

The Pesticides Law and the Attitudes of Pesticides Dealers in the Northern Region of Ghana: Implications for Environmental Security and Human Health

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Abstract

The efforts of Ghana at enhancing its food security through increased and sustained Agriculture production has resulted in the increasing use of pesticides since the 1960s. Knowing very well of the environmental and human health impacts of pesticides, the government of Ghana through the EPA enacted the pesticides law *ie* Part II of the EPA Act (1994, Act 490) to regulate the handling and the use of pesticides in Ghana so as to minimize its negative impacts on the environment and human health. Within the framework of the pesticides law, the EPA in collaboration with strategic stakeholders in the pesticides industry has over the years organized series of training for pesticides dealers throughout the country to equip them with the technical knowledge on the proper handling of pesticides. The purpose of this paper was therefore, to interact with 106 purposively selected trained pesticides dealers in 16 districts of the northern region to ascertain how they are handling pesticides giving due cognizance to their environmental and human health impacts. It revealed that majority of the dealers (81%) had complied with the minimum distance requirement of 10m to 15m to environmentally sensitive areas such as water bodies, play grounds and food vending points. However, with regards to the possibility of run off from the sites contaminating surface water, 63% of the dealers did not comply as their shops were located upstream of surface water bodies without any provisions for spill containment. The paper concludes that Pesticides dealers in the northern region do not handle pesticides according industry best practice and this has the potential to endanger environmental security and human health. The regulatory authorities therefore, have to be empowered to enforce the law on pesticides to the letter.

Keywords: Pesticides Law, Pesticides Dealers, Attitudes, Human Health and Environmental Security

1.0 Introduction

A pesticide is any substance or a combination of substances used to kill or control a pest. A pesticide may be a chemical substance, biological agent (such as a virus or bacteria), antimicrobial disinfectant or device used against any pest.

According to the Pesticides Management and Control Act of Ghana (Act 528) 1996 and Part II of the EPA Act, 1994 (Act 490) a pesticide means; A substance or mixture of substances intended for preventing, repelling or reducing the destructive effects of any pest or a substance or a mixture of substances intended for use as a plant growth regulator, defoliant or desiccants or wood preservative

Pesticides are used for both agricultural and non-agricultural purposes. However, in most jurisdictions, the world over, agriculture accounts for the larger percentage of the total pesticides use. In the US for instance, the Agriculture market alone consumes about 75% of the pesticides sold, followed by industry 18% and home and garden 7% (US Department of Agriculture, 1988).

History provides innumerable examples of mass destruction of crops by diseases and insects. In the period from 1845 to 1851, there was potato famine in Ireland as a result of a massive infection of potatoes by a fungus, *Phytophthora infestance*, now known as *late blight*. This resulted in the loss of about a million lives and mass migration from Ireland. Also, in 1930, 30% of the US wheat crop was lost to stem rust, the same disease that destroyed 3million tons of wheat in Western Canada. In 1988, wheat streak mosaic reduced Kansas wheat production by 13% (US department for Agriculture, 1988).

Thanks to modern development in chemical technology, these debilitating diseases can now be handily controlled by the use of pesticides resulting in increases of agricultural production. It is reported that, cocoa production in Ghana, the largest exporter in the world had trebled and Pakistan sugar was increased by 30% by the use of insecticides. The Food and Agriculture Organisation (FAO) has estimated that 50% of cotton

production in developing countries would be lost without the use of pesticides. According to the U.S. Environmental Protection Agency (EPA), pesticides remain the first line of defence in pest control when crop losses become economic and they remain the only answer to a severe pest outbreak or emergency (Simon J. Yu, 2014).

Apart from increase in Agriculture production, which is a boon not only to the farmer, but to the consumer and the larger society as a whole, pesticides use goes with other benefits such as cost and energy saving, protection of human health from disease carrying organisms, suppression of nuisance causing pests and the protection of other organisms including endangered species. The use of herbicides for example has resulted in a dramatic reduction on labour from around 10% to 12% of the population in developed countries such as the U.S. to the current 2%. It is estimated that more energy is expended on the weeding of crops than any other single human task and that our today's crop fields would quickly be perpetuating of weeds, but for the use of herbicides (Holm L., 1971).

Under minimum tillage farming practice in which farmers try to reduce ploughing in order to save energy and conserve soil, pesticides (insecticides and herbicides) play a significant role as the weed and crop stubble provide a new source of weed seed and harborage of insects. The use of pesticides to control the weeds and the insects requires about 80% less energy than mechanical control. Pesticides thus form the cornerstone of minimum tillage (Holm L., 1971).

The benefits of pesticides notwithstanding, they are still considered as organic pollutants exerting heavy burden on human health and the ecological integrity of our environment. The effects of pesticides on non-target organisms in particular and the environment in general, have been a worldwide contention since the early 70s with Rachael Carson in the fore front with her famous book, "Silent Spring". These agitations formed the basis for most legislation intended to control or prohibit the use of specific pesticides. The most readily identified pesticide non-target consequences were those of the persistent organochlorine insecticides such as DDT and their metabolites or conversion products on certain species of birds or fishes (Rachael Carson, 1962).

Though, pesticides have contributed in no small way in increasing food production, the negative impacts on human health and the environment cannot be neglected. There is evidence to the effect that agricultural use of pesticides has a major impact on water quality and leads to serious environmental and human health consequences. This led to the rise environmental/naturalists movements in the 1960s, the publishing of Silent Spring by Rachael Carson in 1962, the ban of chemicals such as DDT, Dieldrin, Endrin, Heptachlor etc (Padovani *et al* 2004).

There has been increasing concern about children's non-dietary exposure to pesticides and the potential health effects that may result. The literature often suggests that young children are particularly susceptible to exposure to pesticides and importantly that the majority of children's exposure to pesticides occurs within the home environment (WHO, 1997). In a related study Wumbei, 2013 found that farmers spraying cotton in the northern region of Ghana were exposed to unacceptably higher levels of Endosulfan (dien-organochlorine) and Chlorpyrifos (organophosphate) thereby putting them at higher risk.

A number of studies conducted in the USA, have linked the use of pesticides with a variety of alleged adverse effects in children resulting from chronic exposure, including childhood cancers (Davis *et al.*, 1993; Daniels *et al.*, 1997; Zahm *et al.*, 1997; Leiss and Savitz, 1995; Grufferman, 1998; Reeves *et al.*, 1981; Epstein and Ozonoff, 1987; Gold *et al.*, 1979; Infante *et al.*, 1978), adverse effects on the nervous system (Holly R. and Robert C., 2008), immune system (Corsini E. *et al*, 2008 and Phillips T., 2000) and reproductive system (Weidner *et al.*, 2006).

A study conducted in Ghana by the International Water Management Institute in collaboration with the Biology Department of the Kwame Nkrumah University of Science and Technology (KNUST) showed that typical pesticides contamination levels of vegetables on Ghanaian markets pose a threat to human health (Amoah P. *et al* 2004). A major concern, especially in developing countries such as Ghana is that low protein diets may increase people's sensitivity to the effects of pesticides.

The immediate human health hazards associated with pesticides use among others include; mild headache, flu, skin rashes, blurred vision and sometimes paralysis, blindness and death. Long term health impacts of pesticides

include cancers of all types, infertility, miscarriage, feminization of males and masculinization of females, birth defects and effects on the nervous system (Solomon G. *et al*, 2000).

Pesticides sprays can directly hit non-target vegetation or can drift or volatilize from treated area and contaminate the air. Some pesticides drift occurs during every application, even from ground equipment. Drift accounts for a loss of 2 to 25% of the chemical applied, which can spread over a distance of a few yards to several hundred miles. There are thousands of complaints of target spray drift each year in the U.S. (Marvin J. L., 2007).

Although terrestrial impacts by pesticides do occur, the principal pathway that causes ecological impact is that of water contamination (Ongley E., 1996). Different pesticides have clearly different effects on aquatic life, many of these effects are chronic and are often not noticed by casual observers, they certainly have consequences for entire food chains (Ongley E., 1996).

Pesticides have several characteristics that affect how they act once in soil. These include; mobility (how much the pesticide will move), half-life (the length of time it takes for half of the pesticide to degrade. Some commonly used pesticides can persist in the soil from three to five years (Marvin J. L., 2007). Once in the soil, these pesticides slowly, but surely, find their way into surface and ground water, thereby posing a threat to unsuspecting consumers and aquatic organisms.

Because of the adverse ecological and human health impacts, pesticides are carefully regulated in advanced jurisdictions such as Europe and America. For instance, in the UK a stringent risk assessment process is undertaken before a pesticide can be used for any purpose, and the pesticides permitted for non-agricultural use is limited to those that are least harmful and are sold as ready to use (diluted) products (Charlotte N. B. *et al*, 2006).

Pesticide products by the pesticides law of Ghana just as in the UK must have a label, which contains information about the product, hazard information, and instructions for use. Where any products, including pesticides, are authorized according to common principles the provision of enhanced product information such as product labeling assumes consumer understanding and response (Drottz- Sjo" berg, 1991). Consumer response might vary depending on attitude, experience and the understanding of the risks involved (Teuber, 1989). Policy must therefore, be aware that public perception of a particular risk lead to actions which may have real consequences (Pidgeon, 1998).

1.1 Problem Statement

The efforts of Ghana at increasing and sustaining agriculture production have resulted in the increasing use of PPPs (pesticides) since the 1960s (Wumbei, 2013). In the past the major areas of use of these products were; the cocoa sector, the fruits and vegetables sector and the cotton sector (Wumbei, 2013). Today however, PPPs have attracted wide spread use in other areas in the Ghanaian agriculture production system such as; rice, maize and yam

Recognizing the immense benefits of pesticides as well as their potential negative impacts, Ghana enacted a law to regulate the sector. This law, formerly known as the "Pesticides Management and Control Act, 1996 (Act, 528)" is now subsumed in to the main EPA Act (Act 490, 1994) and called "Part II of the EPA Act, 1994 (Act 490)".

Within the framework of the pesticides law, no pesticide can be imported into the country or used in the country unless it is registered and nobody can deal in pesticides unless he or she is licensed to do so. Before a person is licensed to deal in pesticides he/she will have to satisfy a minimum condition of having knowledge in the proper handling and use of pesticides. In order to ensure that this minimum condition is met by potential dealers, the EPA together with her collaborators has provided series of training to pesticides dealers throughout the country.

These efforts notwithstanding, the handling of pesticides by pesticides dealers and the conditions at pesticides retail outlets in Ghana in general and the northern region, in particular, leave much to be desired. The purpose of this paper therefore, is to explore how trained pesticides dealers in the northern region of Ghana are handling pesticides vis-à-vis the Ghana pesticides law.

2.0 Objectives

The main objective of the paper was to engage with pesticides dealers to ascertain how they conduct their businesses in order to protect human health and the environment.

The specific objectives were;

1. To find out if dealers were observing industry best practices to safeguard and protect their own lives
2. To find out if dealers were observing industry best practices to safeguard and protect the lives of unsuspecting consumers
3. To find out if dealers were observing industry best practices to secure and enhance the quality of the environment

3.0 Methodology

The northern region of Ghana is the biggest administrative regions of the country in terms of land mass. It consists of twenty six (26) administrative districts. However, at the time the training was provided to the pesticides dealers the region consisted of only twenty (20) administrative districts. Therefore, the study was conducted in sixteen (16) purposively sampled districts of the original 20 districts in the northern region. The study targeted 120 trained pesticides dealers from across the 16 districts, but eventually only 106 dealers were met. Data was collected through the use questionnaire. Data analysis was done by the use of SPSS version 16.

4.0 Results and Discussion

4.1 Background Information

The exercise was conducted in 16 districts of the northern region where a total of 106 companies/agro input dealers were visited. The Tamale Metropolis recorded the highest number of dealers (30) representing 28% of dealers visited. This was followed by Savelugu and Tolon (15 each) representing 14.2% and the districts with least number of dealers were Kpandai, Nanumba South, Nanumba North and Chereponi with 2 companies each, representing 1.9% of dealers visited. These statistics can be seen in table 1.

Table 1: Distribution of Tarined Pesticides Dealers in the Northern Region

Name of District	Frequency	Percent
Tamale Metro	30	28.3
Savelugu	15	14.2
Tolon/Kumbungu	15	14.2
Yendi	5	4.7
West Mamprusi	5	4.7
East Mamprusi	4	3.8
Bunkpurugu	4	3.8
East Gonja	3	2.8
Nanumba North	2	1.9
Nanumba South	2	1.9
Gushegu	6	5.7
Karaga	4	3.8
Central Gonja	3	2.8
Saboba	4	3.8
Chereponi	2	1.9
Kpandai	2	1.9
Total	106	100.0

4.2 Legal Compliance

With regards to the legal compliance of the dealers, only 57 representing 53.8% of the 106 dealers visited had licenses with about 49 (46.2%) of dealers not having EPA license. Again out of the 57 dealers who had the EPA license, only 17 (16%) had valid licenses with about 40 (37.7%) having their licenses expired. With regards to business registration with the registrar general's department, the dealers seemed to have done well. About 71 (67%) of the dealers visited had their businesses registered, but again in terms of business registration renewal only 20 dealers (18.9%) out of the 71 registered dealers, had their business certificates renewed

4.3 Dealer/Employer Information

The paper revealed that majority of the trained pesticides dealers in the northern region are males. Indeed, 100 (94.3%) out of the 106 dealers visited were males, while only 6 (5.7%) were female. This is understandable, as agriculture in Ghana and the northern in particular, is a predominantly male economic activity. In terms of dealers' level of education, majority of them (44.3%) had only basic education with about 33% (table 2) of the dealers having no education at all. This has serious implications for the business in terms of environmental security and human health impacts as most of the people could not read and interpret label information very well.

Table 2: Pesticides Dealers' Level of Education

Qualification	Frequency	Percent
Basic	47	44.3
Secondary	3	2.8
Diploma	15	14.2
Degree	6	5.7
Non formal	1	.9
No Education	34	32.1
Total	106	100.0

4.4 Siting of Premises (Shops/Store/Warehouses)

The siting of a pesticides shop has serious implications for environmental security and human health and safety. The law therefore, provides that the premises be sited about 10 to 15m away from environmentally sensitive areas (water bodies, play grounds, schools etc). In this paper, it is observed that majority of the shops (81%) had complied with the minimum distance requirement.

However, with regards to the possibility of runoff from the sites contaminating surface water, 63% of the shops visited fell victim as they were located upstream of surface water bodies without any spill containment measures. The law provides that shop owners should put a ramp at the entrance of the shop and also keep absorbent materials such as sand and sawdust to contain chemical spills and leakages. Unfortunately, out of the 106 dealers visited, only 37 (35%) made attempts to put a ramp at the entrance of their shops with the rest *ie* 69 (65%) making no attempt at all. Again, out of the total number (106) visited only 14 (13%) had kept absorbent material in their shops for the containment of spills with the rest not taking the issue serious.

This implies that should there be any pesticide spillage followed by a heavy down pour the chemical will be washed by runoff into the nearby surface water bodies there by endangering human and aquatic lives.

With regards to how accessible the individual shops were to input delivery vehicles and firefighting equipment and personnel, almost all the shops (98%) of the shops visited were sited at areas where they could be accessed very easily.

4.5 Pesticides Storage Facility/Retail Outlet

With regards to provision for hand washing facilities at the premises about 37% of the shops visited did not make any provision for hand washing and of the 63% percent who made provision for hand washing only 46% of them had soap and water readily available at their premises. This is similar to the results of a study in the

Netherlands which found that 63% of subjects washed their hands after using a biocide spray, and only one individual of 24 wore gloves (Baas *et al.*, 2002).

The use of protective clothing, gloves, or masks during the application of pesticides can greatly reduce the applicator's pesticide exposure (Teitelbaum, 2002). However, on the issue of personal protective equipment (PPE) for workers only 11% of the 106 dealers had complied by providing protective clothing such as hand gloves and nose masks to their shop attendants with the rest (89%) not having any protective clothing for their workers thereby putting their lives at great risk. This means that shop attendants are highly exposed to pesticides on daily basis and this definitely will have long term effects on their health.

As a result of the intensive use of pesticides and the lack of proper training for workers and the inadequate utilization of personal protective equipment, there has been public concern about the health impacts of the wide spread use of these PPPs leading to some investigations into the environmental and human health impacts of these products in Ghana (Wumbei, 2013).

4.6.0 Environmental Health and Safety

Environmental health and safety form the policy thrust of the pesticides law in Ghana, hence such issues were explored by this paper. Notable among these issues include;

- Presence of firefighting equipment and how well the equipment are positioned at the shops
- Arrangement of containers to minimize handling
- Ready availability of soap and water
- Presence of warning signs to ward off unsuspecting customers
- Labeling of pesticides containers
- Educating farmers by shop attendants on the proper use of products
- Presence of PPE
- Presence of first aid box
- Presence of pesticides disposal system

4.6.1 Fire Fighting Equipment

The study observed that, only 6 dealers, representing 5.7% of the 106 dealers visited had fire extinguishers at their premises. Out of this small number only two had placed the fire extinguishers at vantage places. The rest had kept them at locations where it had to take them several minutes to fetch them during emergencies.

4.6.2 Arrangement of Containers

Physical handling of pesticides is one way by which the public is exposed to pesticides and pesticides arrangement in the store if not properly done can lead to increased handling thereby resulting in increased exposure. The law therefore, requires that only a few of the products are kept in the shelves for display so that when a customer gets to the shop he will not have the opportunity of touching several of the products to select what he/she wants. Here, again the shops did well, because out the 106 shops visited, 89% of them had properly arranged their shops in order to minimize product handling by customers.

4.6.3 Labelling of Containers

Pesticides container labels contain very vital information on the proper use of the products, their expiry dates, the immediate steps to take in case of poisoning. As a result, the law requires that no pesticide should be sold without a label. The study revealed that all the shops visited had their pesticides containers labeled in English, the prescribed language for pesticides labeling in Ghana and again, all the container labels were intact.

This was a very significant improvement from the past where there used to be some pesticides labeled in French, a language that most Ghanaians cannot read and interpret very well (especially around the Chereponi and Saboba areas).

Even though this paper revealed that pesticides labels in all the shops visited were intact and in the prescribed language, making maximum use of the label information by farmers could not be guaranteed, as most shop attendants could not read and interpret pesticides label information. Similar to this observation, a study

conducted in the US suggested that labels do not impact users' practices, as they are not sufficiently strong in their warnings and recommendations (Grieshop and Stiles, 1989).

Again, an observational study in the UK on pesticide labeling showed that little notice was taken of instructions on the labels, and subjects stated that few read the labels except to find out how to use the pesticide and less would read the safety information (HSL, 1998). Generally, the participants found the labels hard to understand and familiar products were preferred for use and their labels would be less likely to be read, suggesting that their behaviour was based on experience and common sense (HSL, 1998).

4.6.4 Educating of Farmers by Dealers

Another important point that the law on pesticides in Ghana emphasizes is the responsibility of the dealer to educate the farmer on the proper application of the product, the negative impacts of the product if not properly handled and what to do in case of emergency. Here again, the paper revealed that about 96% of the shops visited make attempt to educate farmers on the use of the chemicals. However, what was observed here was that most of the shop attendants lacked sufficient knowledge on the use of the products and only stick to what their suppliers and their bosses told them. This is a very dangerous development as insufficient knowledge on the handling of PPP predisposes farmers to its negative impacts. An epidemiological study of cancer in children found that the risk was greater when precautions were not taken, such as ignoring label instructions when using pesticides in the home environment (Pogoda and Preston-Martin, 1997).

4.6.5 Presence of First Aid Box

Though the law provides that each pesticides dealer keeps a first aid box in his or her shop none of the 106 shops visited had mounted a first aid box. The essence of the first aid box is to create the opportunity to immediately assist a victim of poisoning or any injury before he is being taken to a medical facility.

4.6.6 Presence of Pesticides Disposal System

Only 4 of the pesticides dealers, representing 3.8% of the 106 dealers visited indicated that they had a pesticide (expired) disposal system in place. They asserted that they usually keep the expired products and invite experts from the EPA and the ministry of food and agriculture (MoFA) to take custody of them. Sometimes they repackage them and send them back to their head offices for onward delivery to the appropriate authorities for proper disposal.

The rest of the dealers (102), especially the small shop owners said they had never experienced products expiring in their shops and if it happened in the future they will bury or burn them. This certainly does not fall within the best practice for pesticides disposal and therefore, have serious implications for human health and environmental security.

5.0 Conclusions and Recommendations

Pesticides retailing is a booming business for the youth in the northern region of Ghana. However, there is high illiteracy among pesticides dealers in the northern region and this is affecting dealer compliance to industry best practice and environmental standards as some of the standards require a certain level of ability to read and write. Pesticides dealers do not pay much attention to health and safety as a few of the dealers were seen sitting and eating in the midst of pesticides while most dealers neither use PPE nor provide PPE for their workers. There are more pesticides dealers out there who have not received any form of training on pesticides, but are operating due to lack of regular and sustained monitoring regimes by the regulatory authorities.

Base on the above it is recommended that the government of Ghana should build the capacity of the regulatory authorities (EPA and her collaborators) to embark on regular monitoring and to strictly enforce the law.

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