

Agrochemicals and Crops Productivity in Adamawa State University Farmlands in Gidan Madara, Mubi South Local Government Area, Adamawa State

Musa Hamza Shalangwa

*Modibbo Adama University of Technology Yola (MAUTECH)
Government Secondary School. Mubi, P.M.B. 17, Mubi*
mhgemyjik@gmail.com

Adamu Ahmadu

College of Agriculture Ganye Staff School, Adamawa State

ABSTRACT

A field survey was carried out at Adamawa State University Farmlands in Gidan Madara, Mubi South Local Government Area of Adamawa State. The aim was to investigate the farming chemicals and crops productivity in the University farmlands. A structured questionnaire for peasant farmers on palliation of farming chemicals on crop production was employed to elicit data. However, 100 copies of questionnaire were administered to farmers on the field. The questionnaires were randomly issued to the farmers directly on the farm during harvest season. Frequency counts and simple percentage were employed to analyse data presented in table. Results revealed that salt have corrosive effects on soil properties and plants growth. Farming chemicals imposed yellowing of leaves and inhabits growth. These symptoms affect maize healthy growth and yielding capacity. Farming chemicals bleached used to analyze the proportional impacts and severity on productivity of crop and soil components.

Keywords: *Adamawa State University Farmlands, Agrochemicals, crop production, fertilizers, herbicides and pesticides*

INTRODUCTION

Farming is a main source of livelihood for people in rural communities in Nigeria. Agriculture is directly linked to other sectors of the economy through the processing, consumption, and export of agricultural products (National Bureau of Statistics

(NBS), 2017). The NBS (2017) stated that agriculture provides about 29.15% of national income and employment for about 70% of Nigerians. Nigeria's agricultural development shows significant increase over the past few years due to availability of large and qualitative raw material resources to improve the quality and quantity of the crop (Idris 2017).

Modern agriculture hinges on chemicals (Sánchez-Bayo and Tennekes, 2017; Sarker *et al.*, 2020) for enhanced productivity. According to Idris (2021), some organizations and bodies have taken constructive initiative towards ensuring sustainable use of agrochemicals in Nigeria. Agrochemicals (pesticides and fertilizers) enhance crop production, farming, storage, marketing, distribution of grain, and seed dressing (Ogunjimi and Farinde, 2012). Agrochemicals such as pesticides and fertilizers are commonly used for farming in Nigeria (Ojo, 2016). The common chemicals (pesticides and fertilizers) used in farming to enhance growth and protection of plants are known as agrochemicals. Agricultural fertilizers have been described as chemical substances which provide plants with essential minerals needed for their growth and development. Some chemical supplements or minerals are vital for plant growth, which are usually supplied by fertilizers (Mekonnen *et al.*, 2016; Ramteke and Shirgave, 2012). They are agriculture chemicals (Leong *et al.*, 2020). Although, they are originally used to increase yields, they have been reported to have negative effects on soil (Sun *et al.*, 2019; Corcoran *et al.*, 2020). The unsustainable use patterns of agrochemicals can potentially lead to degradation of soil, water quality and adverse health.

According to the Food and Agricultural Organization (FAO) and the World Health Organization (WHO) (2016), pesticides are mixture of several substances intended to prevent, respond to, kill and reduce pests, such as vectors or human diseases, non-useful plants species or animals which cause harm in the process of agriculture production, processing, storage, transportation, trade in agriculture products, wood products, animal feed, or any substances use in controlling insects in animal productions, or other pests within or outside the body. Agricultural pesticides are known to contribute positively to agriculture yields (Kim *et al.*, 2017). The risks from pesticide vary significantly depending on natural toxicity of pesticide and exposure. Exposures to agrochemicals have been understood to constitute a major occupational hazard in many communities (Ozkara *et al.*, 2016). The worst situation

has pesticide poisonings and death due to illiteracy and insufficient pesticides hazard knowledge (Ojo, 2016). In Nigeria, agrochemicals are used extensively for crop production and control of pest in farming (Idris 2017).

Panchal and Kapoor (2013) observed that high demand for farmlands and food grains led to the extraordinary force to better farm yields and minimize losses in crops due to pest attacks. The use of herbicides can increase yields in many crops (Gianessi, 2013; Karim *et al.*, 2020). The formation of salt compound has corrosive effects on soil and plants growth. In addition, the quality of water sources can reduce expressively after chemicals are conveyed into surface and ground waters (Delpla & Rodriguez 2016). With chemical compounds in water body, aquatic microbes as primary constituents of all known water sources might cause adverse effects to human health (Hess-Erga *et al.*, 2019). Ikpesu and Ariyo (2013) described the effects of abuse and use of pesticides in rural areas. They suggested that producers and consumers should have a greater responsibility to reduce the risk of using short- and long-term pesticides.

Conversely, among peasant farmers there is concern of declining crops harvested annually. Theses may be due to influence of farming chemicals on crop production and soil components for the purpose of farm management. What are the causal factors of low productivity experienced on the farm with all the efforts and managements applied on the land? The study examines the of agrochemicals and crops productivity in the Adamawa State University Farmlands in Gidan Madara, Mubi South Local Government Area of Adamawa State. The aim is to examine the effects of herbicides, fertilizers and pesticides on crop production and soil properties.

RESEARCH METHOD

A fieldwork was conducted at Adamawa State University Farmland in Gidan Madara, Mubi South Local Government Area. The site is demarcated in thousands of plots that are being allocated to University staff and civil servants on rental basis yearly. The study employed structured questionnaire for peasant farmers on palliation of farming chemicals on crop production. However, 100 copies of questionnaire administered to farmers on the field at the Adamawa State University farmlands, Gidan Madara. The instrument was randomly issued to the farmers

directly on the farm during harvest season. Descriptive statistics such as frequency counts and simple percentage were employed to analyze the data presented in table.

RESULTS AND DISCUSSION

Table 1: The impacts of farming chemicals on crop production at Adamawa State University Farmlands in Gidan Madara

S/N	Plants Response to farming chemicals	Positive Impact	Negative Impact	No side Impact	Total Response
1	Flowering of crop	17	12	14	43
2	Yellowing of leaf	16	17	12	45
3	Crop Maturity	11	1	13	37
4	Crop yield	17	14	15	46
5	Soil structure	15	17	15	47
6	Water holding capacity	13	12	14	39
7	Soil degradation	11	15	17	43
	Total	100	100	100	300

Source: Field Survey, 2021.

The table 1 shows the respondents perception of impacts of farming chemicals on crop production at the Adamawa State University Farmlands in Gidan Madara. From the table, 17% of the respondents reported that farming chemicals have positive impacts on crops, while 14% were of the view that farming chemicals have no side effect on flowering of crops. Also, about 17% of the respondents observed that farming chemicals have negative impacts on yellowing of leaves, whereas 16% show that farming chemicals have positive impacts on yellowing of leaves.

However, about 13% of the respondents were of the view that farming chemicals have negative impacts on crop maturity, while another 13% view that farming chemicals have no side impacts on crop maturity. While 17% of the respondents observed that farming chemicals have positive impacts on crop yields, 15% noted that farming chemicals have no side impact on crop yields. Another 17% of the respondents revealed that farming chemicals have negative impacts on soil structure and 15% appeared twice with different views. The first 15% noted that farming chemicals have positive impacts on soil structure, while the second 15% noted that farming chemicals have no side impacts on soil structure.

About 14% of the respondents are of the view that farming chemicals have no side impacts on water holding capacity of the soil, whereas 13% view that farming chemicals have positive impacts on water holding capacity of the soil, which may not have definite impacts on hydrology of the soil. Salt have a corrosive

effects on soil properties as well as on plants growth. Farming chemicals imposed yellowing of leaves and inhibits growth. These symptoms affect maize healthy growth and yielding capacity. Farming chemicals bleached are used for analyzing the proportional impacts and severity on productivity of crop and soil components. The results show that some of the chemical radicals interact with metal ions on that piece of land. The result support the findings of Lechenet *et al.* (2017) that some of the chemical radicals interact with metal ions on that piece of land, as a result, most fungicides and insecticides never enhanced the anticipated harvests.

Nevertheless, 17% of the respondents see farming chemicals having no side impacts on soil degradation, but 15% see it having negative impacts on the soil degradation, which may affect fertility of the soil leading to low production of the crop yields. Adeola (2012) also explored how farmers perceive the pesticide impacts on vegetable production in Ogbomoso, Nigeria and found a high level of awareness of pesticide risks and recommended strengthening advisory services to educate farmers on the safest use of pesticides in the vegetable industry. However, continuous farming on the plots of land due to scarcity of farmlands in Mubi together with continuous utilization of farming chemicals have a detrimental effects on the soil components and production.

It was also observed that atrazine sprayed over five years on wetland, proves to have draining effects on hydrology of an area while some accumulated chemicals reacted with metals ions on the pieces of land that led to formation of soil compounds. Salts have a corrosive effect on soil chemistry, which damage the soil nature of that farmland. Only acid loving components can be grown on that land. Also, persistent use of herbicides and weedicides led to succession of new varieties of weeds and resistance grasses which invade the farmland.

CONCLUSION

Farming chemical substances have their toxic effects on the productivity of the University farmlands. Agricultural chemicals for instance, Diron, atrazine miafrum and pesticides (Best, Karret) have their severe impacts on the soil edaphic factors, hydrology, couple with unstable weather, dry spell, and climate change. All these may enhance poor harvest at the end of harvest season, experience annually by the peasant farmers. Farming chemicals imposed yellowing of leaves and inhibits plants growth. These symptoms affect maize healthy growth and yielding capacity. Farming chemicals bleached the fresh leaves of the crops, wilt, and dry off. These affect maximum efficiency of photosynthesis. This lesion affects production of crops at maturity.

REFERENCES

- Delpla I. & Rodriguez M. J. (2017) Variability of disinfection by-products at a full-scale treatment plant following rainfall events. *Chemosphere*, 166:453-462.
- Food Agriculture Organization and World Health Organization (2016). Guidelines on Highly Hazardous Pesticides, International Code of Conduct on Pesticide Management. Food and Agriculture Organization of the United Nations, Rome.pdf.
- Gianessi, L. P. (2013). The increasing importance of herbicides in worldwide crop production. *Pest Management Science*, 69(10), 1099-1105.
- Hess-Erga O. K., Moreno-Andrés J., Enger Ø. & Vadstein O. (2019). Microorganisms in ballast water: Disinfection, community dynamics, and implications for management. *Science of the Total Environment*, 657:704-716.
- Idris, Aliyu Ja'ag ii (2021). Effects of agrochemicals on soil and water quality in parts of rivers Niger and Kaduna catchments, North Central Nigeria. A Thesis submitted to the Postgraduate School Federal University of Technology, Minna, Nigeria in partial fulfillment of the requirements for the Award of the Degree of Doctor of Philosophy (PhD) In Environmental Management
- Ikpesu, T. O., & Ariyo, A. B. (2013). Health implication of excessive use and abuse of pesticides by the rural dwellers in developing countries: the need for awareness. *Greener Journal of Environment Management and Public Safety*, 2, 180-188
- Karim M., Rahman L. Ferdush J. Tareq Z. & Himel R. (2020). Yield, quality and cost of jute (*Corchorus* species) seed production as influenced by herbicide application time. *International Journal of Advanced Geosciences*. 8. 153-159. 10.14419/ijag.v8i2.31012.
- Kim, K. H., Kabir, E., & Jahan, S. A. (2017). Exposure to pesticides and the associated human health effects. *Science of the Total Environment*, 575, 525-535
- Mekonnen, M. M., Lutter, S., & Martinez, A. (2016). Anthropogenic Nitrogen and Phosphorus Emissions and Related Grey Water Footprints Caused by EU-27's Crop Production and Consumption. *Water*, 8 (1), 30.
- National Bureau of Statistics (NBS) (2017). Nigerian Gross Domestic Product Report.
- Ogunjimi, S. & Farinde, A. (2012). Farmers' Knowledge Level of Precautionary Measures in Agro-Chemicals Usage on Cocoa Production in Osun and Edo States, Nigeria. *International Journal of Agriculture and Forestry*. 2. 186-194. 10.5923/j.ijaf.20120204.10.

- Ojo, J. (2016). Pesticide use and health in Nigeria. *Ife Journal of Science*, 18 (4), 981-999
- Ozkara, A., Akyıl, D. & Konuk, M. (2016). Pesticides, Environmental Pollution, and Health. 10.5772/63094.
- Panchal, M. & Kapoor, C. (2013). Indian agrochemicals market to reach \$6.8 bn by FY17. https://www.business-standard.com/content/b2b-chemicals/indian-agrochemicals-market-to-reach-6-8-bn-by-fy17-tata-strategic-management-group-113081200449_1.html
- Ramteke, A. A & Shirgave, P.D. (2012). Study the Effect of Common fertilizers on Plant Growth Parameters of Some Vegetable Plants. *Journal of National Production and Plant Resources*, 2(2), 328-333.
- Sánchez-Bayo, F. & Tennekes, H. (2017). Assessment of ecological risks of agrochemicals requires a new framework. *Journal of Environmental Risk Assessment and Remediation*. 1. 20-28. 10.4066/2529-8046.100025.
- Sarker, M. N. I., Ahmad, M. & Memon, N. (2020). Potential food safety risk in fruit production from the extensive use of fluorine-containing agrochemicals. *Fluoride*, 53. 1-22.
- Sun C., Chen L., Zhai L., Liu H., Jiang Y., Wang K., Jiao C. & Shen Z. (2019). National assessment of spatiotemporal loss in agricultural pesticides and related potential exposure risks to water quality in China. *Science of The Total Environment*. 677. 10.1016/j.scitotenv.2019.04.346.