Nat. Volatiles & Essent. Oils, 2021; 8(5): 1939 - 1949

NVEO
Natural Volatiles & Essential Oils

The Impact of Environment Due to the Use of Advanced Technology in Agriculture

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Abstract:

Agriculture is the most important and the oldest preparation of food supply for our survival. When the population increases and the demand for food are also increasing. Environmental pollution is the main issue that the living being is facing today. Agriculture is in contact with water, soil, and air that may be polluted by some chemical pesticides and fertilizers they may face harmful health significances, for instance. By each component of the ecosystem is impacting, these practices affect the plants health and living animal in the ecosystem and also this advanced technology is used for human beings. There are many impacts of advanced technology that are affecting agriculture. Due to this advanced technology, the productivity of agriculture cop is got increased, the environment is also affected and it leads to changes in climatic conditions, genetic engineering, deforestation, dead zones, waste, and soil degradation. Some of the important threats in the Agriculture environment are the negative impacts of changes in climatic condition are positively contributing the agriculture, to substantiate this statistic by inadequate data. In this research paper, we challenge to explain the impact of environmental causes due to the technology improvement that is facing by agriculture.

1. Introduction

The impact of the environment that causes the greatest damage to agriculture in developing countries; because primarily low latitude in many forms, climatic endures that is very hot (Mendelsohn 2008). The agriculture landscape is adopting the species capable that may be limited in a straight line of disturbance of grazing regimes, harvesting and planting and the abundance of plants are tortuously and the foods for insects are available. There are many undesirable environmental effects are associated with pesticides and fertilizer usage in agriculture farming. To realize the impact of the environment in agriculture is very important among various species and regions, and the real effects have not been generally investigated for many types in any one of the localities (McLaughlin and Mineau 1995b).

Nowadays the thermal power plant sector and the transport sector is the most suppliers of air pollution all over the country, and there are several numbers of factories are producing the number of plastic bags that are very popularly used by the people for their shopping purpose because it is easy and convenient for their daily use. Those peoples have low awareness about the hazardous due to these issues, many countries have banned the usage of plastic bags over the negative impact on the environment (Jalil, Mian, and Rahman 2013). This plastic bag is one of the impacts on the environment, in this advanced technology, there are many impacts of agriculture on the environment.

Due to this advanced technology, the soil and water resources got degradation is the major threats for the living being and the environment that leads to change in soil and climate, peculiarities and

topography of the agriculture. Both direct and indirect effects on the quality of water and soil resources on agriculture and also disturbed by micro and macro-scale factors at the watershed scale (Zalidis et al. 2002). The micropollutants are not removed by using the urban wastewater management plans, they may have a long-term result than the thought previously. Urban wastewater treatment plants (UWWTPs) discharge the effluents and the quality of surface water is the main responsible for atmospheric deposition. The main basis of the pollution to water is UWWTPs since the industries produced several chemicals or the household things that enter into the sewage system and that directed into the UWWTPs and this also affect the agriculture in the environment (Pesqueira, Pereira, and Silva 2020). The release of 'greenhouse gas (GHSs) into the atmosphere that causes the climatic changes. The parameter is related to the change in climates such as sea level, temperature, soil, and moisture. The important sector that contributes to the climatic change is agriculture. Agriculture contributes to both climatic change and then it is affected by the changes in climatic condition (Aydinalp and Cresser 2008)

The major biodiversity loss is considered as Invasive Alien Plants Species (IAPS) and the ecosystem services are altering and the conditions of socio-economic through the different types. The panoramic of the current review is aimed to be environmental investigate, risks on health and the socio-ecological that are posed by IAPS as well as the compounded IAPS impact with the fragmentation of habitat, changes of land use, and climatic condition. In the biomedical sector advancement, human health safeguard risks is presence impeded by the global environmental changes (Rai 2020). The problems of environmental quality in the agriculture-based industry on the high extraction of the variable natural resources that are under the stochastic conditions, in this the resource variability causes the heterogeneity and the uncertainty (Lichtenberg 2002).

The presence of pharmaceuticals and their fate in the environment is also affecting agriculture. The effects and risks may underestimate the classical tests. This presence in the environment may directly or indirectly affect agriculture, they cause diseases and also affect human beings. The chemical full life cycle will be understanding the lead different functionality is essential for a chemical. The active compounds are available in the environment are demonstrated extensively these research interests are moved from compound analysis, still its undertaken (Kümmerer 2009). The most warning nutrient is nitrogen (N), which controls the efficiency of crops. The agriculture soils are less in N content, this N fertilizer is mostly used for achieving better yielding. The N to the agriculture soils is predictable to increase in the food grain requirements in all country (Fagodiya et al. 2020).

The remaining part of this research paper has explained the Impact of the environment due to advanced technology in agriculture as follows; part 2 represents the previous work highlights that can be done by research scholars related to this domain, part 3 provide the details about the architecture model and their mechanism, part 4 present evaluation and the performance as result and discussion, and part 5 represent the conclusion of this research work.

2. Related Work

The new novel method is introduced and that presents the smart approach that suitable for food production in traditional agriculture; food production aspects the major problem such as climatic

changes, population increases, and degradation of natural resources including soil degradation and loss in biodiversity. The green revolution has multiplied the production of agriculture are folds then the high cost of environmental that with the climatic changes. Traditional agriculture has more attention in worldwide sustainable food production in climatic changes and also considers the difference between the climatic change on agriculture. The agriculture that contributes the GHG emission. The reduction of Greenhouse emission that will prevent the climatic changes and that reduce the cardio heart disease, diabetes and also reduce the livestock production in heavy consumption cities world-wide. The traditional practices on smart agriculture are coupled with the modern sustainable of farming has a noble choice for change in climatic condition adaptation and mitigation for increasing the production of food, This is explained on paper (Singh and Singh 2017).

(Arora 2019) Changes in climatic conditions are one of the most concern and the process of alternating the ecosystem in the world. Temperature is increased on earth mainly due to the emission of Greenhouse gas on the atmosphere, it may be increased due to deforestation. Then the GHG emission got increased, it will affect the soil, water and air are getting polluted. This greenhouse gas has nitrogen, carbon dioxide, and methane, during farming these gases are get pollute food and crop production, and that produce diseases. (Friel et al. 2009)The increase in temperature gets dearth, irregular pattern of precipitation, floods, and other extreme disaster is happening on the globe. By reaching the 9.7 billion population in 2050 would enlarge the food demand then the pressure on agricultural areas is affected by the effects of climatic changes. Agriculture and change in climate have complicated links, unexpected changes in climate condition that threatened food security on a global scale. Then it causes difficulties on cope up with the needs of the growing population.

(Wu et al. 2020) explains the development of agriculture in China, global green development is necessary for all country and it transforms agricultural energy utilization. In this energy efficiency are affecting several factors, mostly in industrial accumulation. The important changes to the spatial plan on the agriculture industry are caused by the characteristic of the agriculture product region and grains. There is a lack of study of agriculture energy efficiency (AEE) impact changes. The spatial series of models are used to examine the agriculture effect on agriculture manufacturing accumulation. The results indicate the shown obvious slopes and links. Then after monitoring the spatial effect link, a positive impact was found in AEE. Energy optimization promoting the energy structures in agriculture and green technology development at the farm level and the rural areas.

Nano-fertilizer is used to improve the efficiency and productivity of the nutrients, minimize the contamination of possible related issues and decrease soil toxicity (Hamad et al. 2020). This is very effective in the study field with the possibility to drastically changes that observe and create the changes in the agriculture field, chemical water management, and biomedicine among others. The efficiency of fertilizer can progress by using zeolites and nano-clays that restore soil fertility and quality. (Aktar, Sengupta, and Chowdhury 2009) the insecticides used in agriculture include a large number of compounds that include fungicides, insecticides, herbicides, and others. They are used to controlling the diseases such as typhus and malaria, they are banned in the most technological countries. The

controversy of abuse and use of pesticides has surfaced that has played havoc with human life and other forms.

(Lamek et al. 2016) that generated agriculture serious concern on the environment that includes soil erosion, greenhouse gases, and water pollution. The parameters of physical-chemical and the heavyweight metals of resources water or bounded by the mountains cultivated were adopted. In Rwandan, the soil almost slopes steeply, this heavily exposures to erosion of soil, loss of fertility, and landslides that the enduring crops to increase the fertility then that decrease the soil erosion control. We need to monitor the quality of water and that promotes the purification measures, timely irrigation, to fertilize and appropriate. To expand the areas for permanent crops and agroforestry, durable for soil erosion to promote bench terraces observes and soil erosion control and quality of water in Rwanda.

2.1 Scope and Objective

This paper represents the research objective of impact on the environment due to advanced technology in agriculture;

- Impact of advanced technology and LCA in agriculture
- Improve food and farming technology.
- Impact of climatic change on agriculture.
- Advantages and disadvantages of using modern technology in agriculture

On this research of advanced technology used in agriculture, farmers will aware of the modern technology and the threats of advanced technology that affect crop production and causes disaster. All the half of food production are related to the greenhouse emission are produced during the farming, the emission that includes the methane from the livestock, nitrogen and carbon dioxide from agriculture that generate changes in land use and leads to deforestation, and this modern technology will increase the crop production. Analyze and provide the precaution, prediction, and uses of advanced technology in agriculture.

3. Methodology

This section describes the effect of modern technology in agriculture. Climatic change is the major threat to the agriculture sector that changes the temperature, seawater level, concentration of CO_2, and rainfall patterns in the atmosphere. The climatic changes affect the safety for food indirectly then the directly over the effects on food production. Reappearance of the flood events and drought associated with the climatic changes and variability has unpleasantly affected food security, (Kogo, Kumar, and Koech 2021)Most countries affected by the dearth and that have a continuing food fault. An growth in the intensity and regularity of the exciting procedures such as heavy rainfall, high maximum temperature, droughts, and flooding are occurring and that expect to accelerate in many regions (Lipper et al. 2014).

Traditional agriculture is got increased worldwide attention on food production in the context of sustainable climatic changes. A climatic changing condition that increasing the concentration of

chlorofluorocarbon (CFC), Carbon dioxide (CO_2), methane, and other "greenhouse" gases (Adams 1989). Global warming shares about a 12% increase in total anthropogenic GHG emissions. This emission consists of Carbon dioxide (CO_2), Nitrous Oxide (N_2O) and methane (CH_4) are the major things that emitted from GHGs emitted by agricultural farming. In climatic change, the agroecosystem is heavily sensitive and susceptible (McLaughlin and Mineau 1995a). It affects both human health care and food production. The adaptation will dull some of the worst predictions, then the warming causes large damage to agriculture (Mendelsohn 2008) This emission will affect the living being deadly disease are caused, water and soil are also affecting.

Internet of Things (IoT) is used agriculture sector, the sensor that empowers to inform each other drop the data and more information among them (Jaiganesh, Gunaseelan, and Ellappan 2017). The cloud agriculture and benefits of IT gives an administration ability to farmers to develop their yields, composts, maladies, estimating details technique to cure the shot at agriculture. (Brentrup et al. 2004) life cycle assessment is evaluating the impact of environmental on herbal nutrients in food production and that contains the mixture of some events. The LCIA (Life Cycle Inventory Assessment) (Kløverpris, Wenzel, and Nielsen 2008). This approach that includes the normalization weighing factors and values to allow the decision of the environment on several herbal nutrition scheme.

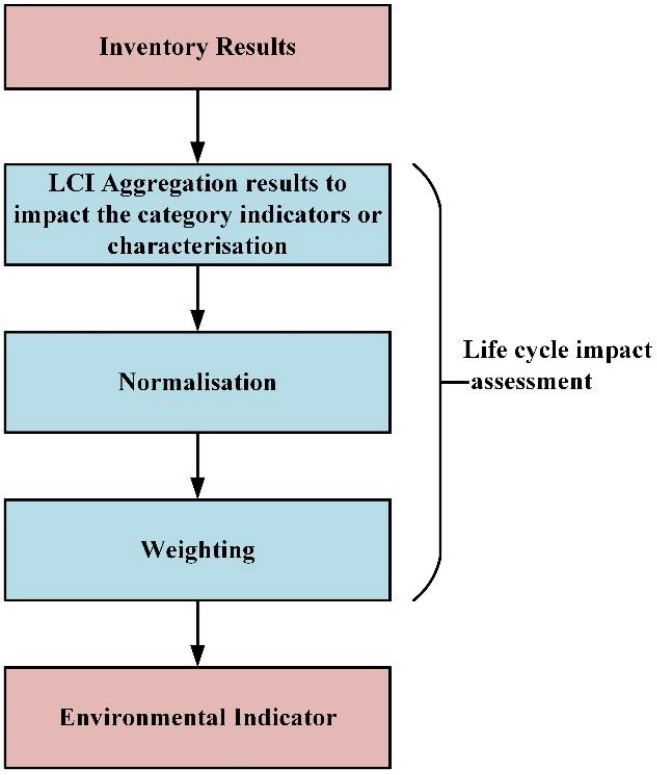

Figure 1. Life cycle of the impact assessment procedure

Fig.1 shows overview of the general LCIA procedure and its several elements. According to the ISO accumulation of inventory outcome results to the effect, classes are compulsory in a LCIA(Lundin and

Morrison 2002). The category list of effect indicator standards under the system examination is named as environment profile. Further the environment profile interpretation, a standardization stage that narrates to the indicator standards to position values. Thus, the resulting standardized indicator values that share the analyzed system in the reference value defined. Further in the ensuing, weighting period that standardized the indicator morals are increased by the increment factors, represents the possibility of the several environment categories effect to the normal harm ecosystem, resources, and human health. Standardized indicator values for the global warming of a product or analysis organization are increased by a weighting exact factor for the global warming (Fagodiya et al. 2020). Later, the indicator weighted standards can be added up to the complete indicator environment. Defines both, weighting and normalization as operational fundamentals of LCIA.

3.1 Advantages and Disadvantages of Advanced Technology in Agriculture

This section, explains the advantages and disadvantages of advanced technology in agriculture, they develop many potentials for farmers in agriculture. It is very supportable in agriculture, but human is still improved than the advanced technology. Modern agriculture has many advantages and disadvantages in agriculture which we cannot ignore.

Table 1. Advantage and disadvantages of modern technology used in agriculture

Sl.no	Technology Used	Advantages	Disadvantages
1	Chemicals used	The chemicals are used for pest control.	The extreme use of chemicals with the assistance of machines reduces the fertility of the soil.
2	Time	They reduce the efficient time in agriculture.	It is efficient but it has several side effects and disadvantages.
3	Cost	Decrease the use of fertilizer and water prices.	But it increases the maintenance cost.
4	Productivity	The advanced technology increases the productivity of crops.	But also, reduces the fertility of the soil.
5	Usage of machines	Advanced technology machines are used to sowing the seeds.	The machines are overused and it may lead to environmental damage.
6	Developed technology	This development in technology is used for the irrigational process.	Lack of knowledge about the technology by farmers can't handle the machines accurately.
7	Use of pesticides and fertilizers	It is used for the plant's production and Plant's health.	The unnecessary usage makes the plants poison and it also causes water and soil pollution.

8	Used for farmers	This advanced technology can reduce the effort of farmers.	The farmers are mostly illiterates so they can't use the advanced machines.
9	Environmental effects	This technology is used to improve their business and trade in agriculture.	The overuse of big machines causes dangerous gases and CO_2 in our environment and harmful for all living things.
10	Robotic Machines	These robotic machines are used to increase the price, and demand for the products, improve soil fertility, reduce the ecosystem impact, and better marketing to exposure the prices.	This robotic machine can't change their culture, we need to set their program as automatic.

The table 1 shows the advantages and disadvantages of modern technology used in agriculture. Modern agriculture can provide a continuous development in a piece of information and digital tools as well as relationships between the researchers and farmers across the private and public sectors. As the period passed, more advanced technology is looked at in agriculture and the tractor was presented that followed by harvesting equipment and new tillage, air seeding technology, and irrigation, improve the food quality and leading to all higher yields and fiber that grown.

4. Result and Discussion

The coefficients change for all components are introduced in the corresponding the matrices weighing, the impact of the environment in agriculture is associated with the advances technology invention in this situation is studied are automatically expressed in the graph of Impact of Environmental assessment spreadsheet in Fig.2. the sequential graph is composed on each aspect, the initial presentation of the components that can eventually have no effects on the studied specific situations, that can be followed by the impact of environmental numeric coefficient outcoming results on all components and graph can be summarized for aspects are considered.

All the indicators are normalized and shown in the table when a significant factor is attributed to each indicator to combine the impact of the environment index on the innovation of technology. The outcoming results in all bar graphs presented by each indicator, where the users may know about the specific changes about the technology caused the major impact on the environment. The impact of environmental coefficient for the indicator is calculated as;

$$Elp_j = \sum_{i=1}^{m} P_{ij} O_{ij} W_{ij}$$

Where, Elp_j = impact of environmental coefficient of the indicator j; P_{ij} = coefficient change component of the indicator j; O_{ij} = occurrence scale factor component of the indicator j; W_{ij} = Factor of weighing component of the indicator j, m = the several number components of the indicator j.

The different impact of environmental coefficient for the component each is computed with the multiplication of the coefficient change by the scale occurrence and the weighing factor. Then, the impact of the environmental coefficient for the individual indicator is obtained with the addition of the impact of environmental coefficients of that indicator for all components.

The impact index of environmental technology invention is calculated as:

$$EIItj_k = \sum_{j=1}^{m} EIP_j W_j$$

Where $EIItj_k$ = impact index of environmental technology invention k; EIP_j = impact of environmental coefficient of the indicator j; W_j = indicator j with the weighing factor for the impact index of environmental composition technology k; m = amount of indicators.

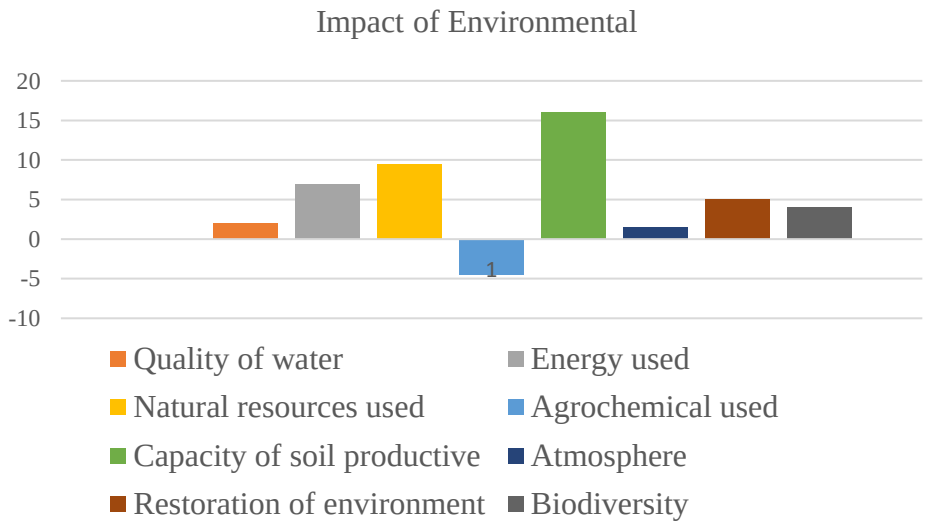

Figure 2. The Impact of Environmental Assessment

Based on the graph results, the system proceeds users with an analysis of contextual agricultural invention technology, according to the performance of the environment is observed in the case study. An approach for indispensable at the point that goes back to each of the spreadsheets to understand and demonstrate each indicator particular results. At one hand analysis, the user system should reappearance to the farm, initial to discuss the outcome results with the manager or farmers and done any corrections that can be considered compulsory to ensure the capability of the outcome results. Next and the most important, the problem comments and direct on replacements that may contribute to

developing the performance of environmental technology in the environment-specific context of agriculture and the system production on the farm.

5. Conclusion

Agriculture was formed to harvest the different food products. In this paper, determine the environmental impacts that affect agriculture due to the improvement of advanced technology and the benefits of modern technology used in agriculture. Due to the population increases, need to cultivate and yields more food crop production, more water resources, fertilizer, and pesticides are used to agriculture, it leads to lack of watershed for wild and human life. In the way of advanced technology is useful to society and it also harmful to the society. The environmental impacts caused due to the excessive use of fertilizer in agriculture that causes depletion of micronutrients and salinity in the soil, it changes the originality and taste of the food and it increases the greenhouse gas emission and soil erosion. Advanced technology is used in agriculture to control and monitor the crop irrigation systems via smartphone, it reduces the time, efforts of the farmer in agriculture and it can increase crop productivity.

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