European Scholar Journal (ESJ)
Available Online at: https://www.scholarzest.com
Vol. 5 No. 2, February 2024
ISSN: 2660-5562

CLEAN AGRICULTURE'S ENVIRONMENTAL IMPACT/ A REVIEW ARTICLE

Abrar Thamer Al-Safaar[1], Rana ihssan hamad[2], Israa radhi khudair[3], Reyam Naji Ajmi [4],
[1],[2],[3]Baghdad University College of education and pure science (Ibn-alhaitham)
[4] Department of Biology Science, Mustansiriyah University, POX 46079, Iraq-Baghdad.
Corresponding Email: Abrar.t.s@ihcoedu.uobaghdad.edu.iq, reyam80a@uomustansiriyah.edu.iq

Article history:

Received: 8th December 2023
Accepted: 7th January 2024
Published: 10th February 2024

Abstract:

Clean agriculture must be managed in a preventive and responsible manner to ensure the environment, health, and survival of current and future generations. It is a live, dynamic system that reacts to influences and internal and external factors. Clean agriculture practitioners can improve efficiency, increase production, and evaluate new technologies, especially when understanding agricultural ecosystems to provide a good plant environment for plant growth, as agriculture is considered one of the most important activities that man has practiced since ancient times. Its access to food and the integration of applications and technologies across sectors enhance the development of the food and agricultural sectors by integrating new farming practices through the industrial sector.

Keywords: Environmental Pollution, Clean Agriculture, Impact , Botany Sector

INTRODUCTION

Clean agriculture is an approach to agricultural production that eliminates the use of chemicals, particularly fertilizers and pesticides. Many people feel that clean farming methods are the sole option, yet there are various approaches that all fit under the banner of building biological natural systems, often known as agriculture. Biodynamic and organic farming are important aspects of clean agriculture [1]. Biodynamic and organic agriculture is based on the principles of a well-established scientific field concerned with the natural balance of the universe and the preservation of natural resources such as soil, water, and aerial elements in the production of clean crops, among others. Organic and biodynamic agriculture are good for preserving crops from a variety of diseases and pest infections, as well as caring for the environment and preventing contamination [2]. Various researches and studies conducted on various fruits, it was found that they contain residues of chemical fertilizers and pesticides at a higher percentage than permitted, and there is little information about the effect of these substances in the long term and the toxicity they cause were the most important criticisms directed at current agriculture, led to deterioration of soil structure and deterioration of the natural environment and traditional lands with health [3].

Excessive use of chemical fertilizers and pesticides has become a danger that threatens citizens' lives and infects them with serious diseases such as cancer and others. Fertilizers were one of the most important factors that helped increase and develop agricultural production, but the unjust and indiscriminate use of it by farmers has left negative effects on the environment and citizen health as it interacts with the soil and leaves negative effects on vario It causes various environmental problems, including [4]:

A- The use of chemical fertilizers containing nitrogenous substances, such as nitrate, can lead to leukemia in the stomach and intestines. Additionally, the use of urea fertilizer, which contains a toxic substance that decomposes at high temperatures and releases ammonia gas, can lead to infections, respiratory syndrome, and infertility.
B- Excessive use of chemical fertilizers, particularly those high in nitrates, can cause crop harm to the mother, land, and beast, resulting in lower yields.
C- Phosphate fertilizers can cause cadmium accumulation in soil, which is harmful to human health. Organic agriculture, on the other hand, relies on natural resources and has a positive impact. Maintaining environmental balance by developing biological processes to the optimum and protecting

the environment soil is one of the cornerstones of organic farming, and there is much evidence for scientists that organic food is safe and nutritious.

Compared to non-organic food, consumers seek to increase their demands for mineral elements and vitamins by ingesting them from organic sources rather than those that have been subjected to pesticide residues or chemical fertilizers. All of this has led to a search for new environmentally friendly agricultural practices and tactics that limit the use of agricultural crops chemical fertilizers by creating other forms of fertilizers, such as organic and biological, all with the goal of producing healthy food. It is safe for people and protects the environment for future generations [5,6].

1-1 What are modern farming methods:

Precision agriculture, vertical farming, artificial intelligence, modern greenhouses, modern agriculture, livestock technology, information system and Geographic GIS[7].

A-Vertical/indoor vertical farming: Growing crops in vertically stacked layers, with controlled environmental conditions to improve growth plants, and soilless farming techniques such as hydroponics . Vertical farming relies on a range of innovative methods and technologies. It is considered integrated together, this is essential in order to make vertical farming a tangible reality, include according [8] :

1- Protected agriculture that relies on isolated structures or facilities made of materials clean closed environment that can control pests (Plastic) that allows sunlight to pass .
2- Aerobic agriculture, which relies on water vapor and humidity instead of irrigation specifically designed to stimulate the growth of traditional and electronic lighting technologies (LED) plant by providing the ideal light spectrum for photosynthesis the plant through this type, all environmental factors can be controlled. Where can be used industrial control of light and environmental control (humidity, temperature, gases) and fertilization.

B-Vertical farming has many features: Reduces the impact of agriculture on the environment water and energy consumption; where used vertical farms up to 70% of less water than traditional farms reduced labor costs, by using robots in handling harvesting, farming, logistics services and farmer problem solving the difficulty faced by the current labor shortage in the agricultural industry increase crop production and cultivation controlling variables such as: light, humidity, and water on limited areas of land[9].

C-Automation of farms/robotic farms: Aim to cover tasks easier and faster. Farm automation technology addresses key issues, such as securing continuous consumer demand, lack of agricultural labor and providing products with the highest quality specifications, It is a technology that makes farms more efficient called “Smart agriculture” use of robots to develop drones that can be used in land surveying open agricultural areas and knowing the cultivated areas of different crops or designing spraying programs through them for control operations, which have recently been used in desert locust control operations, and self-propelled tractors control, automated harvesters, automated irrigation, and automated robots[10].

D-Modern protected agricultural houses and facilities: Agricultural greenhouses are becoming more complex. In particular, it requires special climatic conditions. This means integrating the following facilities into structures energy climate screens help provide shade, and climate screens[11].

E-Renewable energy systems: In order to eliminate energy consumption, reduce and protect crops from sun damage, and create the appropriate climate for crops, solar panels, wind energy and geothermal energy to power themselves. Costs Modern greenhouses use alternative energy sources. Since water is a precious resource, greenhouses are used irrigation systems and hybrid or traditional micro irrigation, with water recycling functions. Modern greenhouse systems provide climate control to create heating and cooling[12].

F-Environmental conditions that facilitate optimal plant growth: Greenhouses operate through automation process automation irrigation and climate to energy generation. Numeric can also be added to a process the air can further improve types of greenhouse structures suitable for desert agriculture as an example. Automation functions. Sensors on plants in water systems[13].

G-Precision agriculture: Precision agriculture: It is agriculture that depends on technology and satellites industrial and Global Positioning System (GPS) systems to understand different variables related to the process agricultural, such as determining appropriate amounts of irrigation, fertilizers, and forecasting harvest periods and quantities. Agriculture goes through stages of development; Where technology has become a part of indispensable in every commercial farm and agricultural companies new micro technology is developing that allows farmers to increase maximize production by controlling every variable crop cultivation, such as: humidity levels, and stress resulting from pests, soil conditions and micro-climates[14].

H-Precision agriculture and nanotechnology applications: It is the technology of extremely small particles, measuring matter in one billionth of a meter, meaning 1:800 of a hair. Humans can understand the size of nanometers and metres, just as it is the difference between a golf ball and the Earth. Applications of precision agriculture using nanotechnology include Green Revolution of the twentieth century was based on the irresponsible use of pesticides and chemical fertilizers, which led to loss of soil biodiversity and increase in resistance to pathogens and pests[15]. So the new revolution began around agriculture micro, powered by nanotechnology. Which will contribute to the release of nanoparticles into plants and advanced biosensors to promote precision agriculture, fertilizers, pesticides and herbicides are used within nanocapsules that release substances, nutrients and agricultural chemicals are supplied slowly and sustainably, giving precise doses to crops. A nanobiosensor is a sensor composed of nanomaterials that can detect the presence of a chemical compound between a biological component and a physicochemical detector via biological interactions[16].

1-2 Benefits of using nanotechnology in the field of precision agriculture:

Reducing fertilizer waste by about 60%. Nanofertilizers help in releasing agricultural pesticides are administered slowly and sustainably to give precise doses to crops and protect plants and treat diseases better. Where biosensors can to detect the presence of pesticides in crops, to help make informed decisions the information. It is a shared and immutable ledger that facilitates the process of recording transactions and tracking assets in a business network. It provides information instant and transparent, in an uneditable record. In other words, it ensures tracking of orders, payments, accounts and above all production, which generates trust greater shareholders and consumers transparency and allows you to collect a large amount of information: from seed quality to crop growth, and even the distribution path[17].

The clarity of the process leads to a protection mechanism towards producers who adopt such environmentally friendly practices which are often economically to track ownership records and resist tampering can be used to solve urgent problems, such as food fraud , recall safety, supply chain inefficiency, and food traceability in the current food system to fuel this dynamic, producers and processors along the supply chain need to enter information into a blockchain ledger. This will create a kind of digital ledger, showing farm practices from operating transport networks, commercial contracts and reducing production instances illegal [18]. Ensuring food safety adds value to the current market by creating a digital ledger in the network and balancing market prices. The traditional price mechanism of buying and selling relies on customer judgments, rather than information provided by the entire value chain. Access to data creates a comprehensive picture of supply and demand, allowing securely verified transactions to be exchanged with every customer in the food supply chain, creating a market with tremendous [16]. Artificial intelligence considers that the rise of digital agriculture and related technologies has opened up a plethora of major new data opportunities; sensors can detect remotely, while satellites and drones collect information for a whole field 24 hours a day. Artificial intelligence technology in agriculture is defined by monitoring (plant health, soil condition, temperature, humidity)[18].

4. CONCLUSION

The agricultural sector is considered one of the most important leading sectors in the national economy of any country, as it works through integrated strategies to achieve sustainable agricultural development that is consistent with social, economic and political requirements, which has an impact in raising rates of agricultural development, increasing crop productivity, increasing exports, increasing the area of reclaimed lands, and maximizing the use of waste. Agriculture and rationalizing the use of agricultural chemicals, such as fertilizers and pesticides, which leads to protecting the environment from pollution and achieving healthy food security in Egypt free of chemicals. Agricultural development is exposed to some modern concepts in the environment, the most important of which is clean agriculture. The Ministry of Agriculture and its various bodies have paid attention to clean agriculture in the fields of agricultural research and production to create a boom in agricultural production to achieve self-sufficiency and an attempt to export with specifications accepted by the global market, free of chemicals, which makes it safe for the health of the individual and reduces the problem of pollution.

The concept of clean agriculture includes modern trends in the field of integrated control of agricultural pests through several basic methods, including agricultural operations, the use of pheromones, the use of biological control, the cultivation of resistant plant varieties, and the use of a prediction system. And early warning, remote sensing, green fertilization, biofertilization, fertilizers that fix atmospheric nitrogen symbiotically and non-symbiotically, fertilizers for dissolving and mineralizing organic phosphates, industrial organic fertilizer from agricultural waste, using algae as an improver for newly reclaimed desert lands, and using genetic engineering in the production and approval of seeds. As well as collecting genetic assets into plant collections to preserve these assets

ACKNOWLEDGMENT

The authors would like to thanks Mustansiriyah University (www.uomustansiriyah.edu.iq) Baghdad–Iraq for it support in the present work and extremely grateful to Baghdad University College of education and pure science Ibn-alhaitham and all the people help us to get our data.

CORRESPONDING AUTHOR: Dr. Reyam Naji Ajmi

Department of Biology Science, Mustansiriyah University, POX 46079, Iraq-Baghdad
Email: reyam80a@yahoo.com , reyam80a@uomustansiriyah.edu.iq ; ORCID: https://orcid.org/0000-0003-2623-6671¸

REFERENCES:

1. FAO. 2021. The State of the World's Land and Water Resources for Food and Agriculture – Systems at breaking point. Synthesis report 2021. Rome, FAO.
2. FAO & ITPS. 2015. Status of the World's Soil Resources (SWSR) – Main Report. Food and Agriculture Organization of the United Nations and Intergovernmental Technical Panel on Soils, Rome, Italy.
3. Ajmi, R.N., Sultan, M., Hanno, S.H. Bioabsorbent of chromium, cadmium and lead from industrial waste water by waste plant. Journal of Pharmaceutical Sciences and Research, 2018, 10(3), pp. 672–674.
4. FAO. 2022. Greenhouse Gas Emissions from Agrifood Systems. Global, regional and country trends, 2000–2020. FAOSTAT Analytical Brief 50.
5. Ajmi, R.N., Lami, A. Ati, E.M. Ali, N.S.M. Latif, A.S. Detection of isotope stable radioactive in soil and water marshes of Southern Iraq. Journal of Global Pharma Technology, 2018, 10(6), pp. 160–171.
6. OECD. 2022. Agricultural Policy Monitoring and Evaluation 2022: Reforming agricultural policies for climate change mitigation. OECD Publishing, Paris.
7. Bureau, J. C. & Antón, J. 2022. Agricultural Total Factor Productivity and the Environment: A Guide to Emerging Best Practices in Measurement. OECD Food, Agriculture and Fisheries Paper n°177. OECD Publishing, Paris.
8. OECD. 2011. Fostering Productivity and Competitiveness in Agriculture. OECD Publishing, Paris.
9. Bureau, J. C. & Antón, J. 2022. Agricultural Total Factor Productivity and the Environment: A Guide to Emerging Best Practices in Measurement. OECD Food, Agriculture and Fisheries Paper n°177. OECD Publishing, Paris.
10. Fadhel R, Zeki HF, Ati EM, Ajmi RN. Estimation Free Cyanide on the Sites Exposed of Organisms Mortality in Sura River /November 2018. Journal of Global Pharma Technology. Technology. (2019); 11(3) (Suppl.): 100-105
11. FAO. 2020. The State of Agricultural Commodity Markets 2020. Agricultural markets and sustainable development: Global value chains, smallholder farmers and digital innovations. Rome, FAO.
12. Rawat, S. 2020. Global volatility of public agricultural R&D expenditure. In Cohen, M., ed. 2020. Advances in Food Security and Sustainability. Elsevier, Vol. 5, pp. 119-143.
13. Johnstone, N., I. Hascic, & M. Kalamova. 2011. Environmental policy design characteristics and innovation. OECD Stud. Environ. Innov. pp. 19-46.
14. Zeki, H.F., Ajmi, R.N., Mohammed Ati, E., Phytoremediation mechanisms of mercury (Hg) between some plants and soils in Baghdad city. Plant Archives, 2019, 19(1), pp. 1395–1401.
15. Fuglie, K. 2016. The growing role of the private sector in agricultural research and development worldwide. Global Food Security, Vol. 10(2016), pp. 29-38.
16. Rawat, S. 2020. Global volatility of public agricultural R&D expenditure. In Cohen, M., ed. 2020. Advances in Food Security and Sustainability. Elsevier, Vol. 5, pp. 119-143.
17. Pardey, P. G., Chan-Kang, C., Dehmer, S.P. & Beddow, J. M. 2016. Agricultural R&D is on the move. Nature, 537: 301–303.
18. World Health Organization, Ammonia in drinking water-background document for development of WHO guideline for drinking water quality, 4th Ed., WHO Series, Geneva, (2021).