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TREND EDITORIAL

Recurring detrimental impact of agrochemicals on the ecosystem, and a glimpse of organic farming as a possible rescue

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Introduction

Today's world is more concerned about rapid urbanization rather than the most important source for all lives "Agriculture," and in recent years, this field has gained much bigger attention due to its importance in human lives. It is the main source for about 86% of rural households. Agriculture has been the backbone of our country; there is an increase in the GDP of 18.1% and there are 52% increased job vacancies (Dethier and Effenberger 2011; Kekane Maruti Arjun 2013). This field is fast emerging with various innovations and different types of modifications in the traditional methods. Due to rapid urbanization, only a small share of the total agricultural land is under organic agriculture (e.g., 4% in Europe) (Eurostat 2007). In India, during the years, there was a decrease in the agricultural lands from 96.98% in 1985, 96.78% in 2000, 90.77% in 2010, and 90.70% in 2012; it indicates rapid urbanization has decreased the agricultural lands (Tripathi and Rani 2017). In India, agriculture is fast emerging due to the existence of the "Green Revolution" (1960); the green revolution came into existence mainly due to the phenomenon "Food Security"—due to rapid industrialization, and also water crisis, leading to a reduced food production. This in turn led to a green revolution aiming at increased crop production, eradication of food instability, and hence improved the economy of a country. The term food security in urban parts of India was seen as Food Insecurity (Lathi and Narkhede 2010). "Food Sovereignty" this concept was developed by "Via Campesina" the International Movement for the sustainability of food production. Declaration of Nyeleni (African Village) came the way from the food sovereignty by this declaration that each human has the right to get well-nourished nutrient food and also the national and local government can do anything to eliminate poverty and also for the efficient distribution of food and minimize the malnutrition, the distribution of the food produced is made impossible because of the various price tags (Menezes 2001).

This revolution has increased the yield of crop production by the use of fertilizers, pesticides, certain modifications in the farming process have also been introduced, and improved types of crops that have been used by the farmers to increase the yield. All these modifications have been done to meet the food demands of the increasing population (Craswell and Karjalainen 1990). The usage of fertilizers on staple crops was increased by the government in many of the Asian countries; this boosted the fertilizer industries, also aimed for food self-sufficiency, and made the farmers use fertilizers to gain the increased crop production. Agriculture not only meets food demands but also employs thousands of people around the country leading to economic development (Bumb 1989). Agriculture is a way to prevent many lives around them, but at the same time, the usage of certain types of agrochemicals lead to hazardous effects on all types of lives that are directly or indirectly involved in this process. The usage of these fertilizers should be according to the standard protocols that might reduce hazardous effects to the crops or to humankind to certain levels (Sharma and Singhvi 2017). The subject of the editorial is to provide an insight into the possible undesirable consequences of the usage of agrochemicals. Assimilating the significance of the about mentioned perspectives, the current editorial focuses on agrochemicals and their effects on the environment and human beings; the undesirable neurological effects also briefed in the editorial as the entire human body and their well-being is solely dependent on the brain (Wang et al. 2020). Further the editorial also proposes a suitable alternative for addressing the challenges discussed throughout the text. The motif of the object is general literature survey

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with relevant interpretations of the data. The current editorial utilized majority of the data which were published in peer-reviewed journals during the last four decades.

This table clearly indicates that there is a decreasing trend in the consumption of with total reduction in food items accompanied by an increased percentage of non-food items. This is imperative to the understanding that fertilizers can probably impact on indigenous crops and quality that might affect the environment, perhaps, as an indirect consequence of variety of natural disasters due to perturbed agroecosystem (as non-food essentials and their demand/consumption are correlated with conditions such as natural disaster).

Agroecosystem, prey for agrochemicals?

The agroecosystem comprises soil, water, livestock, and climatic conditions. Air, in this chain of the ecosystem, is most often affected by various environmental factors and also the man-made factor the "Agrochemicals" is considered as the powerful weapon which can boost the agricultural outputs along with its spillage effects (Bhandari 2014). Agrochemicals are important components in agricultural fields that have been widely used over the last few decades, not only the fertilizers that are being used but also the pesticides (pesticides—they are mainly used to have control over the pests and various other organisms that are targeted on the crop) have been widely used in the fields, fertilizers are mostly used along with pesticides. The usage of agrochemicals has boosted up the productivity of the crop yield, and the hazardous effects of these chemicals are over debate for the last two decades and also to keep the agricultural lands fertile and make the field available for various types of crops cultivation rather than single cultivation. These chemicals are mainly used as the source of nitrogen (mainly used in urea), phosphorus, potassium, sulfur, and various other micronutrients that are required for the crop growth. Nitrogen consumption has increased 2–threefold during 1974–1985. The IFDC (International Fertilizer Development Center) stated that between 1985 and 2000, the usage of fertilizers has increased at an annual rate of 4.8% in Southeast Asia (Bumb 1989). The usage and the extent to which chemicals should be applied to the field might differ according to the type of crop that has been cultivated (Sharma and Singhvi 2017).

After the Green Revolution came an into existence in India, the use of fertilizers along with pesticides has been widely increased to reach an increase in annual growth. The increased usage of these fertilizers and pesticides has been taken advantage of by many industries, being a boon for the industries, leading to various types of hazardous effects to the society and the ecosystem. Not only the chemicals that are being used can lead to toxic effects but also the outlets of these chemical manufacturing industries turn out to be toxic to the environment (Craswell and Karjalainen 1990).

The chemicals that are applied to the fields have been retained in the soil and also in the crops; to some extent, this retention of chemicals can induce food toxicity, affect the underground water table, and induce harmful effects to the livestock, and also to several microorganisms, and to a very serious problem "Water Pollution" and "Heavy Metal Toxicity" (Cd, Pb, Zn, etc.) in the environment; this, in turn, leads to hazardous effects on mankind. The correct usage of these chemicals and their appropriate levels of application to the fields should be taken into serious considerations; if proper levels are applied to the fields, there will be less spillage effects. The guidance for proper usage of these chemicals should be followed by the farmers, and the rules or guidance should be made strict enough to help improve the welfare of our environment (Table 1). Soil, air, and water pollution are major risk factors that are associated with the usage of these chemicals that cause very severe health issues to humans and livestock, and this should be seriously discussed (Craswell et al. 1987) (Fig. 1).

Effects of agrochemicals on soil

Soil fertility in agricultural fields is of prior importance, and when nutrients are not balanced properly in the soil, it leads to infertility of the cultivation lands, at this point implication of agrochemicals to the infertile agricultural fields to balance the land nutrients and to gain crop production (Carmo et al. 2017). Soil acidification is more prone to sandy soil, soil crust, reduction of organic matter content, humus content, change of soil pH, and also the release of greenhouse gases; all these changes are made by the overusage of chemical fertilizers. The intake of phosphate by crops has been diminished by soil acidification; the toxic ion concentration in the soil increases, and crop growth can be inhibited (Cooke 1982). The storage ability of nutrients in the soil is reduced by the reduction of humus content in the soil. Excess nitrogen is applied to balance the nutrient content, but the balance between N, P, and K is destroyed; it results in the reduction of micronutrients and leads to damage in the topsoil. The effects of the excess usage of chemical fertilizers can be buffered by clay soil (Sonmez and Sonmez 2007). The soil analysis conducted in various villages Loni, Adgaon, Chinchpur, Sadatpur, and Gogalgaon, falling in Taluka of Rahata and Sangamneer, the results concluded that the fertilizers and pesticides that are applied beyond the prescribed dosage have led to various damaging effects ranging from change in soil pH to lowered levels of macro and micronutrients. The soil pH has been changed to acidic from alkaline pH from 7.46 to 8.9, the organic carbon levels lowered, indicating the improvement of the soil fertility. The nitrogen level in the field has also been lowered by 80%, and thus, there should be an application of nitrogenous fertilizers to the fields. Fifty percent of phosphorus contents were also

Table 1 Trends in percentage composition of consumer expenditure since 1987–1988 (Directorate of Economics and Statistics (DES), Ministry of Agriculture, India. 2014)

Year/group	1987–1988	1993–1994	1999–2000	2004–2005	2009–2010	2011–2012	1987–1988	1993–1994	1999–2000	2004–2005	2009–2010	2011–2012
	Rural						Urban					
Cereals	26.3	24.2	22.2	18.0	15.6	12.0	15.0	14.0	12.4	10.1	9.1	7.3
Gram	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
Cereal substitutes	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
Pulses and products	4.0	3.8	3.8	3.1	3.7	3.1	3.4	3.0	2.8	2.1	2.7	2.1
Milk and products	8.6	9.5	8.8	8.5	8.6	9.1	9.5	9.8	8.7	7.9	7.8	7.8
Edible oil	5.0	4.4	3.7	4.6	3.7	3.8	5.3	4.4	3.1	3.5	2.6	2.7
Egg, fish, and meat	3.3	3.3	3.3	3.3	3.5	3.6	3.6	3.4	3.1	2.7	2.7	2.8
Vegetables	5.2	6.0	6.2	6.1	6.2	4.8	5.3	5.5	5.1	4.5	4.3	3.4
Fruits and nuts	1.6	1.7	1.7	1.9	1.6	1.9	2.5	2.7	2.4	2.2	2.1	2.3
Total, food	64.0	63.2	59.4	55.0	53.6	48.6	56.4	54.7	48.1	42.5	40.7	38.5
Total, non-food	36.0	36.8	40.6	45.0	46.4	51.4	43.6	45.3	51.9	57.5	59.3	61.5

(Courtesy: Reproduced from "The impact of the Green Revolution on indigenous crops of India," Ann Raeboline Lincy Eliazer Nelson et al. 2019)

lowered, but there was an increase in the potassium levels up to 80%. There is also an increase of Mn about 48% and decreased levels of other micronutrients like Zn and Cu, and this concluded that the decreasing levels may be due to the alkalinity of the soil, the soil contamination affects the groundwater quality, the application of the agrochemicals should be in the prescribed dosage, and also natural manure should be used to control these contaminations (Natraj and Katyal 2014).

Punjab is considered the grain bowl of India is facing serious problems in the cultivation lands, the nutrient imbalance in the soil, and also the contamination by these agrochemicals to the food materials and also increasing cancer patient's farmers, it is due to the start of the "Green Revolution" (Rahman and Debnath 2015). The heavy metals toxicity and their accumulation of the heavy metals in the soil becomes an increasing risk in the agroecosystem, and this increase is ultimately due to the usage of chemical fertilizer and pesticides; also there is an increase in the heavy metals that are let-out to the fields by the mining industries and various other industries, heavy metals like Cd, Pb, and As have increased in the fields (Atafar et al. 2010). The pesticides are inexpensive and their application to the fields is very easy and they are effective against the pests or weeds that harm the crops. This source of inexpensive material has caused a huge impact on the environment with their hazardous effects on humans and also on various other living beings around them (Kumar et al. 2013). The Moghan's irrigation and drainage network was done in Ardabil-Iran studies that showed the effects of agrochemicals in the water system and the soil. This study showed the soil starts to lose its physical characteristics like bulk-density has been decreased in the soil and increased heavy metals content and their accumulation. The study concluded that proper planning should be done for the usage of the agrochemicals and management of the material (Yargholi and Azarneshan 2014).

Effects of agrochemicals on water

Water is another important component of cultivation, the fertilizers applied to the field are taken by the soil, and this N-mineral is removed from the soil by leaching, drainage, or removal from the soil. N-mineral enters the groundwater from the root zone (Cooke 1982). 2–10% of N-mineral has been interfaced by the groundwater; the nitrogen that has been applied to the field is oxidized to nitrate by microbial activity. Drinking water containing nitrate (the dissolved nitrogen) above 50 mg/NO_3^-/L leads to various serious conditions like blue-baby syndrome, goiter, heart diseases, gastric cancer, and also birth defects (Feigin and Halevy 1989). Phosphate and nitrogen in water has turned out to be the main factor for "Eutrophication" (is the process by which unwanted growth mass is developed over the water bodies).

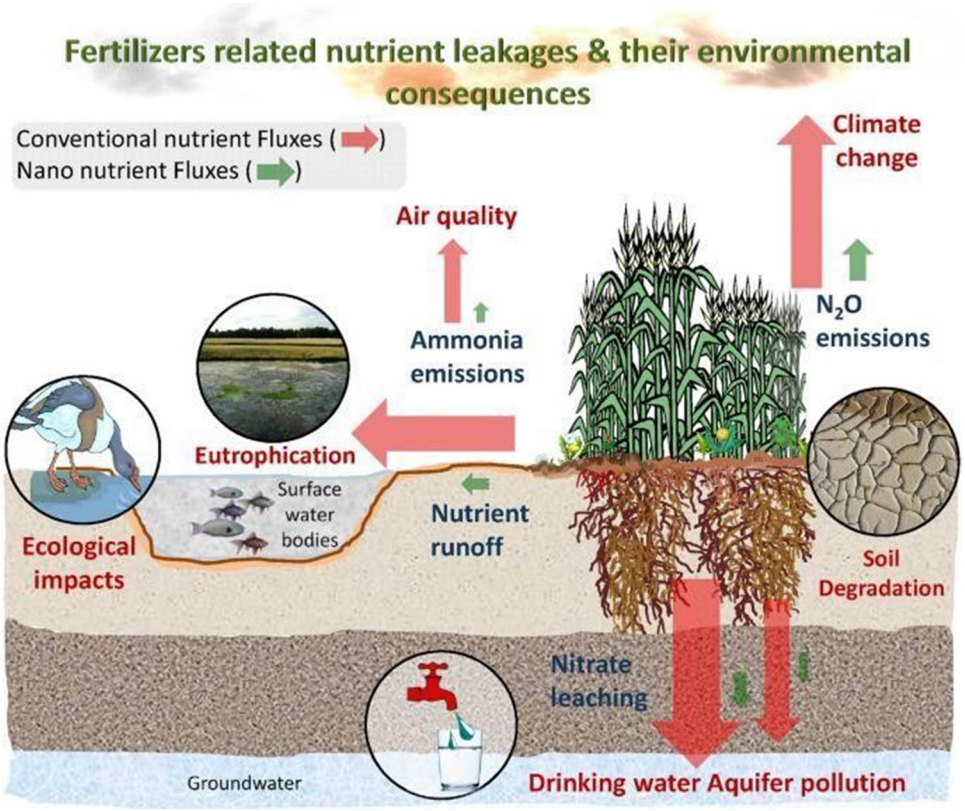

Fig. 1 Schematic representation of overview of the spillage effects of agrochemicals onto the environment (Courtesy: Reproduced from Bhardwaj et al. 2022)

Surface water should contain ≤ 50 µg/L of phosphorus content; this level should not exceed (Heinz-Ulrich Neue 1993).

Effects of agrochemicals on air

Air pollution is a very serious effect of chemical fertilizers; air is the major source of life when polluted may lead to serious hazardous effects on living and non-living beings (Savci Serpil 2012). The chemical fertilizers used in the agricultural fields are the potent cause for the emission of anthropogenic N_2O that is about 60% from the agricultural soil, and they produce the trigger for the global warming "the greenhouse gases," causing the depletion of ozone layer forming holes in the layer, this, in turn, exposes the humans and also animals to the ultraviolet rays (Shoji et al. 2001). Nitrogen oxide is the third important gas for the global warming rather than CO_2, methane (Rütting et al. 2018). Various types of greenhouse gases are CO_2, CH_4, and N_2O produced during the manufacturing of nitrogenous fertilizers when these gases combined with CO_2 have hazardous effects. Nitrogen fertilizers emission is of different nitrogen oxides (NO_2, N_2O, and NO); these nitrogen oxides are formed by the conversion of nitrogen fertilizers by the soil bacteria; these nitrogen oxides would cause severe air pollution (Cooper Julia, et al. 2017). Ammonia volatilized and emitted gets deposited in the atmosphere and it is oxidized to nitric acid and sulphuric acid that create acid rain that would affect the environment and the living beings (Sharma and Chetani 2017).

Effects of agrochemicals on human health

The effects of these agrochemicals on human beings start from the foremost man of crop cultivation "Farmers," who is first to be affected by these agrochemicals that are used in the fields. The farmers who use these chemicals do not handle them properly with prior safety measures, which are of important concern while handling these chemicals. While spraying or applying these chemicals, the farmers must wear gloves, safety masks, and then start to spray the chemicals to the field, and when these safety measures are not taken properly, then the pesticides make their entry through the bloodstream, dermal way, inhalation, and led to various signs and symptoms. A study was conducted in Bhopal and Madhya Pradesh in the agricultural fields stated that the farmer's direct exposure to the pesticides for 18 months makes led to various acute signs and symptoms such as shortness of breath, skin irritation, blurred vision, and burning sensation in the eyes. This study concluded that the authorities involved should impose proper safety measures for the farmers to follow the measures to prevent themselves (Choudhary et al. 2014). When fertilizers and pesticides is being applied to the field, it first contaminates the soil and then the underground water, the water polluted is both hazardous

to livestock and humans, the nitrate that is concentrated in water can immobilize hemoglobin, and organophosphate pesticide is used recently instead of organochlorine due to their fewer effects to the society but when they get deposited in vegetables can lead to cancer in humans, dizziness, vomiting, nausea, and skin itching (Miah et al. 2014).

DDT (dichlorodiphenyltrichloroethane)

DDT was one of the most used pesticides that are used for years; the hazardous effects were studied, and their usage was banned, but besides it has been banned still, it is being used in developing countries. The hazardous effects range from dizziness to various types of cancers, reproductive problems, lung damage, birth defects, injury to the nervous system, and dysfunctions of the immune and endocrine system (Thuy 2015). Some amounts of pesticides are also seen in human breast milk; this trace can affect both the life of the paternal and the neonatal (Meghdad Pirsaheb et al. 2015).

NPK (nitrogen-phosphorus-potassium)

NPK is an artificial inorganic chemical fertilizer used for its nutrient source of nitrogen, phosphorus, potassium, the mentioned nutrient essential for the development of crops, and also the yield is increased when NPK is used largely. N—growth of the leaves and vegetation; P—root and growth; and K—flowering, fruiting, and regulation of nutrient and water in plant cells (Marianah Masrie Rosman et al. 2017). The nitrogen fertilizers that are applied to the fields are taken in different proportions by the plant, groundwater, air, and the soil. Fifty percent is used by the plants, 2–20% gets volatilized; and 15–25% reacts with the organic matter and soil (Savci Serpil 2012). A comparative study revealed that NPK can increase the population of the earthworms when applied according to the government-prescribed ratio NPK (g/plant) 12.2:12.2:12.0. This ratio was applied to two types of plantations; they are PCL (pineapple, citrus, *Leucaena leucocephala*) and ML (maize, *Leucaena leucocephala*). They concluded that there was an increase in the earthworm biomass density and also the population but it revealed that NPK (inorganic fertilizer) that an effect on the PCL plantation, but it did not have any effect on the ML plantation, and it was concluded not only the fertilizers but also the vegetation can affect the increase in the earthworm population. These results were obtained when the application of NPK was in the prescribed dosage, but still, if this dosage is used in long-term exposure, this dosage can also affect the earthworm (Lalthanzara and Ramanujam 2011). The consumption of NPK is depicted in Fig. 2.

DAP (diammonium phosphate)

DAP has gained importance, due to the high cost in handling, transportation of fertilizers. DAP is widely used for its blending nature with other fertilizers (International Fertilizer Development Centre 1979). DAP is far better than MCP (monocalcium phosphate); it is because DAP is much superior to MCP in surface-broadcast of P fertilizer for wheat. The P helps fixation in the soil with lower efficiencies can be done by DAP, by $CaCO_3$, by NH_3 volatilization from DAP, the important component of crop production N and P fertilizers used. When urea or DAP is applied to the fields, it increases the soil pH and NH_3 volatilization losses for the application calcareous soils, prescribed dosage DAP (g/plant) 26.5 g/plant (Fenn and Kissel 1973) (Fig. 3). The authors of the current editorial also had investigated the effects of NPK and DAP on the experimental organism and had observed a significant negative impact on the memory and locomotion abilities of the model used (unpublished data).

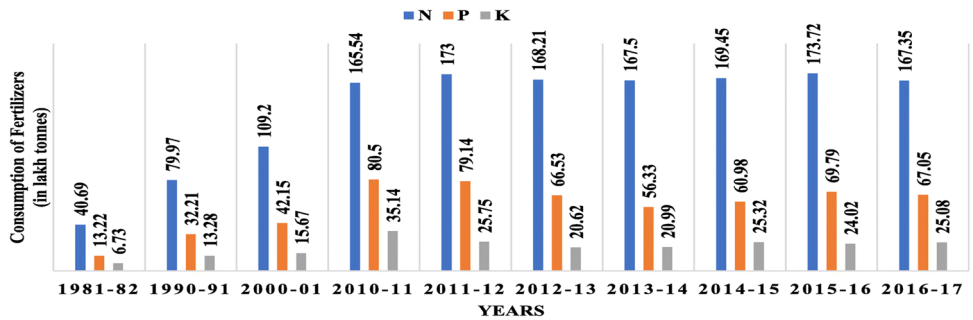

Fig. 2 Consumption of fertilizers (N, P, and K) post-Green Revolution period (Department of Fertilizers and Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW). India 2017). The consumption of N, P, and K fertilizers increased steadily post-Green Revolution era. In particular, the period after 2000–2001 saw increased consumption of inorganic fertilizers, as the application of inorganic fertilizers influenced crop yield. Nitrogen-based fertilizers such as urea, ammonia, and nitrate were widely used. The uncontrolled use of these N, P, and K adversely affected the fertility of the soil and altered the microbiota of the soil. (Courtesy: Reproduced from "The impact of the Green Revolution on indigenous crops of India," Ann Raeboline Lincy Eliazer Nelson et al. 2019)

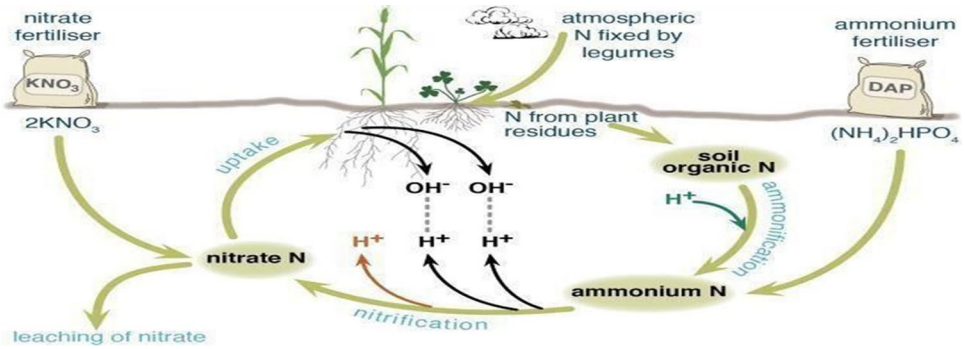

Fig. 3 (Courtesy: Reproduced from "Causes of soil acidity," 2018, Department of Primary Industries and Regional Development, Government of Western Australia, Agriculture and Food)

Effects of OP and OC on agroecosystem

Organophosphate was found within the air and therefore the surface of agricultural fields in California and Washington (USA) (Armstrong et al. 2013). Carbamate is very toxic to the earthworm population; the organophosphate is hence shown to reduce the population of earthworms (Edwards 1987). Due to the use of these pesticides, it is reported in Italian Forests it can contaminate the water bodies, air, and living beings around them (Trevisan et al. 1993). The organochlorines, polychlorinated biphenyls, and the persistent pesticides were found to be in the regions of Arctic Ocean food webs (Hargrave et al. 1992). In a survey conducted in West Bengal, India, these pesticides were present in fish body parts such as the gills, brain, liver, skin, and fish (Konar 2011). The residues of 13 organochlorines were found in the species of three lakes in North-eastern Louisiana (USA) (Deribe et al. 2013). Organochlorine and organophosphate can be causative agents in changing feeding behavior and reproduction, leading to a reduced population of raptorial birds (Mitra et al. 2011). The high toxicity of organochlorine, organophosphate insecticides can have an impact on the bird's mortality (Hunter 1995).

Neurological effects of OP and OC

Various types of pesticides are involved in the neurological effects, among these, organophosphate (OP) is described well, and it is a neurotoxin. OP poisoning leads to severeless effects in accordance with exposure to pesticides. Low levels include dizziness, headache, vomiting, and excessive sweating. In high-level exposure, the effects are muscle weakness, twitches, arrhythmic heart rate, convulsions, and coma. OP poisoning mechanisms involve the following progression, after the inhibition of AChE, there is increased stimulation of cholinergic receptors (Keifer and Mahurin 1997); other target macromolecules are also involved (Pope 1999). A characterization of OP poisoning in 1–4 days is intermediate causes is muscle weakness, and fatal. When the exposure prolongs to 2–5 weeks, it induces delayed polyneuropathy-symptoms involving sensory abnormalities, muscle cramps, weakness, and paralysis occur primarily in the legs, and these symptoms are due to the OP inhibition of neuropathy target esterase-neural enzyme this may be irreversible causes the consequences of axonal death (Keifer and Mahurin 1997). Prolonged long-term sequences of OP poisoning, the studies of individuals the farmworkers, farmers, pesticides poisoning (McConnell et al. 1994; Rosenstock, et al. 1991; Wesseling, et al. 2002) affected individuals' people, the study reveals that an increased symptom of the prevalence of deficits in cognitive, psychomotor function, decreased vibration sensitivity and motor dysfunction these effects of poisoning were observed less than or around 10 years (Savage et al. 1988). These damages that have occurred providing they are permanent. Less severe cases can also cause long-term consequences-studies reveals that banana farmworker, who has been affected by OP toxication, has been treated for intoxication without any requirement of hospitalization they test worse feel for cognitive and psychomotor function and also tested for non-poisoned less than 2 years later (Wesseling et al. 2002). In low-level exposure to pesticides, studies have revealed that exposure to low levels is not consistent enough to cause symptoms (Maizlish et al. 1987). But at the same time, certain studies conducted in developing countries revealed that acute and chronic conditions are very similar that cannot be segregated at times (Kamel and Hoppin, 2004).

The literature survey suggests that exposure to any kind of pesticides has increased the risk of Parkinson's, especially for people with farming as their occupation (Le Couteur et al. 1999; Priyadarshi et al. 2001). The case study done before 1999 was reviewed by Le Couteur et al. 1999, suggests that there is an increase in 1.6–sevenfold risk in association with the disease. Studies also indicate that the herbicide paraquat also leads to degeneration of neurons that are involved in Parkinson's disease (McCormack et al. 2002). Fewer case studies also suggest that the exposure to OP, herbicides that contain glyphosate, diquat, and also fungicides including maneb and dithiocarbamates, increases the risk of Parkinson in individuals (Barbosa et al. 2001; Sanchez-Ramos et al. 1987; Sechi et al. 1992; Meco et al. 1994; Hoogenraad 1988; Davis et al. 1978). Dieldrin is an

organochlorine and was found in the post-mortem brains of Parkinson's disease patients (Corrigan et al. 2000; Fleming et al. 1994). ALS (amyotrophic lateral sclerosis) is another alarming neurodegenerative disease that is found in individuals with exposure to pesticides or their occupation as farmers (Nelson 1995–1996). Greater risk increase with > twofold increase with a higher concentration of exposure to OP and OC's leads to ALS (Bidstrup et al. 1953; Fonseca et al. 1993). There is twofold increase risk of Alzheimer's in exposure to any kind of pesticides, primarily dithiocarbamate fungicides (Baldi et al. 2003).

Mild cognitive dysfunction (Bosma et al. 2000) with vascular dementia and also dementia along with Parkinson's (Lindsay et al. 1997; Hubble et al. 1998). The relationship between the pesticide and Alzheimer's is quite different because the loss of cholinergic neurons is the basic neurochemical defect in Alzheimer's to increase the cholinergic tone, it is occasionally treated with OP-cholinesterase inhibitors (Ringman and Cummings 1999).

Organic farming

Organic farming came into play when conventional farming over-exceeded food safety, quality of food, human health, devising the fauna, and flora, deteriorating the environment with the agrochemicals (Rembialkowska 2007). India is a large organic producer, over the years, it is ranked 8th position. Organic farming is more eco-friendly way than conventional farming; they have high sustainability with rich nutrition value, the demand for organic products have increased worldwide (Sharma and Goyal 2000) (Adolph and Butterworth 2002) (Willer and Lernoud 2019) (Suryatapa Das, et al. 2020). In organic farming, there is no usage of agrochemicals; this kind of farming depends on the biological system and the biological cycle involved in organic farming (Nourthbourne 2003). Four principles suggested by IFOAM to carry on organic farming: health care should be taken into consideration for the health of all individuals, livestock, and micro-organisms. Fairness-maintaining fairness to the producers and the consumers is a primary concern and to the environment. Ecology-organic farming depends on living things and the biological system to enhance biodiversity and agroecology. Care for organic farming should be precautionary and a responsible way to protect the health and well-being of humans and the environment (IFOAM 1998).

Benefits of organic farming

A study reported 27% increased vitamin C content was found in fruits and vegetables produced by organic farming, more than the conventional farming yield. The secondary metabolites produced by the plants act as a protective cover against various types of cancer, inflammation, and other diseases. These metabolites are found in higher concentrations in organic farming products (Lairon 2010). Increased lysine content of 25–30% was reported in organic wheat greater than conventional farming (Woese et al. 1997; Brandt et al. 2000). Thirty percent of cancer-fighting antioxidants were found in organically grown corn, strawberries (Food Marketing Institute 2008). The phenol and phenolic compounds found in the organically grown fruits and vegetables were double the amount than the conventionally grown fruits and vegetables (Rembialkowska 2007); increased salicylic acid was found in tomatoes (Rossi et al. 2008). Total sugar content and the taste of organic fruits and vegetables are far better than conventional farming (BjØrn and Fruekidle 2003). Less nitrate-containing crops are produced by organic farming; the nitrate content can lead to various worsening life-threatening conditions (Woese et al. 1997). Organic farming improves the physio-biological properties of soil, their nutrients, organic biomass, and their less retention of water. Their usage of the minimal amount of water compared is an advantage over conventional farming. Increased soil quality and less water retention capacity result in increased yield even during drought years (Pimentel et al. 2005). The requirement of a large amount of labor, thus, led to job vacancies (Halberg 2008) (Manida 2021).

Importance of organic farming

Organic farming has gained importance over the years socially, economically; it is accepted all over the world, due to its beneficial way of food production, deduction of all types of pollution, and no usage of agrochemicals. Food quality and nutritional value has an add-on to farming (Yadav 2017). Even though at an increased cost of the organic products like organic vegetables, cereals, and fruits, people are ready to buy the costlier products, due to their increased nutritional value, healthier consumables, and safe to be consumed. The awareness among people about organic products and their reliability has been increased over the years (Mukherjee et al. 2018).

Natural perspectives

The use of traditionally available products like vermicompost, biopesticides, which are very effective against pests, acts against the nervous system of the pests to avoid damage to crops. The biopesticides can also be easily removed from the crops by washing them thoroughly (Oguh et al. 2019).

Chemical perspectives

CRF (controlled release fertilizer) or polymer coated is one of the best ways to increase the phosphorus content in the soil. These CRF or polymer-coated can release the phosphorus content according to the needs of the plants and their contamination with the soil can be decreased, and negative effects and overdose can be reduced. The prescribed dosage usage of the agrochemicals can lead to deduce effects on the environment (Zahrani, 2000; Yaseen et al. 2017).

Conclusion

Agriculture, life-core practice is the foremost way of living for all organisms on the planet; this is intervened by various spillage factors including pollution of the environment by agrochemicals. The current editorial was based on the data published from the peer-reviewed journals of the yester years which had highlighted the hazardous effects of agrochemicals on the ecosystem and the undesirable outcome of health risks, including neurological aspects. In line with previously published review article ("The impact of the Green Revolution on indigenous crops of India," 2019) quoted elsewhere in the text that discussed increased usage of fertilizers in the post-Green Revolution era until 2017, this review strongly suggests the usage of fertilizers anticipating the crop yield, ironically, severely impacts on the soil fertility and the related ecosystem. The scientific approaches/research that was made by scientists over the past years globally as well as in India should be taken into consideration for the improvement of the issues discussed. Further, it would be an appropriate point to mention that the policymakers and implementation of the same should be focusing on the environment/health risks and also should set up a platform for the suitable/safe use of the agrochemicals. Suitable alternatives and approaches such as the natural mode of intervention should be more often demanded for the beneficial way of flora and fauna of the agroecosystem and hence for the healthy existence of human race on the earth.

Author contribution AJV has conceived the concept of the editorial. AJV and PDG were involved in writing and editing of the manuscript.

Declarations

Ethics approval Not applicable.

Consent to participate Not applicable.

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