Impact of Excessive Application of Agrochemicals on the Environment: Evidence from Ajigo Farm, Gwagwalada, Nigeria

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Abstract- ***The finding was carried out to examine the effects of excessive application of agrochemical input on the environment. In doing so, the finding has on the basis of personal observation and secondary sources examined the side effects of agrochemicals used by the Ajigo farm and also the farmers at Deshi, and Dobi through their wrong applications, and its effect with evidence in the community. Environmental problems in Nigeria generally are many, diverse in nature, and are caused by man's interaction with nature (environment) for exploits in several ways both in the rural area, and the cities; where industrial activities predominate, and rural areas; where agriculture thrives. And this finding shows that the wrong application of chemicals contributes to some of the environmental problems in Paiko, Deshi, and Dobi community. Through agricultural activities; man directly or indirectly creates problems that are detrimental to his health/survival, well-being, natural existence, and stability. The researchers observe that these problems are the consequence of environmental pollution through the wrong applications of agrochemicals which also degenerates into environmental degradation and several other hazards such as widespread epidemics, depletion of natural habitats, and thus; impede the socio-economic development of Nigeria as a nation. The necessary data for this finding were obtained from Ajigo farm, farmers, and residents at Paiko, Deshi, and Dobi communities in Gwagwalada, Abuja. One-hundred and twenty copies of the questionnaire were distributed to the selected residents and a total of one-hundred questionnaires were fully responded to and were utilized. This study reviewed that the impact of agrochemicals input on the environment shows that all the variables examined are good predators to the impact of agricultural chemicals input on Environment.***

Indexed Terms- ***Environmental Effect, Fertilizer and Manure, Nitrate, Herbicide, Pesticides, Water Quality***

I. INTRODUCTION

1.0 Background of Study

Agricultural inputs broadly refer to the materials used or added in the process of agricultural production, and these include biological Inputs, chemical inputs, and agricultural facilities and equipments. Agrochemical inputs denote the different types of chemical applications in agricultural production, such as pesticides (including natural and biological pesticides), chemical fertilizers, veterinary drugs, and feed additives, among others. Agricultural management practices for example, an increased use of agricultural chemicals or fertilizers are often evaluated based on their benefits for economic efficiencies in production (e.g., reduction in total production costs and increased production yield) while less attention is generally given to their potential

environmental effects [1].

However, many countries have reported alarming residues of agrochemicals in soil, water, air, agricultural products, and even in human blood and adipose tissue Research suggests that the massive use of inorganic fertilizers world-wide is associated with the accumulation of contaminants e.g., Arsenic (As), Cadmium (Cd), Fluorine (F), Lead (Pb) and Mercury (Hg) in agricultural soils. In the USA, according to a survey of 51 major river basins and aquifer systems by the US Geological Survey, pesticides were detected 97% of the time in samples from stream water in agricultural areas. In Japan, pesticides were frequently detected in the air of residential environments and childcare facilities following the application of pesticides, this is consistent with the findings that outside pesticide applications are major contributors to indoor air pollution in agricultural communities [2]. The usage volume of fertilizers and pesticides in China has been recorded as the highest in the world. Specifically, its chemical fertilizer usage volume has reached more than 59 million tons and pesticide more than 1.8 million tons alarmingly, the total utilization rate of fertilizers and pesticides is only 35% and thus, any fertilizer and pesticide losses are likely to contaminate soil, surface water and groundwater. In China, estimates indicate that contaminated arable land area is 150 million acres, accounting for 8.3% of the total arable land in the nation in addition; nearly half of the groundwater resources have been inordinately polluted by agricultural chemicals, which seriously threaten the safety of drinking water in China, especially in rural areas, reports that consequences of an increased use of agricultural chemicals transcend the environment [3].

1.2 Statement of Problem

Observation and examination gotten from the environment and agricultural workers at Ajigo farm has proven that there is poor use of chemical input on the environment. Some of the harmful chemical fertilizers may cause an effect on the environment if not been used properly, this includes water pollution. Water pollution affects the lives of aquatic animals by affecting their respiratory system and causing distinction of some of the aquatic animals. Wrong use of agrochemicals causes burn to crop there by reducing its nutritional value and causing poor crop yield, acidification of the soil, mineral depletion of the soil, and when this chemicals flairs to the atmosphere, increases air pollution thereby, affecting the lives of individuals as well as the lives of atmospheric animals [4]. Excessive use of chemicals destroys soil nutrients like Sodium (Na), Potassium (K), Nitrogen (N), and also creating imbalances in soil fertility, according to the research. Trees and aquatic species, which play a vital role on ecological balance, are gradually vanishing since these are subject to the direct victim of chemicals and deforestation. Proper education on the use of agrochemical helps users, and farmers to know the exact quantity to apply on the environment to avoid damage on the environment. Proper use of agrochemicals increases crop yields, boost the soil fertility and texture.

Objective of the Study

i. To understand the effect of wrong application of agrochemicals on the environment.
ii. To examine the impact of excessive use of agrochemicals on the environment.
iii. To identify ways in which the environment can be protected from excess agrochemicals.

Research Questions

i. What are the effects of wrong application of agrochemicals on the environment?
ii. What are the impacts of excessive application of agrochemicals on the environment?
iii. In what ways can the environment be protected?

Scope of the Study

The scope of this study will be limited to Ajigo farm at Paiko, and other small farms at Deshi, and Dobi communities, Gwagwalada area council, Abuja. And it will be of benefit to farmers, agriculturist, government, policy makers, school administrators, teachers, students, and other researchers. This will enhance their knowledge on the proper use of agrochemicals to improve farm products and to keep the environment clean from pollution.

II. LITERATURE REVIEW

- The Concept of Agrochemicals

Pesticides constitute any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. They can also serve

as plant regulators, defoliants, or desiccants. Chemicals like Boric acid (H_3BO_3), Fiproni ($C_{12}H_4C_{12}F_6N_4OS$), Dimethoate ($C_5H_{12}NO_3PS_2$), and Malathion ($C_{10}H_{19}O_6PS_2$) have long been used to control pests [5]. Sumerians already employed sulfur compounds to control insects and mites 4500 years ago. Pyrethrum, a compound derived from the dried flowers of Chrysanthemum cineraria folium, has been applied as an insecticide for over 2000 years. Salt or sea water has been used to control weeds. Inorganic substances, such as sodium chlorate and sulfuric acid, or organic chemicals derived from natural sources were widely employed in pest control until the 1940s. During World War II (1939-1945), the development of pesticides increased, because it was urgent to enhance food production and to find potential chemical warfare agents. Consequently, the1940s witnessed a marked growth in synthetic pesticides like DDT, aldrin, dieldrin, endrin, parathion, and 2,4-D. In the 1950s, the application of pesticides in agriculture was considered advantageous, and no concern about the potential risks of these chemicals to the environment and human health existed [6]. In 1962, Rachel Carson published the book "Silent Spring", in which she mentioned problems that could arise from the indiscriminate use of pesticides. This book inspired widespread concern about the impact of pesticides on human health and the environment.

However, IPM or related methods did not eliminate the need for pesticides. These chemicals ensure the production of adequate quantities of high-quality pest-free crops, which is important for food supply, prevents human diseases transmitted by insect or rodent vectors, and positively impacts public health. The best pesticide policies need to reconcile environmental concerns with economic realities, pest management is mandatory, and farmers must survive economically. Several studies have described the problems that not using pesticides would cause. Without pesticides, food production would be lower, and larger cultivated farm areas would be necessary to produce the same amount of food, which would impact the wildlife habitat. More frequent cultivation of the fields would be increase soil loss due to erosion, [7] have pictured the U.S. society without pesticides: agricultural production would decrease, food prices would rise, farmers would be less competitive in global markets, and U.S. exports would drop, leading to many job losses. Despite their benefits, pesticides can be hazardous to both humans and the environment. Countless chemicals are environmentally stable, prone to bioaccumulation, and toxic. Because some pesticides can persist in the environment, they can remain there for years. Environmental contamination or occupational use can expose the general population to pesticides residues, including physical and biological degradation products present in the air, water, and food [8].

2.1.1 Pesticides and Environmental Health

Pesticides reach the environment primarily during preparation and application. Application can take place via different techniques, depending on factors such as the formulation type, the controlled pest and, the application timing. In agriculture, it is possible to apply pesticides to the crop or to the soil. Liquids sprays are commonly used in crops; for example, boom sprayers, tunnel sprayers, or aerial application [9]. Systemic pesticides can also be employed. As for soils, pesticides can be applied as granules, injected as a fumigant, or sprayed onto the soil surface, which is possibly followed by pesticide incorporation into the soil top layer. Seeds are sometimes treated with pesticides prior to planting. After application, pesticides can be taken up by target organisms, degraded, or transported to the ground water [10]; they can also enter the surface water bodies [11], volatilize to atmosphere, or reach non-target organisms by ingestion, for example. The physical and chemical properties of the pesticide, soil, site conditions, and management practices influence the behavior and fate of pesticides.

Concerning the physical and chemical properties of pesticides, their solubility determines their transport in surface runoff and their leaching to groundwater. The partition coefficient also affects the behavior of pesticides, and many chemicals do not leach because soil particles adsorb them [12]. Adsorption depends on the chemical and on the soil type. The volatility of pesticides indicates their tendency to become a gas; the higher the volatility (high vapor pressure), the larger their loss to the atmosphere. Environmental conditions such as temperature and humidity impact volatility, which can occur from soil, plants, or surface water, and may continue for several days or weeks

after pesticide application [13]. In the atmosphere, the chemicals can be transported over long distances. Subsequent atmospheric deposition can contribute to surface water pollution. Finally, the degradation of pesticides also determines the behavior and fate of these compounds in the environment. Degradation (their brake down into other chemical forms) can occur by photodecomposition, microorganisms, and a variety of chemical and physical reactions. Pesticides with low biodegradation are called "persistent"; they can remain in the environment for a long time [14].

Once pesticides reach non-target organisms, they may undergo biotransformation via reactions like hydrolysis, oxidation, reduction, or conjugation catalyzed by liver enzymes. Biotransformation is an effort of the organism to detoxify and eliminate xenobiotics, but this process can also produce metabolites that are more toxic than their parent compound, a phenomenon called bio-activation [15]. An example of bio-activation is the biotransformation of DDT, which is not highly toxic to birds, into DDE, which causes thinning of eggshells because it disrupts calcium metabolism. In organisms, the absorption of a pesticide with high lipid solubility and low elimination rate can lead to bioaccumulation of this chemical in the fatty tissue, and the final concentration of the chemical in the organism will be higher than its concentration in the environment. When the bio-accumulated chemical passes from lower to higher trophic levels through the food chain, successively greater pesticide concentrations emerge in animals of higher trophic level. This phenomenon is called biomagnifications. The offspring of top predators can also become contaminated, mainly in the case of marine mammals, because they can consume milk with extremely high fat and pesticides content. [16].

2.1.2 Environmental Effects of Herbicide Use

Some substantial benefits can be gained using herbicides to manage unwanted vegetation. Compared with alternative means of weed control, such as mechanically weeding by hand or machine, herbicides are less expensive, often safer (especially in forestry), faster, and sometimes more selective. However, if herbicides are not used properly, damage may be caused to crop plants, especially if too large of dose is used, or if spraying occurs during a time when the crop species is sensitive to the herbicide [17]. Unintended but economically important damage to crop plants is sometimes a consequence of the inappropriate use of herbicides. In addition, some important environmental effects are associated with the use of herbicides. Fig 2.1.2 below shows the percentage of herbicide used at Ajigo farm. These include unintended damage occurring both on the sprayed site, and offsite. For example, by changing the vegetation of treated sites, herbicide use also changes the habitat of animals such as mammals and birds. This is especially true of herbicides use in forestry because biodiversity and semi-natural habitats are involved. This is an indirect effect of herbicide use because it does not involve toxicity caused to the animal by the herbicide. Nevertheless, the effects can be severe for some species [18]. In addition, not all the herbicide sprayed by a tractor or aircraft deposits onto the intended spray area. Often there is drift of herbicide beyond the intended spray site, and unintended, offsite damage may be caused to vegetation. There are also concerns about the toxicity of some herbicides, which may affect people using these chemicals during their occupation (i.e., when spraying pesticides), people indirectly exposed through drift or residues on food, and wildlife [19].

For these and other reasons, there are many negative opinions about the broadcast spraying of herbicides and other pesticides, and this practice is highly controversial. The intention of any herbicide treatment is to reduce the abundance of weeds to below some economically acceptable threshold, judged based on the amount of damage that can be tolerated to crops. Sometimes, this objective can be attained without causing significant damage to non-target plants. For example, some herbicides can be applied using spot applicators or injectors, which minimize the exposure to non-pest plants and animals. Usually, however, the typical method of herbicide application is some sort of broadcast application, in which a large area is treated all at once, generally by an aircraft or a tractor-drawn apparatus. An important problem with broadcast applications is that they are non-selective, they affect many plants and animals that are not weed. This is especially true of herbicides, because they are toxic to a wide variety of plant species, and not just the weeds. Therefore, the broadcast spraying of herbicides results in broad exposures of non-pest species, which can cause an unintended but substantial mortality of non-

target plants. For example, only a few species of plants in any agricultural field or forestry plantation are abundant enough to significantly interfere with the productivity of crop plants. Only these competitive plants are weeds, and these are the only target of an herbicide application. However, there are many other, non-pest species of plants in the field or plantation that do not interfere with the growth of the crop plants, and these are also affected by the herbicide, but not to any benefit in terms of vegetation management. In fact, especially in forestry, the non-target plants may be beneficial, by providing food and habitat for animals, and helping to prevent erosion and leaching of nutrients [20]. Therefore, going by this information, the bar chart below shows the percentage of the usage of herbicides discovered.

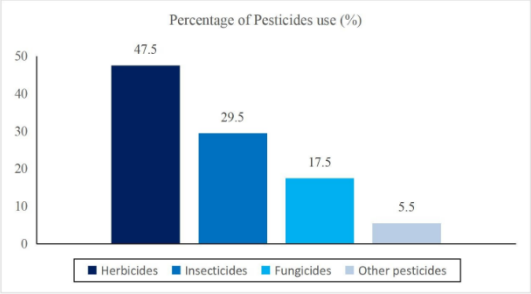

Fig 2.1.2 Percentages of global pesticide use (Alengebawy *et al. 2021*) [21]

2.1.3 Implications of Excess Fertilizer and Manure on Water Quality

When nutrients and other pollutants associated with animal manures and commercial fertilizers are not managed properly, they can affect plant and animal life (including humans) negatively. Some of these impacts include algae blooms causing the depletion of oxygen in surface waters, pathogens and nitrates in drinking water, and the emission of odors and gases into the air. Nutrients from manure and fertilizers enter lakes and streams through runoff and soil erosion. Generally, soil test nitrogen (N) and phosphorus (P) increase greater amounts of plant available N and P move with water. Runoff water from fields with high soil-test N and P may contain a high level of these dissolved nutrients, increasing the risk of contaminating streams, wetlands, and lakes. In addition, erosion carries fine particles of soil that are enriched with nutrients. Eroded soil particles with attached nutrients will accumulate as sediment in water resources and serve as a source of available nutrients during long periods of time. When manure or commercial fertilizers enter surface water, the nutrients they release stimulate microorganism growth. The growth and reproduction of microorganisms reduce the dissolved oxygen content of the water body. Without sufficient dissolved oxygen in surface water, fish and other aquatic species suffocate. The resulting dead fish and other aquatic species degrade the water quality and cause unpleasant odors.
[22].

- Weed Growth and Algae Blooms

The number of plants and algae in a lake, pond or other water body increase with an increased supply of nutrients, particularly N and P. N and P are present in manure in sufficient quantity to be used as fertilizer for crop growth and will have a similar effect on algae and aquatic plants. As with crops, nutrient availability is the critical factor in the growth of aquatic plants and algae. The nutrient present in the least amount for growth will limit the production in the aquatic system. Introduction of even small amounts of the limiting nutrient to crops or aquatic systems can increase production substantially. In the case of agricultural crops, this is a good thing.

However, increased production of aquatic plants and algae is not healthy for water resources. Eutrophication is the term used to describe the natural or human-accelerated process whereby a water body becomes abundant in aquatic plants and low in oxygen content. As these aquatic plants die, microorganisms use the organic matter as a food source. Once again, the microorganisms grow and reproduce and use up the oxygen in the water. Any increase in the amount of aquatic plant growth ultimately will result in a reduced dissolved oxygen content of the water body, eventually suffocating fish and other aquatic species. In addition to oxygen depletion, the potential exists for the algae to be toxic. Blue-green algae (cyanobacteria) can cause rashes, nausea and respiratory problems in humans and has been documented that it kills livestock that drink from affected water storages. See the NDSU Extension publication "Cyanobacteria Poisoning (Blue- green Algae)" for more information [23].

Fecal Organisms

The fresh manure from warm-blooded animals has countless microorganisms, including bacteria, viruses, parasites, and fungi. Some of the organisms are pathogenic (disease causing), and some of the diseases that animals carry is transmittable to humans, and vice versa. Many states use fecal coli form bacteria as an indicator of pollution from warm- blooded animals, including humans. The test for fecal coli forms is relatively simple and inexpensive, compared with testing for specific pathogens. Some fecal coli forms can be found in natural water sources, even without the influence of humans or their domestic animals. Birds, beaver, deer, and other wild animals contribute fecal coli forms to surface water directly or in runoff. Contamination from runoff and natural deposition are not the only ways for water to become impaired. If manure applications are mismanaged near wells, the risk of bacterial contamination of the groundwater via the well is greatly increased. Therefore, avoid surface application of manure where it can come into direct contact with a well or other drinking water supply. In addition, when grazing near surface water sources, take measures to restrict livestock use [24].

Nitrates

High levels of nitrates can be toxic to livestock and humans [25]. Nitrates are not adsorbed to soil materials, so they may leach to groundwater. In some instances, stored or land-applied manures or nitrogen fertilizers like Urea (H_2NCONH_2), Ammonium sulphate ($(NH_4)_2SO_4$), and Ammonium nitrate (NH_4NO_3) have caused high concentrations of nitrates in water [26]. This is because nitrates freely leach down through the soil profile, nitrogen that is not used for crop or plant growth can reach the groundwater easily [27]. Nitrate is not toxic to animals, but at elevated levels, it causes a disease called nitrate poisoning. See the NDSU Extension publication “Nitrate Poisoning of Livestock” for more information. High levels of nitrates in drinking water are known to cause methemoglobinemia (blue-baby syndrome) in human infants and other warm-blooded animals. In humans and livestock, nitrates interfere with oxygen uptake in the circulatory system [28]. Also manure odors can be a nuisance for nearby neighbors and communities. Constant nuisance odors can degrade the quality of life for anyone subjected to them. In addition, people have a wide range of susceptibility to health effects from odors. Gases are emitted from facilities throughout the year but are released at the highest rates during agitation, pumping and application of liquid manure systems or during cleanout and application of solid manure systems. Volatilization of ammonia to the atmosphere may become a water quality problem near animal production facilities when it is returned to the earth dissolved in rainfall [30].

2.1 Theoretical Review

Agrochemicals are widely used in agriculture to improve crop production, but their impact on the environment is a growing concern. Several theoretical frameworks have been proposed to predict the effects of agrochemicals on biodiversity and ecosystem properties [31]. The use of agrochemicals has shown two contradictory outcomes, a positive contribution to crop productivity but a negative effect on human health and the environment. The environmental performance of intensive farming is low, and agrochemical waste leads to extremity. The impact of agrochemicals on the environment causes soil degradation, sediment, and water pollution, and affects the local economy, personal health, and family relations. Pesticides are classified based on their structure and toxicity, and their use on large scale and indiscriminately has raised concerns about their impacts on the human health and environmental sustainability [30]. Efforts have been made to reduce the negative impact of agrochemicals on the environment [32]. One approach is to improve the efficiency of agrochemical use by measuring how efficiently farms use agrochemical inputs. Another approach is to develop new agrochemicals that provide improved efficacy and favorable environmental profiles [33].

In the last two decades, researchers have mainly focused on the following four areas regarding the increased use of agrochemicals and their impact. First, prior literature has explored the pollution derived from using pesticides and chemical fertilizers for the natural environment (i.e., soil microbial community response, agricultural water pollution, agricultural greenhouse gas emissions, and agricultural fertilizer loss). Secondly, researchers have investigated the effects of using pesticides and fertilizers on agricultural production (i.e., soil fertility, farmland diseases, farmland weeds and farmland pests). Thirdly, other

research has focused on the impact of using pesticides and fertilizers for society (i.e., social economy, food security and human health). In conclusion, the use of agrochemicals has both positive and negative impacts on the environment. While they increase productivity, their use has also been associated with negative effects on human health and the environment. Efforts to reduce the negative impact of agrochemicals on the environment include improving the efficiency of agrochemical use and developing new agrochemicals with improved efficacy and favorable environmental profile.

2.2 Empirical Review

Certainly, it would be an incomplete work, or perhaps meaningless, if we fail to get ourselves acquainted with the subject matter of discourse, the Impacts of Excessive Application of Agrochemicals on the Environment: Evidence from Paiko, Deshi, and Dobi, Gwagwalada, Abuja. To describe, summarize, evaluate, and clarify the related works of other scholars as related to this work and to establish a fundamental basis for this research.

P. Indira Devi (2022) conducted research on Agrochemicals, Environment, and Human Health and highlighted that chemical pesticides are broadly categorized as insecticides, fungicides, bactericides, herbicides,and rodenticides. These belong to major chemical groups such as organophosphates, carbamates, organochlorines, triazines, and dithiocarbonates. Also discovered some latest additions, which claimed to be safer alternatives, are pyrethrins and neonicotinoids [34].

Sudhangshu Kumar Biswas (2014) Agrochemicals are often considered a quick, easy, and inexpensive solution for controlling weeds and insect pests and increase yield in agricultural landscapes. However, use of pesticide comes at a significant cost. Took an insight on how agrochemical pollutes our water body. Although the agricultural soil is the primary recipient of agrochemicals, water bodies that are adjacent to agricultural areas are usually the ultimate recipient for agrochemicals residues. There is a suspicion that agrochemicals residues are common in surface water system, especially in irrigation drains, which ultimately pollute the pond and river water, and can harm aquatic environment [35].

P. Indira Devi (2022) on his research, while studying the effect of agrochemicals on human health, was able to link his findings to the efforts of different countries to ensure scientific use of agrochemicals through different approaches. This includes legal, market-based, and educative interventions. The regulatory authorities of nations approve agrochemicals that are considered tolerable or no persistent at the recommended rate of application, but the global production, consumption, and export of chemical pesticides often follow unscientific practices, augmented by aggressive marketing. As a result, even chemicals that are banned in a country get exported to other countries. This is also aided by either poor regulations and/or the lack of enforcement of regulations in the importing countries, which are primarily developing countries [36].

Jeschke (2022) the use of agrochemicals has both positive and negative impacts on the environment. While they increase productivity, their use has also been associated with negative effects on human health and the environment. His findings recommend another approach to reduce the negative impact of agrochemicals on the environment include improving the efficiency of agrochemical use and developing new agrochemicals with improved efficacy and favorable environmental profile [37].

III. RESEARCH METHODOLOGY

For the present study, the researcher used a descriptive research design. This method gives researchers the flexibility to observe variables. Descriptive designs help researchers to identify what is happening to predict what will happen. The researchers present the method, research design, population of the study, study area, sample and sampling techniques, research instruments, the validity and reliability of the instruments used, procedure for Data Collection, and Method for data analysis.

3.2 Population of Study Area

The population of this study area comprised the numbers of people living in Paiko, Deshi, and Dobi communities the local government area council, Gwagwalada, Abuja. Generally, according to the 2006 National population census, Paiko has a population of 158,086 persons, and the total number 1.4 million in

general for the local government council. This study covers the population of 158,086 residents of Paiko, Deshi, and Dobi communities. This number makes the population of the study but since it will be difficult, if not totally impossible to reach every member of the population, and to ensure manageability and accurate empirical conclusion, a sample was drawn from the population.

3.3 Study Area

The study was conducted at Ajigo farm Paiko, Deshi, and Dobi Gwagwalada local government area council in the Federal Capital Territory of Nigeria and it is predominantly an agricultural communities. It's about 30 kilometers by road from Ajigo farm in Paiko to Deshi, 25 kilometers from Deshi to Dobi. And it is also 45 kilometers by road from Dobi to Gwagwalada. A river connected these communities together and the location is very easy to get. It is about 100 km from Paiko to Gwagwalada. Paiko is boasted of a population of about 158,086 people, based on the 2006 Census; the postal code of the area is 920103. Conventional farming practices are commonly used in this area, with the use of synthetic fertilizers and pesticides being wide spread. The excessive use of synthetic fertilizers and pesticides in this study area has a detrimental effect on the soil, leading to soil degradation, nutrient depletion, and reduced biodiversity. These chemicals also pollute their groundwater, affecting the quality of drinking water and the health of local communities. Furthermore; conventional farming practices in Paiko, Deshi, and Dobi often rely on monoculture, which involves the cultivation of a single crop in a particular area. This can lead to soil erosion, reduced soil fertility, and increased susceptibility to pest outbreaks and diseases.

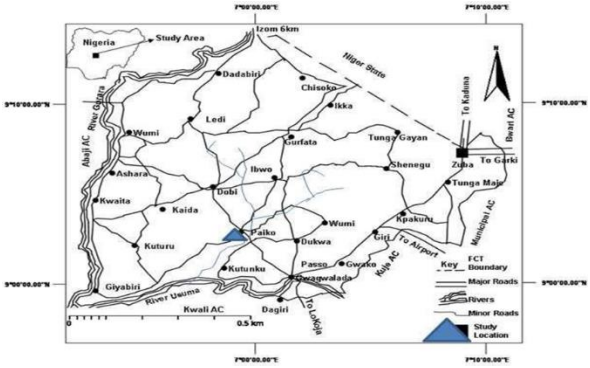

Figure 3.2 *Map of Gwagwalada Area Council Showing The study Sites (Makwe Edit, 2014)* [38]

i. Sampling and Sampling Techniques

The study employed simple random sampling techniques. Random sampling was selected from Ajigo farm, farmers from Paiko, Deshi, and Dobi communities. Five (5) respondents from the community chiefs, Twenty (20) respondents from Ajigo farm, forty (40) respondents from the people living in the communities were sampled and Thirty-five (35) respondents from the farmers, and the farmers association were sampled. In all, one-hundred (100) respondents were sampled from the one-hundred and twenty shared questions for the study.

ii. Procedure for Data Collection

The researchers sought and obtained permission from respondents before the administration of the instruments. The instruments were administered on the one-hundred and twenty (120) respondents by the researchers. The exercise lasted for three weeks. This required immediate completion of the instruments for retrieval.

iii. Field Survey

Field visits/stakeholder consultations were made to the following areas, Ajigo farm at Paiko, Deshi, and Dobi communities during this activity, discussions were held with individuals of these areas, relevant farmers, the chiefs of in the communities, the leaders of the farmers association, community health workers, and the staff of NAFDAC of how often the effect of agrochemicals in those environment were reported, and the efficiency of Government agencies on agrochemical control. Also, several relevant questions were addressed to the State Ministries of Environment and waste management authorities so also the NESREA department. Using the specific circumstances of each area visited, the particular technical operations of each area on the project, including related agencies such as NESREA, and environmental protection agency's authorities were studied, as their capacity to implement the proposed environmental friendly agrochemicals and mitigation measures were assessed. Discussions were held to determine appropriate recommendations, and suitable approach for improvement on agrochemical control and training for the farmers of that particular area so

as to make their environment free from agrochemicals pollution through excessive usage.

3.3 Type of Study

The researchers used descriptive survey method for the study in which questionnaires were carefully administered to Ajigo farm workers, the community leaders, people and farmers living in Paiko, Deshi and Dobi communities.

3.4 Methods of Data Collection

The methods of data collection for this study were grouped into two. These are primary and secondary data. Both sources of data were extensively used for the purpose of drawing an empirical conclusion for proper analysis of the study to come up with objective findings.

Primary Data

The primary data for this study were obtained through the distribution of questionnaires and data from direct responses of oral interviews with the staff of Ajigo farm, some few staff of NESREA, residents of Paiko, Deshi, and Dobi, farmers, and community leaders within these communities. This is to enable the researchers to obtain wider detailed, reliable, and up-to-date information on the topic. The data gathering instruments for this study are the following instruments:

i. Questionnaire Instrument

The questionnaire was prepared and personally administered by the researchers. To be sure that accurate information was obtained and to ensure that the questionnaire covers the entire sampled population, its distribution cut across the one- hundred (120) respondents from the sampled areas.

ii. Personal Interview

The researchers also made use of personal interviews to obtain firsthand information on the topic. It is a data-gathering instrument that enables the researchers to have in-depth knowledge of the topic of the research through face-to-face interaction. This instrument was used because it gives an opportunity for in-depth investigation or deeper probing into an issue under study. One-hundred and twenty (120) respondents were interviewed by the researchers on issues that concern the topic of this research.

Secondary Data

The principal sources of the secondary data for this study were obtained through the review of relevant pieces of literature, the use of materials from textbooks, website pages, and journals, and also going through relevant official administrative documents of NESREA of the local government of the study areas.

IV. RESULTS AND DISCUSSION

4.1 Results

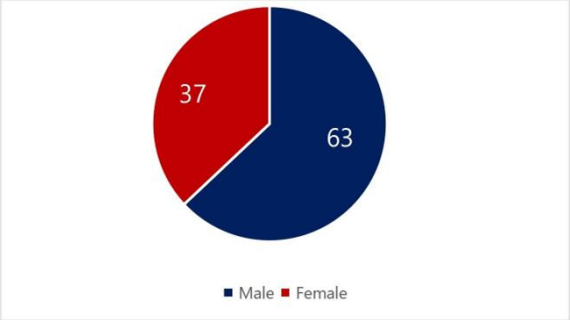

Figure 4.1 Genders of Respondents.

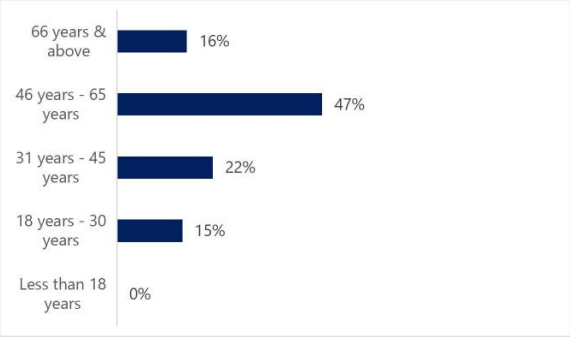

Figure 4.2 Ages of Respondents.

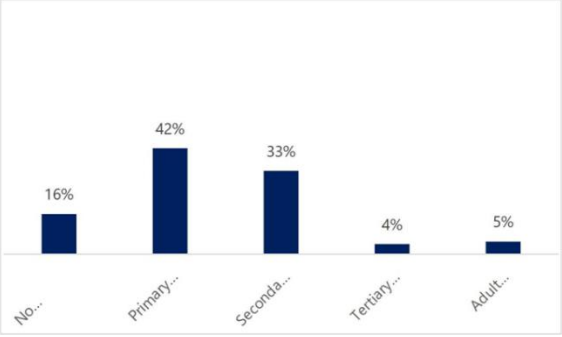

Figure 4.3 Educational Status of Respondents.

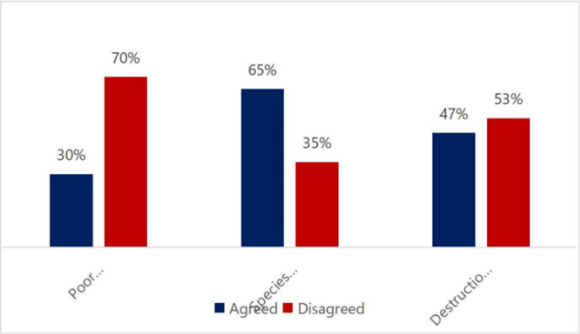

Figure 4.4 Effects of wrong use of agrochemicals.

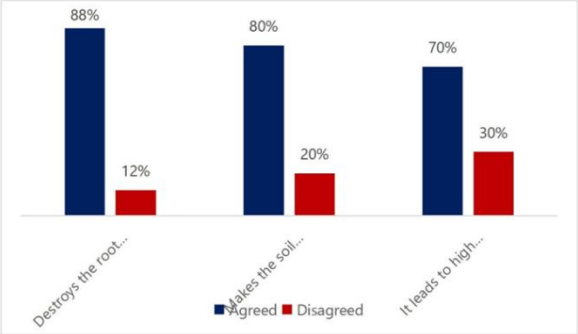

Figure 4.5 Excess applications of agrochemicals.

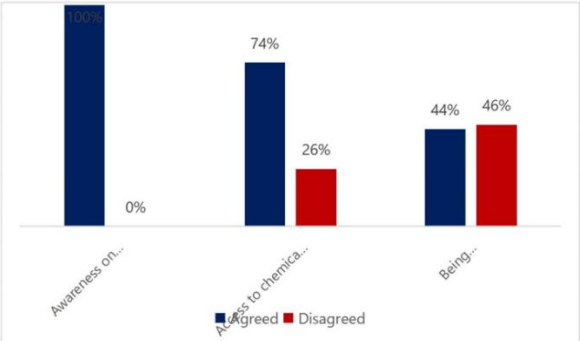

Figure 4.6 Ways to improve the environment.

4.2 Discussion of Findings

Fig. 4.1 shows that sixty-three (63) respondents were male, while thirty-seven (37) were females. These accounted for 100% of total population respectively. Paiko and Deshi had the highest number of male respondents and lowest population of female respondents. The finding shows that there were more male than female respondent in the study area, this implies that male were readily available than female in the study area. In fig. 4.2 forty-seven (47) respondents were between the age of 46 years to 65 years, twenty-two (22), respondents were between the age of 31 years to 45 years, sixteen (16) respondents were between the age of 66 years and above and fifteen respondents (15) were between 18 years to 30 years. These accounted for 47%, 22%, 16% and 15% of 100% total population respectively. Our finding shows that there are more respondents whose ages are between 46 years to 65 years. This implies that most of the respondents dependent on farming and earn a living through farming.

Fig. 4.3 shows that forty-two (42) respondents had primary school education, thirty-three (33) had secondary school education, sixteen (16) had no school education, five (5) had Adult education and four (4) had tertiary education. These accounted for 42%, 33%, 16%, 5% and 4% of 100% total population respectively. The finding shows that the highest number of respondent had primary school education and this raised a red flag to the researchers. [39]. The respondents with secondary and tertiary education are educated enough to get feedback from them, that will help to understand their knowledge on the impacts of agrochemicals input on the environment.

Fig. 4.4 Depicts that 65% of the people living in Paiko, Deshi and Dobi community agreed that species extinct due to chemical use, 30% agreed that over time due to poor use of agrochemicals, agricultural output reduced and 47% of them responded by saying that wrong use of agrochemicals leads to destruction of natural habitat. Fig. 4.5 revealed that over 80% of the people living at Paiko, Deshi and Dobi community rated that excess application of agrochemicals in the environmental makes the soil inhabitable for micro organisms, 30% disagrees it leads to high cost of production while the final output is less and 88% agrees that excess application of agrochemicals destroys the environment and the root of plants. Finally, It is observed from fig. 4.6 that 100% agreed that awareness on agrochemicals can help reduce the wrong use of these chemicals, 74% agreed on the restrictions of agrochemicals use to only professionals while 44% employed the knowledge in being environmentally friendly.

Due to the fact that many scholars had done various work on all of the variables examined in the study before, but the result of this study has obviously shown the effect and impact of these variables to the impact of agrochemicals input on the environment. And the

results of this study that survey, Paiko, Deshi and Dobi community can also be use as a gazette for others in Gwagwalada Area council.

V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

Based on the data analysis, the following summary is made of the major findings of the study;

Wrong use of agrochemicals, excess application of agrochemicals and ways to improve the environment are important factors to control the use of agrochemicals on the environment. Thus, the independence variables are good predators to achieve the control of agrochemicals input on the environment. The wrong use of agrochemicals and excess application of agrochemicals are good factors to enhance the control of agrochemicals input on the environmental achievement. According to the findings, excess applications of agrochemicals combine with wrong use of agrochemicals are good predators of agrochemicals input on the environment. Educating the community and farmers on ways to improve the environment is also a good factor to enhance the quality use and control of agrochemicals input on the environment to meet the needs of the present generation without compromising the needs of the future generations.

5.2 Conclusion

Findings obtained from this study are justifiably concluded as follows: that all the variables: wrong use of agrochemicals, excess application of agrochemicals and ways to improve the environment are good and even better predators on the impacts of agrochemicals input on the environment. The wrong use of agrochemicals is a good predator on the impact of agrochemicals input on the environment as it educates the people on how to properly use the agricultural chemicals for better results. The excess application of agrochemicals is a distinct factor because it gives information on how to minimize the use of agrochemicals to avoid environmental degradation, and ways to improve the environment gives knowledge on how to maintain the environment to meet the needs of present and future generations.

5.3 Recommendation

As regards the result obtained from this study, the researchers made the following recommendations:

i. Agrochemicals should be made available only to those who have been tested and trusted by means of education and license.
ii. Campaign for sustainable development should be encouraged.

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