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APPLICATION OF PESTICIDES BY FARMERS AND THEIR IMPACT ON THE CONSUMPTION OF VEGETABLES PRODUCED IN NIGERIA

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Abstract
The study examined the application of pesticides by farmers and their impact on the consumption of vegetables produced in Nigeria. Efforts to improve the quantity and quality of vegetables by farmers by applying inorganic pesticides have put consumer health at risk. The essence of the study is to determine how the use of pesticides has impacted on the health of vegetable consumers. The study adopted a desk research methodology to obtain secondary data on pesticide application on vegetables. Thus, the result of other studies revealed that the excessive application of these inorganic substances (pesticides) has proven to harm consumers' health. It concluded that crop protection improved the quantity and quality of farmers. On the other hand, it endangers the health of consumers negatively.

Key Words: *Bactericides, Health Risk, Pesticide, Residue, Thiamethoxamt, Yield Increase*

Introduction
Vegetables are crops characterized by a short-term gestation period with vital nutrients needed for proper human growth. According to Olasantan, Makinde, and Salau (n.d), tender edible shoots, leaves, fruits, and roots of plants and spices are taken whole or in part, raw or cooked. In Nigeria, the production of vegetables has increased in recent years owing to their growing importance to human nutrition (Kiwango, Kassim, and Kimany, 2018). The measures put in place by farmers to sustain and increase good yield in terms of quantity and quality of their farm outputs dependent on the use of pesticides. The incorrect applications not often followed by farmers pose a health risk to the consumers who finally consume such vegetables. Crop producers achieve their goal at the expense of consumers' well-being. EFSA (2009) states that incorrect use of pesticide has occasionally resulted in human and environmental harm. Premlata and Basavaraja (2018) asserts that vegetables are treated with chemical until harvest time, then delivered straight to the marketplace. This practice causes significant chemical residues in vegetables with adverse health effects on consumers (Dasgupta, Meisner, & Mainul-huq, 2006). Boon, Van der Voet, Van Raaij, and Van Klaveren (2008), hold that consuming pesticide residue in vegetables over an extended time can alter excitability, leading to paralysis and possibly death. Arguing further Gilden, Huffling, and Sattler (2010) state that chronic exposure has both erotic and behavioral consequences. Insecticides abuse can cause cancer, allergies, hypersensitivity, and afferent neurological circuits, among other things.

Pest infestations cause more than 45% of yearly food production globally (Abhilash & Singh 2009). Cynthian (2021) reports that Nigeria losses 50 percent of its annual farm produce to damages caused primarily by the pest. There has been an increase in agricultural practice on crop protection to control insect-borne attacks and disease. Inorganic chemical substances are applied to protect plants (Ecobichon, 2001). Incorrect application of pesticides on vegetables has become a source of worry to consumers. Ecological disturbance could be caused by the abuse of pesticide usage, especially in vegetables (Premlata and Basavaraja 2018).

The focus of the study therefore is to examine facts from works of literature to ascertain the health safety of vegetable consumers in the light of farmers' crop protection practices in Nigeria.

Literature Review

The review focuses on literature that have content related to the scope of the study. The empirical studies assist to give factual results on previously conducted research findings. The non-empirical provides the work with in depth knowledge on crop protection.

Meaning and classification of Vegetables in Nigeria

Welbaum (2015), vegetables lacks a universally accepted definition because of its arbitrary nature, is commonly based on usage rather than plant morphology. Olasantan, Makinde, and Salau (n.d) classification is as follows:

Classification according to the part consumed: This classification is done based on the part of the vegetables that are eaten.

i. Leafy vegetables: fronds, as well as juicy young sprouts, were selected for ingestion. Amaranthus, celosia, pumpkin, lettuce, cabbage, bitter leaf, water leaf, Jewish mallow, as well as fluted pumpkin are just a few examples.
ii. Fruit vegetables: Immature, underdeveloped unripe fruits or mature ripe fruits produced as vegetables make up this category. Cucumber, tomato, okra, pumpkin, eggplant, garden egg, watermelon, sweet pepper, and chili pepper are just a few examples.
iii. Seed vegetables**:** This group is crucial in the production of seeds. Egusi and Ito melon are two such examples.
iv. Root vegetables: sweet potato, Irish potato, carrot, and radish, to name a few.

Spices: are used in dishes such as chili peppers, onions, garlic, and basil for flavor and colour.

i. **Classification according to Season/Climatic area/ area of cultivation:** this classification is done based on seasonality, the area, and climatic conditions in which they are cultivated
ii. Cool season vegetables: cabbage, garlic, onion, radish, spinach, lettuce, potato, and carrot are just a few examples.
iii. Warm season vegetables**:** Tomato, pepper, cucumber, okra, eggplant, garden egg, melon, pumpkin, and sweet potato are just a few examples.

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Classification according to botanical or taxonomic: This classification is done based on family, general, and species. These are the most acceptable classification system.
Table 1: according to botanical or taxonomic

Family	Botanical name	Common name
Amaranthaceae	*Amaranthus dubius*	Amaranth
	Celosia argentea	Celosia
Cucurbitaceae	*Cucurbita maxima*	Pumpkin
	Cucumis sativus	Cucumber
Malvaceae	*Abelmoschus esculentus* (L.) Moench	Okra
Solanaceae	*Solanum tuberosum*	Irish potato
	Solanum melongena L.	Eggplant
Tiliaceae	*Corchorus olitorius* L.	Jews mallow
Compositae	*Vernonia colorata*	Bitter leaf
	Lactuca sativa	Lettuce
Cruciferae	*Brassica oleraceae*	Cabbage
	Raphanus sativus	Radish
Portulaceae	*Talinum triangulare*	Water leaf
Basellaceae	*Basella rubra*	Indian spinach

Classification according to the frequency of cultivation: this classification is based on how frequently the vegetable is cultivated.

i. Regularly cultivated vegetables: Onion, Amaranthus, Celosia, Egusi Melon, Okra; Eggplant, Tomato, and Pepper are some examples.
ii. Occasionally/Wild vegetables such as mushroom (*Agaricus* spp, *Celosia triguna* Ajefawo) *Basella Rubra* (White) – Indian spinach *Basella alba* (Red) *Crassocephallum biafrae* - Bologi, *C. crepidoidis* – Ebolo

Classification according to their maturity time, harvesting pattern, and growth habit: this classification is based on how the 3 identified factors above.

i. Vegetables with a short growing period and harvested two or three times by topping or young leaf removal: Leafy vegetables like Amaranthus spp. and Celosia argentea belong to this category.
ii. Vegetables which can be harvested over several weeks or months: Vegetables in this group include Corchorus spp., Solanum spp., Capsicum spp., Tomato, Okra, and Cucurbits.
iii. Vegetables with climbing growth habit: These are veggies that are trained along a stick and on the inside walls of a house. Snake gourd, fluted pumpkin, ito melon, and basella spp. are examples.
iv. Vegetables with creeping stems: Melon, cucumber, as well as watermelon are examples of such fruits.

Importance of Vegetables in the Human Diet

Vegetables remain one of the six classes of food and as such authors such as Olasantan, Makinde, and Salau (n.d), Ahmed, Hill, Smith, Wiesmann, and Frankenberger (2007) all maintain that the health benefit of vegetable consumption include:

1. Vegetables are essential sources of macro- and micronutrients, as well as phytochemicals that are necessary for sustaining human health and avoiding disease.
2. Vegetables provide the majority of the nutrients that are lacking in other foods. This involves mineral supply, particularly calcium and iron.
3. Acid neutralizers, such as okra, corchorus spp, neutralize the acid created by some dietary components.
4. The fibers/roughages found in okra, cucumber, amaranthus, lettuce, and cabbage help to avoid constipation and enhance digestion.
5. Vitamins A, B, and C are abundant in vegetables, which aid to reduce infection susceptibility. Vitamin A is found in carrots, sweet corn, amaranthus, and celosia; Vitamin B is found in the bitter leaf, water leaf, solanum, and celosia; and Vitamin C is found in tomatoes, carrots, lettuce, cabbage, and amaranthus.
6. Carbohydrate-rich veggies include potatoes, sweet corn, carrots, and others. Green beans and peas are low-cost protein sources. In the human diet, Vernonia (bitter leaf), Amaranthus, and Telfeira all supply some protein.
7. Vegetables are necessary for a well-balanced diet and the elimination of inadequacies in nutrients.

Vegetables improve the appeal of our staple foods and boost their intake.

Overview of the Concept of Crop Protection

Crop protection is the research and practice of preventing harm to agricultural and forestry crops from pests, weeds, and other plant diseases (both vertebrate and invertebrate). Fruits, vegetable crops (potatoes, cabbage, etc.), and field crops (wheat, rice, etc.) are all examples of crops. Numerous environmental factors can affect field crops. Insects, birds, rodents, viruses, and other pests can destroy plants. Crop protection includes both chemical pest control techniques like fungicides, insecticides, and weed killers as well as biological pest management techniques including cover crops, trap crops, and beetle banks (agro textiles and bird netting). For instance, bird caretakers use animal psychology while biotechnology-based methods like (plant breeding and genetic modification).

Crop Protection Methods

The major methods used for crop protection are discussed below:

1. Cultural method: This focuses on altering the environment to make it undesirable to the pest, so preventing or at least decreasing the severity of the damage. Choosing a good location, using clean planting materials, tillage, deep sowing, manipulating planting and harvesting times, crop cleanliness, crop rotation, intercropping, close season, trap crop planting, mulching, irrigation, and crop spacing modification are all examples of cultural control measures. This method is limited to larger-scale farmers in a way.

2. Host plant resistance: This refers to the plant's proportion of hereditary characteristics, which has an impact on the pest's ultimate damage. Antixenosis (Anti-guest), Antibiosis, and Tolerance are examples of host pest resistance.
3. Biological control: The utilization of live creatures as pest exterminators is known as bio control. Biological management has three distinct advantages: it provides long-term control after innate adversaries have been created. In the long run, it is cost-effective, and the pest is unlikely to acquire immunity.
4. Chemical control: This entails the application of natural or manufactured chemicals to kill, repel, or attack pests. Pesticides are the name for such compounds. Pesticides are classified by the type of pest they are used to control. Pesticides are used to kill insects, herbicides to kill weeds, fungicides to kill fungi, nematicides to kill nematodes, rodenticides to kill rodents, ascaricides to kill mites, and avicides to kill birds.
5. Regulatory or legal control: This is about government restrictions aimed at preventing pests from spreading from one country or region to another. Absolute prohibition, quarantine, post-entry quarantine services, restricted items, and closed season are examples of legal controls.
6. Integrated Pest Management (IPM): This is a way of pest control that is both cost-effective and environmentally friendly. It takes all necessary steps to reduce pest numbers and keep them below the levels that cause economic harm, or to manipulate populations such that they do not cause harm. IPM works to keep the environment and human health from being harmed unnecessarily.

Agro-chemicals used in crop protection and their application time**:** The major agrochemicals that are used to protect vegetables from diseases causing agents according to Johnson and Charles (n.d.) are fungicides, bactericides, nematicides, etc. These agrochemicals also aid in the improvement of vegetable production, and as such, they are briefly discussed below;

a. **Fungicides:** To control root-infecting diseases, fungicides are sprayed on the soil. They are sprayed on the foliage and fruit, and they are also used as post-harvest dips to reduce disease losses during storage and shipping. Fungicides have two modes of action (systemic and contact): Plants are treated with protective fungicides before they become infected. Fungicides that eradicate control fungi that have already established themselves in the host plant. One of the earliest extensively used fungicides with little systemic activity was benomyl. Many of the new fungicides have a systemic effect. Metalaxyl seed treatments efficiently prevent sweet corn downy mildew and Pythium fungal seed deterioration.
b. ***Application Time:*** Fungicides are sprayed at intervals of 10 to 14 days. The shorter interval should be employed during periods of favorable weather for fungal development. Although some fungicides have systemic activity, they are all most effective when sprayed before the host plant becomes sick.
c. **Bactericides:** Bactericides are antibiotics that are used to treat bacterial infections. To reduce disease losses during harvest or storage, they are administered as foliar sprays or utilized as post-harvest treatments. Primary bactericides, such as copper-containing insecticides and Streptomycin sulphate are the most common types of bactericides.

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Application Time: Copper-based insecticides are protective and must be administered before harmful bacteria infect the host plant. Streptomycin sulfate is a systemic antibiotic that should only be administered as a preventative measure. Bactericides are usually applied every 10 to 14 days. If the climate circumstances support rapid disease development, use the shorter interval.

d. **Nematicides:** Nematicides are nematode-controlling chemicals used in the soil. These can be injected into the soil as a liquid, sprayed into the soil surface, applied as granules, integrated into the soil, or sprayed directly onto the plant foliage. The following are examples of fundamental nematicides: Organophosphates are pesticides that kill nematodes when they come into contact with the pesticide's fatal dose. For nematode control, they are used as row or broadcast treatments. Furthermore, Oxamyl is a systemic pesticide that is used to control nematodes on a variety of vegetable crops, whilst Fumigants are pesticides that emit a poisonous gas that is harmful to nematodes. There are also utilized in plant beds and agricultural soils to control nematodes.

Application Time: Spraying fumigant-type compounds two to three weeks prior to planting is necessary to allow phytotoxic pesticide levels to escape from the soil. Both before and after planting, organophosphate chemicals might be utilized. Both pre- and post-plant therapies can make use of oxyamyl.

e. **Herbicides:** Herbicides are weed-controlling agents. Selectivity and mode of action are used to classify them. Herbicides are divided into two types: selective and non-selective. Soil sterilants are herbicides that are not selective. There are frequently employed to keep weeds and brush at bay around buildings and fences. Some nonselective herbicides are highly hazardous to trees and other non-target plants that may be growing near the treatment area. Many of these products are long-lasting and can be found in the soil for years. While In and around vegetables, selective herbicides are utilized. Herbicides are classified as preplant, preemergent, and postemergent. Preplant herbicides, some of which require integration, can be used before planting the crop. Preemergent herbicides can be sprayed before the crop is seeded, or before the crop emerges. Herbicides that are sprayed after the crop, weeds, or both emerge are known as postemergence herbicides. Some herbicides' selectivity is achieved through location rather than chemical selectivity.

f. **Insecticides:** To destroy insects, people employ insecticides, which are harmful substances. Insecticides called ovicidal and larvicidal are used to eliminate insect eggs and larvae. Agriculture use insecticides, which are credited for raising agricultural output in the 20th century. Almost all pesticides have the potential to have a significant impact on ecosystems. Many of these chemicals are hazardous to people, animals, and/or the environment. Systemic insecticides, which have long-term or residual activity, and contact insecticides, which have no such activity, are the two principal types of insecticides. The way a pesticide kills or inactivates a pest is known as its mode of action.

Application Time: When pest populations are large enough to warrant treatment, insecticides are employed before, during, and after planting. Treatments should be used only after evaluating the region and determining that an insect population is significant enough to cause economic crop harm.

Pesticide Application on Vegetables and Its Residue Effect on Consumers' Health

Pest infestations are so severe that farmers are forced to use a lot of insecticides to save their crops. According to Rajabu Tarimo and Hangali (2017), if insect infestations are not controlled, crop losses can be as high as 100%. Pesticides are frequently employed in the production of vegetables because they prevent or reduce pest losses, improving yield as well as crop quality, including cosmetic appeal, which is often essential to customers (Oerke & Dehne, 2004; Cooper & Dobson, 2007). The cosmetic appeal is that attraction that puts a high premium on farmers' produce. Pesticides can also boost food's nutritional value and, in some cases, its safety (Boxall, 2001). Sonchieu, Ngassoum, Nantia, and Laxman (2017) maintain that pesticides are highly used in vegetable farming to increase production and meet up with the high demand for the crop. This could be done at the expense of the unsuspecting consumer exposing them to excessive pesticide residues above the minimum required level in human and animal diets (Kiwango, Kassim & Kimanya, 2018). Dietary pesticide exposure is predicted to be five times higher than exposure from other routes such as inhalation and touch (Bempah, Buah-Kwofie, Denutsui, Asomaning, and Tutu 2011).

The health concerns linked with pesticide residue exposure range from acute illnesses such as: coughing, nausea, stomach ache, diarrhea, and vomiting to chronic illnesses such as endocrine disruption, immune system malfunction, and the development of several malignancies (Thatheyus & Gnana,2018; Toft, Hagmar, Giwercman and Peter 2004). Pesticide use can have unforeseen impacts on the environment, air, water, soil, plants, animals, birds, amphibians, aquatic life, and humans, according to the World Health Organization (1990). According to Godswill, Asongw, Yerima, and Aaron (2014), pesticide drift happens when particles of pesticides suspended in the air are carried by the wind to other locations, damaging the surroundings. Approximately 98 percent of all insecticides and 95 percent of herbicides applied do not reach the target destination; instead, they reach non-target species. Godswill, Asongw, Yerima, and Aaron (2014) and Matthews, Wiles, and Baleguel (2003) undertook a pesticide application survey in Cameroon, their study shows that pesticide usage has been linked to a variety of ailments, according to their research. Unfortunately, Cameroon supplies the Nigerian market with tomatoes, pepper, and other vegetables. Residues will persist after usage and can be hazardous, causing changes in the ecological balance and lowering ecosystem production, either through acute impacts (mortalities) or chronic effects (carcinogenic effect, reduced reproductive potential, teratogenicity).

Empirical review

The application of pesticide on vegetables as crop protection techniques have continually generated a lot of scholarly interest because of the effect on human health. For instance vegetable producers, according to Hoi, Mol, and Oosterveer (2013), use pesticides extensively, and often at higher quantities than the label allows. This led to the documentation of approximately 7000 cases of pesticide residual poisoning in 2002, according to Nguyen (2003). In their study on pesticide use in vegetable production: a survey of Vietnamese farmers' knowledge, Nguyen, Thanhle, Havukainen, and David (2018) found that inappropriate pesticide mixing and disposal methods, as well as

inappropriate pesticide applications, pose potential risks to human health and the environment. It was suggested that a cost-effective method of pesticide applications and food safety would be community-based training and education, backed jointly by local, national, and international agricultural production and food safety organizations.

Pesticide exposure can have a number of neurological health consequences, such as memory loss, loss of coordination, slowed response times to stimuli, decreased visual acuity, altered or irrational mood and behavior, and diminished motor abilities (Pallavi, Ashutosh, and Deeplata 2014). In a related development, Sonchieu, Ngassoum, Nantia, and Laxman (2017), in Santa, North West-Cameroon, pesticides were applied to some cultivated vegetables, with health implications. This study's objectives were to evaluate the application and results of pesticides in the Santa agricultural region and to calculate the health effects on 372 farmers who were chosen at random using questionnaires between March 2015 and April 2016. The result was the cultivation of fourteen major vegetables, the use of fifteen active ingredients (fixed into 26 formulations) to spray vegetables, a low educational level (First School Leaving Certificate) for 69.8% of pesticide applicators, and poor application of spraying parameters (doses, frequency and duration of spraying, pre-harvesting time, safety precautions). In addition, pesticide wastes and used containers are thrown out, burned, or reused at home. A few of the illnesses linked to pesticide wastes and used containers include abdominal pain, vertigo, migraines, nausea, vomiting, skin irritation, malignancies, eye problems, and chronic cough/catarrh.

The negative effects of pesticide contamination extend beyond the environment to include human health. The primary causes of risks during the application of pesticides include a lack of information, expertise, and awareness, poor enforcement of the law, and sales of expensive pesticides on the open market (WHO, 1990). The dosage, route of exposure, ease of absorption, kind of action of the pesticide and its metabolites, accumulation and persistence in the body, and lastly the individual's health status all play a role in how serious any consequence from exposure to pesticides will be (WHO, 1990). In Nigeria, numerous food samples have been tested for pesticide contamination; one of such study was carried out by Etonihu et al. (2011) on sorghum, white beans, and maize grains that were randomly purchased from open markets in Nasarrawa and Plateau states. The findings showed that 28 pesticides were present in the food items, and that each brand's chemical formulations had amounts of chemicals over the WHO-required minimum threshold.

According to a study by Akan et al. (1997), 217 fruits and vegetables from different parts of Nigeria, including foods of animal origin, were tested for the presence of organochlorine. These foods represented the four main cereal crops: rice, maize, sorghum, and soybeans. The maximum residue limit for DDT, Aldrin, and Dieldrin was found to be exceeded in meat, pulses, and cereals (MRL).This means that a lot of consumers may have already taken the food before the analysis with its attended health risk associated with such consumption. In 1959, it was claimed that a family in southwest Nigeria consumed a leaf that had been treated with lindane, resulting in hospitalization for every member of the family. This was Nigeria's first case of human pesticide exposure

(Adeoluwa et al, 1987). In the same vein, Oyeyiola et al. (2017) reported mortality associated with bean meals made from beans treated with Gammalin 20 in Doma, Gombe State, and Bekwara Local Governments of Cross Rivers State, respectively. The World Health Organization's Insecticide Testing Unit (ITU) in Lagos, Nigeria, conducted a study in 1963 to assess the effectiveness of two carbamate and one organophosphorus pesticide in a village-scale trial. The toxicological data from the trial revealed that one of the carbamate tests (3-isopropylphenyl N-methyl carbamate) was too dangerous for humans to be used as residual insecticides in homes (Vandekar, 1965). Amaranth, cabbage, lettuce, pumpkin, and spinach have been shown to have insecticide residues such as HCHs and DDT. In India, cabbage, tomato, and brinjal have all been found to contain such residues (Boon, 2008 et al & Sosan, et al 2017).

Elgueta et al. (2017) states that there exists a high level of pesticide residue in leafy vegetables when a human health risk examination was conducted in North-central agricultural areas of Chile. Organochlorine pesticides are also very harmful chemical substances that have a far-reaching effect. The literature review has provided dependable results within the area of study and beyond to truly establish the fact the misuse of pesticides have been detrimental to consumers' health in Nigeria. Insecticide residue in vegetables has the potential to alter their nutritional value and have harmful health effects (Adeleye et al., 2019). More of these insecticides are being used in farming, which raises health hazards and damages the environment (Yasir et al., 2020). According to estimates from the World Health Organization, there are around three million cases of poisoning from insecticide residue each year. Globally, there are over 220,000 fatalities (WHO, 1990; Hossain et al., 2013). Aldrin levels in lettuce were found to be higher above the WHO-recommended minimum residue level (22.66 g/kg) due to pesticide residues on crops in Ghana (Vincent et al., 2018).

Behaviour of Farmers/Supplier in Pesticide Application

In the issue of pesticide misuse, the farmers' are not only the culprit but others in the chain of distribution contributes to the malpractice. Many farmers from developing countries hold that pesticides are indispensable for increasing production (Rios-Gonzalez, Jansen & Javier Sanchex-Perez, 2013). Integrated risk information system (2019) reported that over 90% of farmers believed that applying organic chemicals for pest control would largely reduce their yields. Gong et al. (2016) opined that in china, family members are likely going to influence farmers to use the non-chemical method if the production is for home use only.

Research has linked some vendors wilfully increasing the recommended dose of insecticides for personal reasons (Agency for Toxic Substances and Disease Registry 2002 & Zhang et al. 2015). A closer association with farmers reveal that many dealers of pesticide had little knowledge of their product, which means they are likely to give the wrong prescription to farmers (Li et al., 2014). In Kenya, insecticide vendors mostly have insufficient training on correct prescription to farmers (Nguetti et al, 2018). Research findings in other countries revealed that the behaviour of farmers tend to improve if they are trained and supported with best practice on pesticide usage (Jallow et al, 2017; khan et. al., 2015 & Sharma et .al 2015). Farmers are disposed of new knowledge, more willing

mind to accept new technology and other pest control options (Timprasert, Datta & Ranamukhaarachchi, 2014).

Research from other emerging countries stated that good equipment servicing enhances good insecticide application (Puckett, 2018). This relates that the spray quality and quantity on the foliar part of the plants would be precise in application. Research findings in Southeast Asia, Ecuador, and Peru stated that farmers are aware of the health dangers of insecticide misapplication but do not discourage their usage.

Result and Discussion

The situation presents to consumer a pitiable state, because most of the consumers have little or no knowledge on the health risk associated with the consumption of vegetables, which most times are eaten fresh without being cooked. It is also a worst condition in the developing countries because of near absent of effective agricultural institution to educate and enforce policies and government regulation on food safety. Strong argument exist to support the use Agrochemicals, without it, food security may remain a mirage in Nigeria. To help solve this problem, the use of organic and biological means of pest control should be advocated. The use of pesticides with zero level post - harvest interval should be encouraged. For example, Thiamethoxamt pesticides have reduced risk of residual elements on plant. Companion planting system; benefits farmers to a large extent in pest control. Both plants are beneficial in pollination and insect deterrent. The activities of the insects are beneficial to both crops.

Agricultural extension agencies at all levels of government should be trained educate farmers and teach them best practices in the use of inorganic pesticides. Federal Government should market agricultural insurance organization to farmers. This would help them get compensation for damages caused by pest, fungi and others. Public service announcement on radio and television both by government and private own media houses should advocate the idea on proper use of washing vegetables with disinfectants such as chlorine, salt and other to ensure vegetable safety before consumption.

Conclusion and Recommendations

The study was undertaken to establish the effect of crop protection management on the health of consumer. Common crop protection practices in Nigeria shows a very high usage of inorganic chemical substances with dangerous effect on human consumption as discussed already. The health of millions of Nigeria is currently put in serious threat by the over dependence and abuse of pesticides application by larger scale vegetables farmers across Nigeria, mostly in the Northern states and others.

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