Agriways 2 (1) : 63-67 (2014)

ISSN: 2321-8614

RESEARCH ARTICLE

IMPACT OF CHEMICAL BODIES ON SUSTAINABLE AGRICULTURE AND ITS EFFECTS ON ENVIRONMENT

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ABSTRACT

In India, there is a constant pressure on crop production from available land in order to keep pace with the food requirement for an ever- increasing population. With the present growth rate in population, which is anticipated to cross billion marks by 2000 AD, for which approx 350 million tones food grain will be required against the present level during 2020. In intensive agriculture, chemical fertilizers are recommended and used by farmers sometimes injudiciously, expected to harvest high yields leading to a high degree of profitability. However, wrong and untimely application of synthetic fertilizers continuous imbalanced use of fertilizer, indiscriminate use of pesticides or crops, and soil along with organic wastes, including domestic and industrial sewages and sludge and food processing wastes coarse adversely affect the natural balance of the soil / crop ecosystems, microbial ecology and environmental pollution, resulting in wide spread decline in the crop yields. A group of leave metal search as arsenic, cadmium, lead and mercury has also been proved to toxic to human being and other animals as they move along with food chain.

Key Words : Sustainable agriculture, Chemical bodies, Ecosystem, Environment Pollution.

There are certain house hold and industrial chemicals, having wide spread application in refrigeration, air conditioning, fire extinguishing and dry cleaning, that are known to deplete this life saving layer.

These chemicals are caused zone depleting substances and include primarily the chlorofluorocarbons (CFC_s), Carbon tetrachloride (CCl_4) and Hydro-chlorofluorocarbons (HCFCS). Molecules of these substances drift upward through the troposphere and eventually reach the stratosphere. With less ozone in the atmosphere, more ultraviolet radiation reaches the earth, leading to higher incidence of stain can cataracts, destruction of certain forms of aquatic life reduction in crop yields and damage to the immune

system.

Besides the other polluting sources a group of heavy metals such as arsenic, cadmium, lead and mercury have also proved to be toxic to human being and other animals as they move along with food chain. Salts and acid rains are other major sources of environmental pollution. Likewise, due to higher demand for crop nutrients in a low – fertilizer situation accompanied by the high cost of inorganic nutrients and the concern about environmental degradation and pollution. Hence the need for cheaper sources of nutrients is recognized, and there is an increasing demand for organic food. This demurral can be fulfilled by INM and adoption of new technologies including bio-fertilizers by various organic sources. Which are vital components of sustainable agriculture.

MATERIALS AND METHODS

The field experiment was conducted at Krishi Vigyan Kendra, Bahraich of Narendra Deva University of Agriculture and Technology, Kumarganj, Faizabad (Uttar Pradesh) during the summer season in the year 2010. Geographically the centre is situated at 28^0 24' N Latitude, 81^0 38' E Longitude and at an Altitude of 126 metres above the mean sea level. Bahraich comes at Eastern Plain, Hot Sub-humid (moist) climatic zone in upper Gangetic plain (tarai) region. The summers are very hot and dry while winters are too cold and moderate to heavy rainfall. Generally, South-West monsoon sets in the third or fourth week of June, reaches its peak in July and August, and continue up to September. Cyclonic weathers leads to few winter rains. The mean annual rainfall at Bahraich is 1100 mm of which about 75-80 percent is received from June to September. Winter season extended from November to March, wherein frost occurs generally in the end of December and may continue up to the end of January. The mean minimum temperature ranges from 2 - 5^0 C in winters, while during summers the mean maximum temperature varies from 43 - 45^0C in May. The mean relative humidity varies in the range of 65-85 percent from mid July to end of February and decreases thereafter gradually to about 75 percent by the end of May and till first week of June. Mean weekly data on mean temperature, relative humidity, sunshine hours and total rainfall recorded during the crop season i.e. summer season 2013, at the meteorological observatory located at the Krishi Vigyan Kendra, Bahraich (Uttar Pradesh).

RESULTS AND DISCUSSION

Continues use of imbalanced chemical fertilizers has caused alarm regarding passable side effect in relation environmental pollution in different states of the country. Repeated use of chemical fertilizers without the use of any organic manure is causing the soil to become more and more hard and imperious to water.

Fertilizers play a key role in enhancing crop production. The fertilizer consumption of India has in creased many folds in recent years which is given in the table.

Table 1 : Consumption of N_2 P_2 O5 and K_2O in India (million tones)

Year	Consumption				
	N	P_2O_5	K_2O	Total	
		M.t.			Kg /ha
1970-71	3.7	1.2	0.6	5.5	31.9
1975 -76	8.0	3.2	1.3	12.5	67.6
1980-81	8.4	2.8	0.9	12.1	65.5
1985 -86	11.6	4.8	1.7	18.1	93.8
1990 -91	10.9	4.2	1.6	16.6	86.7
1995 -96	11.4	4.4	1.7	17.5	90.1
2000 -01	10.7	4.3	1.7	16.7	84.9
2005 -06	11. 08	4.12	1.6	16.8	88.3
2010 -11	11.72	4.62	2.13	18.47	97.1

Source : Fertilizer Statistics 2010

Long term effect of nitrogenous fertilizer on Soil properties:

Continuous use of nitrogenous fertilizers causes reduction in soil moisture content in soil at different soil moisture tensions, increases soil P^H, reduce microbial activity and their population in the level of furrow slice and decrease in the total nitrogen and carbon (C:N) ratio.

In developing countries, unabated use of nitrogenous fertilizers has the largest contribution to the depletion of soil fertility and productivity and adverse effect on different soil properties viz, Physical. Chemical and biological properties of soil.

Contamination of water quality

As discussed earlier, the portion of added nutrient which is neither take by plants nor retained by the soil may pollute the surface water bodies through run- off and may leach down to ground water. The effect of such nutrient loss and ground water has been discussed under eutrophication and ground water pollution, respectively.

Eutrophication The amount of available nutrients is a key factor for biological production in water. An inceasing abundance of nutrients in water leads to increasing biological production, a moderate increase may be beneficial (e.g. increase fish stock). But if primary production becomes to high the results is regarded as detrimental.

Ground water pollution Plant nutrients, specially NO_3- N in sudation form of 3ppm or above when added to surface natural water leads to the undesirable growth of aquatic micro pore and aquatic algae and pallet the drilling water higher concentration of nitrate in ground water is unfit for drinking water. World health organization (WHO) recommended that drinking water should nor contain more than 11.3 mg NO_3/L as permissible for drinking water but up to 50,g NO_3/L is acceptable in European Economic countries.

Harmful effect of excess amount of nitrogen (NO_3 or MH_3) on atmospheric quality and on human and animal health.

The applied N may escape into the atmosphere in the form of gases like NH_3 N_2O, N2. Atmospheric ammonia may contaminate water bodies, impairs visibility and causes corrosion. Nitrous oxide emission into the atmosphere is a matter of concern to mankind because nitrous oxide influences the integrity of stratospheric an ozone layer shields biosphere against ultraviolet which otherwise can cause skin cancer and other several plants animal disease. It is also incurved in green house effect, although in importance next to Co_2 and al H_4 only.

A high nitrate ground water (10mg No_3 N/L). when used for drinking water is invalided in the incidence of methemoglobinemia or blue baby disease which occurs in baby mammals.

Detrimental effect of phosphatic and potassic fertilizer on environment:

Fertilizers phosphatic and Potassic are contaminating to the ground water surface Viz. Industrial waste, detergent powder, factory etc.

It is disserved that during the production of SSP in the factory, by products like sludge which contains objectionable amount of fluoride might cause pollution if and. When mixed with finished product superphosphate as filler.

Harmful effect of pesticides on environment

Continuous use of pesticides in soil and plant over the gears may contaminate the ground water and detrimental effects of chemical (Pesticides) have been found on ecofriendly. Studies have increased incidence of miscarriages, stillbirths and delayed pregnancy among woman agriculture workers, pesticide mixing and spraying and harmful effect on atmosphere, due to using by various pesticides. The food we eat the water and milk we drink are contaminated with one or other chemicals. The most safe and scared mother milk has also been found to be contaminated HCH. Transfer of pollutant to the pursuing infant is also well documented. Some chemicals with greatest persistence have higher risk of bringing about environmental pollution.

Detrimental effect of heavy metals on animal , plants and environment

Heavy metals include metals with a density of more

Common Range of persistence of some pesticides

1	Orgaropteophasphate insecticide (Marathon)	1-12 weeks
2	Carbamate Insecticide	1- 8 weeks
3	Arsenic	Infinite
4	Triazin herbicides (Atrazin Simonized)	1- 2 Years.
5	Benzoic acid herbicides (Amiber, Diuron	2- 12 Month
6	Chlorinated lydrocarboninsecedes (DDT, Chlordane)	2- 5 Years.
7	Urea herbicides (Monogram)	2- 10 Month
8	Phenoxy herbicide	1-5 Month

than 5.5g/cm^2 many of these heavy metals are in fact essential for plant growth and development. Fe, Zn, Mn, Cu, Co, and Mo are examples of some useful metals. The presence of these heavy metals in excess causes toxicity problems in soil and plants. However, when present up to a desirable level, these metals improve soil fertility and likely to cause adverse effect on plant growth many metals (Hg,Pb,Cd and As) which are not refried for plant and animal and human nutrition but are found in raw materials used for fertilizer production.

From soil through plant uptake a part of these metals may reach in food chin which may pose problem to environment, plants, animal and human health.

Effect of organic wastes on Environment pollution

Many organic wastes exert beneficial physical effect on soils and significant source of plant nutrients. It is commonly used in leafy vegetables and several cole crops. But they commonly carry considerable amount of inorganic as well as organic chemicals which may have detrimental effect on Environment.

– It is evident that the most serious environmental threat caused by food processing what disposal is that of soil and water pollution by nitrogen and heavy metals.

Promoting the greenmanuring. FYM, vermicompost crop residues and biofertilizers etc.

– It can be concluded that to boost up crop production without affecting the environment by the use of organic manures, in addition to need based chemical fertilizer, along with judicious application of chemical fertilizer / pesticide use essential.

CONCLUSION

It is quite evident that the soil is most important capital asset. Therefore to safeguard its fertility and prevent its losses fertilizer use hold key and promise for fading the future generation though we require more food to feed our huge population for which more and more crop production in vital but not at the cost of polluting the environment it is true that crop production can not be sustained it inorganic fertilizer and chemical pesticide are used in discriminate way resulting in pollution of soil and water and health hazard of plant human being, cattle and plants also.

Some of the agriculture technologies can be adapt to preserve the environment quality with priority are

– Conservation of natural recourses'.

Average consumption of sewage and sludge from municipalities in unit

Composition	Concentration on dry wt. Basis	Elements	Concentration
Organic carbon	32.4	Zinc	1676
Total nitrogen	3.4	Copper	925
Total Phosphorus	2.6	Chromium	870
Total Sulphur	1.5	Nickel	76
Calcium	4.2	Cadmium	285
Sodium	0.4	Lead	565
Potassium	0.7	Mercury	8

– Integrated plant nutrient management.

– Use of bio-agents for controlling several disease pest insect and biotechnical control of weed.

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