safe working environment for all? Using 1 = very high, 2 = high, 3 = don't know, 4 = low, 5 = very low

Issues of compliance	**1**	**2**	**3**	**4**	**5**
Wearing protective clothes during spraying to avoid contamination					
Avoid spraying close to water bodies					
Using only approved chemicals to spray farms					
Thorough washing of safety clothes and boots before sending them home					
Bathing with soap before having direct contact with family members after handling chemicals on farms					

17. Which of the following safety gadgets do you use when applying chemicals to your farm? [1] Goggles [2] Safety boots [3] Overalls [4] Gloves [5] Hats [6] Nose masks [7] Others …….
18. If you don't use all, why? [1] Not aware [2] Not available [3] Cannot afford [4] Others …….
19. How will you describe the state of the safety gadgets? [1] Very good [2] Good [3] Don't know [4] Poor [5] Very poor

20. How do you dispose of your chemical containers after applying chemicals on farm? [1] Refuse dump [2] Burn them [3] Burry them [4] Leave them on farms [5] Bring them home [6] Others ……..
21. Where do you store chemicals before spraying them on farm? [1] Home [2] Farm [3] Others
22. If home, which part of the house do you store the chemicals? [1] Bedroom [2] Kitchen [3] Unused building [4] Others ……..

Section E: Challenges out-growers encounter in the implementation of OHSE practices at TOPP

23. To what extent do the following issues pose challenge to out-growers in the implementation of OHSE practices at TOPP? Using 1 = very high, 2 = high, 3 = don't know, 4 = low, 5 = very low

Challenges	**1**	**2**	**3**	**4**	**5**
Experience symptoms related to chemical pollution					
Non-availability of safety gears in community					
High cost of purchasing safety gears					
Family members occasionally showing signs of chemical pollution					
Low level of education on how to handle chemicals					

24. How do you think such challenges could be addressed?

……

……

25. Any additional information:

……

Thank you

INTERVIEW SCHEDULE FOR UNIONISED WORKERS OF TOPP

Dear Sir/Madam,

This interview guide is designed to assess occupational health, safety and environmental (OHSE) practices at the Twifo Oil Palm Plantation. It aims at examining the OHSE risks unionised workers are exposed to through the operations of TOPP, OHSE practices adopted by TOPP to ensure safe working environment for unionised workers, level of awareness and perception of unionised workers on OHSE practices implemented by TOPP, level of compliance of stakeholders to the OHSE practices of TOPP, and challenges unionised workers encounter in the implementation of OHSE practices at TOPP. This is in partial fulfilment for the award of a Master of Philosophy degree at the University of Cape Coast. As a result, any information given will be treated with utmost confidentiality.

Section A: Background characteristics of respondents

1. Sex: [1] Male [2] Female
2. Level of education: [1] None [2] Basic [3] SHS [4] Tertiary
3. Staff category: [1] Junior staff [2] Senior staff [3] Management

Section B: OHSE risks employees are exposed to

4. How do you agree to the following as OHSE risks employees are exposed to? Using 1 = strongly agree, 2 = agree, 3 = don't know, 4 = disagree, 5 = strongly disagree

OHSE risks	**1**	**2**	**3**	**4**	**5**
Increased skin diseases after spraying					

Respiratory difficulties during spraying					
Burning of eyes during spraying					
Tractor rollovers					
Faulty machines causing injuries					
Poor state of safety gadgets					

Section C: OHSE practices adopted by TOPP to ensure safe working environment for employees

5. How do you agree to the following as OHSE practices adopted by TOPP to ensure safe working environment for employees? Using 1 = strongly agree, 2 = agree, 3 = don't know, 4 = disagree, 5 = strongly disagree

OHSE practices	**1**	**2**	**3**	**4**	**5**
Training employees on safety practices					
Providing safety gears for employees					
Having routing maintenance of equipment					
Providing prompt medical services to employees					
Creating buffers between TOPP's operations and communities to avoid contamination					
Employing machinery in more risky areas					

Section D: Level of awareness and perception of employees on the OHSE practices implemented by TOPP

6. How do you perceive the following about the OHSE practices implemented by TOPP? Using 1 = very effective, 2 = effective, 3 = don't know, 4 = less effective, 5 = least effective

Perceptions	**1**	**2**	**3**	**4**	**5**

Training programmes organised for employees					
Safety gears provided for employees					
Maintenance plan for preventing accidents					
Buffer areas in preventing contamination					

Section E: Level of compliance of stakeholders to the OHSE practices of TOPP

7. To what extent do you comply with the OHSE guidelines to ensure safe working environment for all? Using 1 = very high, 2 = high, 3 = don't know, 4 = low, 5 = very low

Issues of compliance	**1**	**2**	**3**	**4**	**5**
Using safety gears in operations					
Respecting buffers around TOPP farms					
Changing working cloths before going home					
Ensuring environmental safety in your operations					

Section F: Challenges employees encounter in the implementation of OHSE practices at TOPP

8. To what extent do the following issues pose challenge to employees in the implementation of OHSE practices at TOPP? Using 1 = very high, 2 = high, 3 = don't know, 4 = low, 5 = very low

Challenges	**1**	**2**	**3**	**4**	**5**
Low commitment of management in ensuring safe working environment					
Poor condition of safety gears					
Poor supervision					

No clear policy on OHSE					
Experience symptoms related to chemical pollution					

9. How do you think such challenges could be addressed?

……

……

10. Any additional information:

……

……

Thank you

FOCUS GROUP DISCUSSION

This focus group discussion guide is designed to assess occupational health, safety and environmental (OHSE) practices at the Twifo Oil Palm Plantation. It aims at examining the OHSE risks out-growers are exposed to through the operations of TOPP, OHSE practices adopted by TOPP to ensure safe working environment for out-growers, level of compliance of stakeholders to the OHSE practices of TOPP, and challenges out-growers encounter in the implementation of OHSE practices at TOPP. This is in partial fulfilment for the award of a Master of Philosophy degree at the University of Cape Coast. As a result, any information given will be treated with utmost confidentiality.

1. What constitute best practices for managing pesticides containers after chemical application?
2. What platform(s) have been created by the management of TOPP to engage community members and out-growers?
3. What do you use such platforms for?
4. Why do some people in the community still use water from the streams when the community has been provided with borehole?
5. How do you determine that the water bodies have been chemically polluted?
6. What do you do when you suspect the water body has been polluted?
7. How do you determine that your farms have been affected by the chemical applications of TOPP?
8. What do you do when you suspect your farms have been affected by the chemical applications of TOPP?

Thank you.