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Assessing the Impact of Agrochemical Misuse on Health and Environment: A Case Study of Ghanaian Agriculture

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ABSTRACT

The escalating global population demands heightened food production, prompting intensified agricultural practices worldwide. However, this surge in agricultural activity, particularly in underdeveloped regions like Ghana, often leads to the indiscriminate and excessive use of agrochemicals. This study delves into the ramifications of agrochemical misuse on human health and the environment, focusing on Ghana's agricultural sector. Through an examination of scientific evidence and empirical data, the study highlights the prevalence of agrochemical residues in food products and their association with various health conditions. Additionally, it scrutinizes the ecological consequences of agrochemical pollution, emphasizing the need for sustainable farming practices. By assessing the challenges posed by agrochemical misuse, this research advocates for the adoption of organic farming as a viable solution for achieving agricultural sustainability and safeguarding human and environmental well-being.

Keywords: Agrochemicals, Agriculture, Health, Environment, Ghana, Pesticides, Organic farming, Sustainable agriculture

INTRODUCTION

Agriculture stands as a cornerstone of global civilization, providing sustenance, economic stability, and cultural identity to societies across the world [1]. However, amidst the burgeoning global population and escalating demand for food, the agricultural sector faces unprecedented challenges. One of the most pressing issues confronting modern agriculture is the indiscriminate use of agrochemicals, which has far-reaching implications for both human health and environmental sustainability [2]. Throughout history, agriculture has continually evolved to meet the demands of growing populations. Technological advancements, coupled with scientific innovations, have revolutionized farming practices, leading to increased crop yields and enhanced productivity [3]. Central to this agricultural revolution has been the widespread adoption of agrochemicals, including fertilizers, pesticides, and herbicides. While agrochemicals have played a crucial role in modern agriculture by combating pests, enhancing soil fertility, and maximizing crop production, their excessive and indiscriminate use has raised significant concerns [4]. In many developing countries, where regulatory frameworks are often inadequate, farmers resort to the unrestrained application of agrochemicals as a means to boost yields and secure livelihoods. However, this approach has led to the accumulation of harmful residues in soil, water, and food products, posing serious risks to human health and ecological integrity [5]. Ghana, a West African nation with a rich agricultural heritage, grapples with the complex interplay between agricultural development, environmental sustainability, and public health. Agriculture forms a substantial portion of Ghana's economy, employing a significant portion of its workforce and contributing substantially to its Gross Domestic Product (GDP). However, the rapid expansion of agricultural activities, coupled with the intensification of farming practices, has raised concerns about the overreliance on agrochemical inputs [6].

This study seeks to examine the multifaceted impacts of agrochemical misuse on Ghanaian agriculture, with a particular focus on its implications for human health and environmental sustainability [3]. By analyzing scientific evidence, empirical data, and stakeholder perspectives, this research aims to elucidate the challenges posed by agrochemical misuse and explore potential pathways towards sustainable agricultural development [4]. Through a comprehensive examination of the prevalence of agrochemical residues in food products, their association with

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adverse health outcomes, and the ecological consequences of agrochemical pollution, this study endeavors to provide insights into the urgent need for reforming agricultural practices in Ghana [5]. Furthermore, by advocating for the adoption of organic farming techniques and fostering collaboration among stakeholders, policymakers, and international organizations, this research aims to catalyze positive change towards a more sustainable and resilient agricultural sector in Ghana and beyond.

METHODS

This study employs a mixed-methods approach, combining literature review, empirical data analysis, and stakeholder interviews. Scientific literature and statistical reports provide insight into the prevalence of agrochemical residues in Ghanaian food products and their impact on human health. Empirical data, including pesticide residue analysis and health statistics, are collected from relevant sources to assess the extent of agrochemical misuse and its consequences. Additionally, interviews with agricultural stakeholders, policymakers, and international organizations offer perspectives on the challenges and potential solutions regarding agrochemical management in Ghana.

Chemical use of crops in Ghana by Agro.

As the agriculture is almost 41% worth of the national Gross Domestic Product (GDP) [6], it can be seen as the main pillar of the Ghanaian economy. With just 57% of the country's total land in production agricultural, efficiency in land management and adopting modern agricultural techniques is a prerequisite for the acreage to meet the growing population needs [6]. The application of crop protection chemicals, provision of organic fertilization, and boosting water and soil management procedures are viewed as key factors to agri-production increase [7]. However, the development of a pattern burst is observed that it results in shrinking of agricultural land which requires a more intensive use of agrochemicals to compensate the deficiency of food production [7].

Agrochemicals that include fertilizers, pesticides, and insecticides are broadly used across the world during the growth of several crops like cocoa, palm oil, cola nuts, coffee, cotton, vegetables, fruits, various tubers, and legumes [7]. Nikalelisthomo agrochemicals, which are dominant fertilizer size used in pineapple cultivation where this plant loves sandy soils [7].

Pesticides Response in the Comestibles

Detection of pesticide residues in food under different names carries long-term implications for public health. [4]. The samples of street food in Accra street in Ghana during 1999-2000 showed super high levels of pesticide residues, microorganisms, heavy metals, and microorganisms [4]; [8]. Chlorpyrifos, insecticide, was detected in the samples of waakye (rice beans) and fufu (cassava and plantain dough for the stomach) [4]. Vegetables in Ghanaian market were also identified to be having traceable content of all kind of pesticides, including chlorpyrifos, lindane, endosulfan, lambda-cyhalothrin and DDT residues [4]. Several studies on the plaintiff be a witness residue on export quality cocoa beans from different districts in Ghana, but these residues had lindane exceeding the maximum residue level set up by the Codex Alimentarius Commission [9]. Other studies have detected organochlorines in fruits, vegetables, fish, and fish products, and low levels in some products exceed the maximum residue limits recommended which is likely to cause harm to the consumer [10]; [11].

The problem of pesticide exposure and its repercussions on health is one of the most frightening issues related to agriculture nowadays. However, in the context of health preservation and prosperity, the misuse of pesticides has brought about major challenges. These pesticides proved to cause damage among both animal species and humans; they resulted in fish kills and reproductive failure among birds, and sicknesses in the case of human acute illnesses. In the case of Ghana, the deficiency in the national statistics on farmers poisoned by pesticides corresponds to certain factors like the low level of the awareness of the symptoms and costs of medicine which are high as well as the omission by health workers in reporting [12]. Exposure to pesticides has resulted in cancer for humans, especially in locations where DDT, and its metabolites DDE remains in the environment.

A survey on the use of pesticides causing symptoms among farmers of irrigation projects unveiled that 36% of them perceived these adverse effects, including headache, dizziness, fever, blurred vision and nausea or vomiting [12]. Also, research that took place during the period of 1989-1997 found that in 30% of the examined poisoning's cases chemical toxicity was the cause of death, inorganic, organophosphorus or organochlorines being the main contributors to the deaths [12]. Aside from the intensive use of synthetic agro-chemicals which is painstakingly propagated by infertility, poor farming habits and illegal mining, these becomes enough reason to question its sustainability. Though the agrochemicals contributes to the increased crop production, the indiscriminate use of these chemicals frequently causes the issue related to health and the environment. Encouraging the change to sustainable organic farming techniques alongside global norms which go towards environmental preservation may come to the aid on this issue. The organic farming systems stand as a valuable option, bringing about a sustainable agricultural development, which implies reduced application of chemicals to farming and their consequent negative results on human life and environment. Partnership between the agricultural stakeholders, policymakers, and the

international organizations is of great need to promote and design better use of agrochemicals as well as to disseminate the adoption of organic farming as a way of realizing a healthier and stable ecosystem.

CONCLUSION

The indiscriminate use of agrochemicals in Ghana's agriculture poses significant threats to human health and the environment. Evidence suggests that agrochemical residues in food products contribute to various health conditions, while their pollution adversely affects ecological balance. To address these challenges, a paradigm shift towards sustainable farming practices, particularly organic farming, is imperative. By promoting the adoption of organic farming techniques and fostering collaboration among agricultural stakeholders, policymakers, and international organizations, Ghana can achieve agricultural sustainability while safeguarding the well-being of its populace and environment.

REFERENCES

1. Carvalho, P. F. (2006). Agriculture, Pesticides, Food Security and Food Safety," Environmental Science and Policy, Vol. 9, No. 7-8, pp. 685-692.
2. Kwakye, M. O., Mengistie, B., Ofosu-Anim, J., Nuer, A. T. K, and Van den Brink, P.J. (2018). Pesticide Registration, Distribution and Use Practices in Ghana. Environment, Development and Sustainability.
3. Tariq, M. I., Afzal, S., Hussain, I. and Sultana, N. (2007). Pesticide Exposure in Pakistan: A Review. Environment International, Vol. 33, No. 8, pp. 1107-1122.
4. Bempah, C. K. and Donkor, A. K. (2011). Pesticide residues in fruits at the market level in Accra Metropolis, Ghana, a preliminary study. Environmental Monitoring and Assessment. 175 (1-4):551-561
5. Clarke, E. E. K., Levy, L. S., Spurgeon, A. and Calvert, I. A. (1997). The Problems Associated with Pesticide Use by Irrigation Workers in Ghana. Occupational Medicine, 47, 5, pp. 301-308.
6. Ministry of Food and Agriculture (MOFA), "Agriculture in Ghana: Facts and Figures," Produced by the Statistics, Research and Information Directorate, Accra, 2003.
7. Ntow, W. J. (2001). Organochlorine Pesticides in Water, Sediment, Crops and Human Fluids in a Farming Community in Ghana. Environmental Contamination and Toxicology, Vol. 40, No. 4, pp. 557-563.
8. Acquah, S. O. (1997). Lindane and Endosulfan Residues in Water and Fish in the Ashanti Region of Ghana," Proceedings of Symposium on Environmental Behaviour of Crop Protection Chemicals by the IAEA/FAO, IAEA, Vienna, 1-5.
9. Botchway, F. (2000). Analysis of Pesticide Residues in Ghana's Exportable Cocoa," Higher Certificate Project, Institute of Science and Technology, London.
10. Lema, E., Machunda, R. and Njau, K. N. (2014). Agro-chemicals use in horticulture industry in Tanzania and their potential impact to water resources. International Journal of Biological and Chemical Sciences. 8(2): 831-842.
11. Kuranchie-Mensah, H., Atiemo, S. M., Palm, L. M. N. D., Blankson-Arthur, S., Tutu, A.O., and Fosu, P. (2012). Determination of organochlorine pesticide residue in sediment and water from the Densu river basin, Ghana. Chemosphere. 86(3):286-292.
12. Yeboah, F. A., Mensah, F. O. and Afreh, A. K. (2004). The Probable Toxic Effects of Aerosol Pesticides on Hepatic Function among Farmers at Akomadan/Afrancho Traditional Area of Ghana. Journal of Ghana Science Association, Vol. 6, No. 2, pp. 39-43.

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