Pratidhwani the Echo
A Peer-Reviewed International Journal of Humanities & Social Science
ISSN: 2278-5264 (Online) 2321-9319 (Print)
***Impact Factor: 6.28** (Index Copernicus International)*
Volume-XI, Special Issue, June 2023, Page No.248-254
Published by Dept. of Bengali, Karimganj College, Karimganj, Assam, India
Website: http://www.thecho.in

A brief scenario of Soil Pollution of Bankura district- Its major factor and consequences

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Abstract:

*This research investigation of soil pollution has indented to draw the attention of a wide range of research activities in regards of its causes and consequences on flora, fauna and human beings. Soil pollution happens as an outcome of the penetration of elements which alter the components and organism of soil and reduce its productivity, pushing it towards vulnerability and draught and makes it unsuitable for farming practices. The research interrogates the major soil pollutants like radioactive uranium pollution, pollution created by transport, domestic and industrial waste, forest fires and others. Mostly the agro pastures are irrigated by rivers polluted with factory, thermal power centres wastewater. In addition it also discusses the most important sources of pollution generated by pesticides, herbicides and harmful chemical fertilizers that contain toxic elements and entering in deep stratum of soil and lasting for a long time in connection to enrich soil fertility. This study deals with the impact of water logging the desertification (Dryization) of agro lands and their conversion into a drought areas that makes unsuitable for farming practices, and pollutes entire soil circumstances. The research suggests some management mitigations in terms of soil protection and agricultural lands from pollution by applying some green fertilizers, bio-*pesticides and aforestation programme.

Key words: pesticides, fertilizers, irrigation, soil pollutants.

Introduction: Soil pollution is a burning issue in context of Environmental geography. A vast very number of researchers are doing research about their interest in environment, due disastrous impact that the pollution in agro lands which affects the lives of humans and animals. The physio-chemical and boilogical changes in soil composition are responsible for the entry of foreign bodies. In addition the use of harmful pesticides and chemical fertilizers in large quantities, acid rain and the unplanned dumping of solid and liquid waste from factories, thermal power centres (Mejia) contributes negative impact on soil fertility and organic materials. The addresses several robust topics, such as the connotations on environmental pollution, factors for soil pollution. It also enlightens soil pollutants, such as radioactive contamination. The harmful radioactive pollution becomes a crucial global

pollutant that harms soil, plants, humans and animals. This paper focuses on domestic, industrial and transport related waste pollution. Mostly the industries are located near municipal areas of Bankura, Bishnupur and Sonamukhi and associated rivers.

Abrupt use of various Pesticides, fungicides and chemical fertilizers affects soil ferility and agricultural productions. The use of untreated wastewater in irrigation purposes causes soil pollution through the development of harmful insects and plants. Environmental pollution is defined as unexpected changes that occur in the ecosystem in form of partial or total, due to the comprehensive human activities. It also affects local atmospheric changes in a mild way that results from changes in the environment made by humans. Environmental pollution is treated to be a cause of inconvenience, unsustainability, damage, disease, distraction and death [Jamal, 2019]. Soil pollution can be defined as the penetration of foreign bodies in soil profile which leads to a change in the bio-chemical and physical composition of soil stratum. This often occurs due to uses of pesticides and fertilizers, and robust fall of acid rain that changes the pH level of the soil, littering radioactive agents and so on [Barden, 1988]. Also, it can be defined as the diminishing effects on the soil layers causing a change in the natural properties of the main environmental interactions due to the leakage of complex chemical compounds or man-made pollution by radioactive agents that. It makes negative affect, directly or indirectly on the local living and non-living agents. Agricultural pollutants include agricultural residuals, such as plant residuals, weeds, leef, roots, burning agents; ripen fruits etc [Al-Yasiri, 2019]. The problem of soil pollution is different from other pollution as it is a long-term problem. It can also be completely eliminated by reducing the mass uses pollutants and identifying the treatment [Taher, 2009]. Despite the importance of soil to human lives, there is no legislation in the Asian countries that aims to soil protection specifically. Various policies need to be addressed by local environmental agencies in regards of prevention of water, waste, chemicals and industrial pollution and protection of soil, which has become widespread in Bankura district [Rashid, 2017].

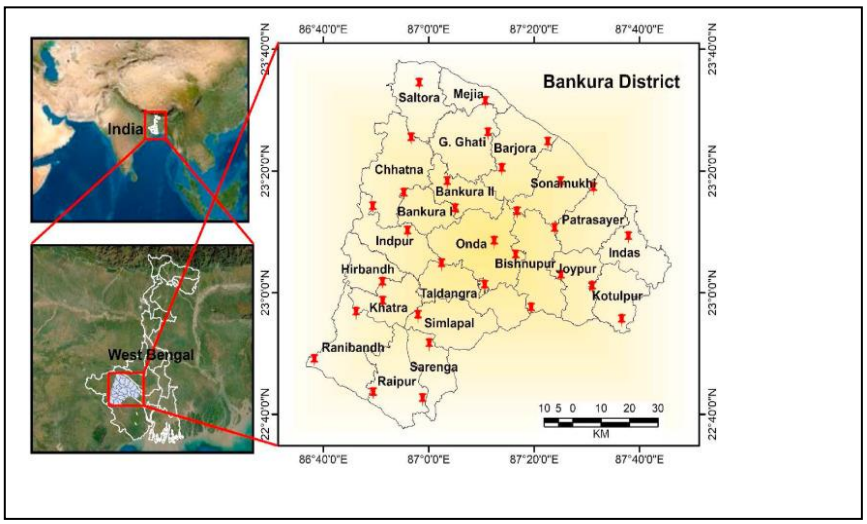

Fig: Location Map of Bankura

Soil Components: Generally soil consists of two major components such as

1. **Inorganic materials:** It constitutes the major % of the soil. These materials often generated from the disintegration of the various parental rocks that builds up the earth's crust, such as igneous, sedimentary and metamorphic rocks by physical, chemical and biological weathering. Nitrogen- phosphorous-potassium (NPK), manganese, lead, zinc, iron, copper, aluminium, sodium and potassium salts are the necessary elements for plant absorption that determine the fertility and quality of the soil whether it is acidic, basic or neutral [Al-Yasiri, 2019].
2. **Organic materials:** These materials consist of flora and fauna related wastes such as animal excretory (such as blood, skins, carcasses of dead animal's roots and residuals of plants, leaves, stems, etc.) They are decomposed and transformed humus over time. Humus is one of the main bio-fertilizers of soil. Soil is a dynamic agent that contains Large to microscopic organisms. They are part of this biospheric environment. They contribute to the soil aeration, hydration and its chemical composition. Bacteria help to absorb nitrogen and make fixation to absorb it by the plants as they are unable to absorb it from the atmosphere directly. Therefore, the soil must be preserved and saved from pollution [Al-Yasiri, 2019].

Soil pollutants:

Radioactive pollution: It can be considered as major forms of pollution of a global impact. It occurs from industrially radioactive materials which fallout from nuclear bombs, and the industrial and thermal power centres of nuclear energy and other radioactive materials such as uranium. It needs a sound scientific methods and a comprehensive radiological survey [Rashid, 2017].

Domestic & Industrial wastes pollution: Industry pollution is very dangerous for environment, especially water resources, because most industries are choosing their sites near water bodies, lakes, and rivers and disposing their waste without takingproper treatment in river. [Rashid, 2017].The unplanned industrial development, ignorance of safety measures, population burst and increasing customize demands lead to increase in solid waste and promote the problem of soil pollution and increase its damages. The best management to this type of soil pollution is to establish advanced factories in all by marinating protocols to burn waste or crush them. In addition, environmental laws must be acted on this regard. [Rashid, 2017].

Natural phenomena: In Bankura district especially in Khatra and Joypur forest ranges forest fires pollute the environment, because it releases many toxic elements into in the soil.

Mining: In Raniganj belt of North Bankura has affected soil, water and living organisms since ancient times. The digging of soil for mineral extraction releases huge quantities of heavy metals, and others which lead pollution of soil.

Desertification: The phenomenon of desertification helps to loss soil fertility and natural vegetative cover. It helps to expose soil into open air for erosion and the transformation of

agri land, pastures, and other areas, to dry deserted regions. Many natural and human factors combine to soil pollution. Desertification can be direct lead to a decrease in the areas of arable land involved in agri production [Rashid, 2017].

The pollution of agricultural soil:

Pesticides and their impact on the agri ecosystem: The toxic compounds used to kill and combat harmful insects and fungi that cause various diseases cereal crops. However, their abrupt use leads to the elimination of micro-organism benificail to agricultural practice. Wrong practices and unauthorized use of them causes failure to soil management. The problem such as imbalance of the ecological balance, and the pollution of the various elements of the environment such as soil, air, water, plants and animals found abundantly [Baya, 2008]. Many international organizations restricts about the use of many of these pesticides, especially an old pesticide known as DDT [Fadlallah S 2001].

The negative effects by uses of insecticides are as follows:

a) The overuse of chemical pesticides causes to absorb residuals of pesticides and store them in their body organs like tissues, roots and leaves. It causes harm to humans and faunas by directly eating them. It causes indirect harm to human community by eating those animal contaminated products by pesticides (such as eggs, milk, meat ... etc.) [Fadlallah S 2001].

b) Spraying chemical pesticides to agricultural crops leads to the elimination of good microorganisms in the soil (decomposition elements such as nitrogen-fixing bacteria and streptococcus bacteria) that hampers humus structure [Fadlallah S 2001].

c) The unplanned use of chemical pesticides leads to an imbalance in the existing eco-systematic balance between pests and their natural enemies [Fadlallah S 2001].

d) The over use of pesticides for long term periods may lead to the acquisition of many insects and pests of immunity against the pesticides used that hampers human health by genetic disorders.

e) In developing country, the negative effects of pesticides have not ended at this point. Rather, their impact affects its chains in foreign trade of agri-products especially those affected by these chemicals such as fruits, cereals, vegetable.

Chemical fertilizers and their impact on the agricultural environment: The increasing hunger for food and clothing results declining fertility. People have re-sorted agricultural fertilizers to increase soil fertility and [Fadlallah S 2001]. Sometimes for some little benifits it causes various harmful damage to the elements of the environment surrounding the soil [Baya B 2008]. Organic fertilizers which are produced from animal, bird and human waste is a crucial elements needed by plants and soil (nitrogen - phosphorous - potassium).

The most prominent negative effects that result from the excessive use of chemical fertilizers in agriculture are the following:

a) The excessive use of chemical fertilizers quantities someties exceed the plant’s need leads to their accumulation in the tissues, roots and leaves of cultivated plants that makes carcinogenic effects on human health after its consumption.

b) The excessive use of chemical fertilizers leads soil structural deformation. Soil porosity has altered that effects the ground water stability in this arid district.
c) Many chemical fertilizer compounds are complex by structure and cannot be disposed of easily.
d) This accumulation of fertilizer will dissolve in the irrigation water and seep into the groundwater and contaminate it.
e) The excessive use of organic fertilizers leads to the spread of insect and hampers productivity.

Other pollutants of agricultural soil: In addition, the physio-chemical pollution of agricultural soil by using chemical fertilizers, pesticides are some human excess in the use of irrigation water. It leads to increase in the surface water and salinity in the soil. It may have an adverse effect on aeration and soil temperature, which reduce productivity.

The excessive use of wastewater in irrigation operations: Some dry agricultural areas depend on rain and wastewater for irrigation. This leads to the accumulation of mud and clay water and blocks the water flow and insists the growth and spread of water weeds. It increases the growth of reproduction of snails and insects, especially mosquitoes.

Logging and overgrazing: It also ruins the physical, chemical and biological characteristics of agricultural lands due to their rapid exposure to erosion and sand encroachment processes [Baya B 2008].

Industrial solid waste: A person consumes various goods and cleaning materials to take care of their personal hygiene in form of their clothes, or his tools. They contain phosphates that increase the cleaning ability of the industrial detergent. They have toxicity for all of the living agents.

The effects of air pollution on plants: The plants are exposed in various forms of pollution, such as air pollution. The acid rains dissolve the pollutants floating on the air and carry them to the soil to reach the plants and infused in their cellular fluids and destroy their tissues and other fluid transportation.

The contamination of the soil with hydrocarbons: The soil near of the petrol pump stores the petroleum products is contaminated as a result of several activities.

a) The introduction of various pollutants into soil through many paths after the disposal of solid or liquid waste in piles or waste causes severe soil pollution. Municipal or industrial wastes, mines, sediments, contamined including metals, cyanides (CH), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), asbestos and methane (CH4), ammonia (NH3), and hydrogen sulfide (H2S) in soil environment.

The rationality of application of micro-organisms to test soil contamination: The vast potion of global soil is mixed with the necessary microorganisms. It is the pivotal factor to maintain cycle of carbon, nitrogen, sulphur and, phosphorous in soil environment as it maintains the continuity of these elements in the soil in an adequate amount for aliving flora

and fauna. There are many good bacteria and fungi which act as propulsive agents for soil fertility. To make treatment of soil through biological way need to seek careful scientific attentions [Salam et al, 2020].

There are numerous methods to measure soil pollution which includes- measuring the rate of soil respiration (generation of carbon dioxide by soil organisms) and activity of enzyme of the soil, such as the decomposition made by urea with urease and phosphatase compounds. In addition it may include measuring the dimension of contamination made by microorganism requires nitrifying bacteria. It helps to measure of the oxidation of ammonia into nitrate. Also, these methods follows the ISO standard and laws to regulate the effect of pollutants on soil micro-organisms [Salam et al, 2020].

The rationality of application of sophisticated plants to test soil pollution: Plant roots are one of the crucial agents to know about soil nature. Numerous international methods already been applied to measure the degree of soil toxicity and pollution level on advanced plants. In this methods the degree of pollutant are measures in forms of delaying root growth and inhibition of the germination process and it founds the abrupt growth of emergence of seedlings above the ground. It is also helps to calculate the rate of seeds germination, seed yield, and degree of seed fertility [Salam et al, 2020].

Some management methods and preventive measures to protect soil and agricultural resources: The organic farming is the most relevant technological methods that have recently started in Bankura district. It aims to preserve soil and agricultural production from the harmful and poisonous pollution created by using fertilizers and pesticides. It avoids the use of chemicals in agriculture to make it safe and sustainable for humans and to preserve the natural properties of the soil. It also preserves the surrounding environment from further degradation [Fadlallah S 2001]

Effects:

a) It increases the productivity and soil nutrition level (the supply side).
b) It obtains a crop item that is accepted by an individual consumer (the demand side).
c) It helps to improves the surrounding environment (soil and its components) and preserve it from further degradation.

Management methods: Some recommended management measures are given below.

a) The use of biological pesticides in form of bacteria, fungi, and viruses (microbial pesticides).
b) The impinge of genetically engineered seeds in connection of pest control by producing varieties or crop species to resist various pests and diseases.
c) The use of dietary inhibitors is essential to prevent it from feeding and has no side effects.
d) The use of insect repellents in form of non-toxic and non-friendly to insects.
e) Natural treatment for harmful pests and insects should be used to combat without the support of insecticides.

Conclusion: The Article has attained a number of outcomes. Soil pollution occurs as a result of the harmful pesticides that changes its chemical and physical composition and makes it unfit for agriculture. It lasts for a long time until it is properly addressed or resolved. Soil pollutants are multiplied and varied. They have a bio-accumulation and Bio-magnification role. The radioactive pollution is gradually started to make pollution in to the soil. The industrial and household waste throws in agricultural areas and rivers abruptly. Desertification and overgrazing are major factor for loss of its fertility and natural vegetation cover. Soil is exposed to high erosion and then turns into dry draught prone areas. Deforestation contributes to loss of its fertility and dryness. The use of pesticides in large quantities causes toxicities and soil loss. It contains arsenic, which causes the pollution of agricultural crops. The havoc use of chemical fertilizers such as nitrogen, phosphate and potassium also leading in deformation of a porous layer that is accelerates the inability of plant roots to absorb soil nutrients. The use of untreated wastewater and garbage's contributes to soil pollution. The most prominent preventive methods to protect the soil and agri-lands is the adoption of organic agriculture, and green fertilizers and pesticides such as beneficial bacteria and fungi beneficial to make the agriculture and its canvas soil remains healthy and sustainable.

References

a) Ahmed Sabah Al-Jasimee et al 2020 J. Phys.: Conf. Ser. 1664 012141.
b) Al-Yasiri. K. (2019). Pesticides and their Impact on Contamination of Agricultural Soils located between Al-Kifl Stream and Awfi River. Babylon University Journal for Human Sciences, 5(1), 91-96.
c) Badran. A. (1988). Environmental Pollution, Its Sources and Types. Journal of Science and Technology, 4(1), 4-7.
d) Baya. B. (2008). Environmental Pollution and Development in Medea, Biskra, Master Thesis(Algeria : Ministry of Higher Education and Scientific Research, University of Matouri Qatnya, Faculty of Humanities and Social Sciences, Department of Sociology and Demography).
e) Fadlallah. S. (2001) Environmental Pollution and its Impact on Agricultural Economic Development. Assiut Journal of Environmental Studies, 20(1), 77-89.
f) Jamal. Q. J. (2019). Air Pollution: Concepts and Effects. Journal of Scientific Prospects, 11(1), 300-305.
g) Melhem. M., Kayyal. M. (2004) Soil Contamination with Hydrocarbons - An Evaluation Study - Adra Air Depots. Damascus University Journal of Engineering Sciences, 20(1), 72- 82.
h) Rashid. S. (2017). Effects of the Economic Problems of Environmental Pollution in Iraq and Methods for Its Treatment. Al-Mustansiriya Journal for Arab and International Studies. 14 (1), 106- 112.
i) Salam Hussein Ewaid et al (2020) J. Phys.: Conf. Ser. 1664 012143.
j) Taher. J. (2009). Environmental Pollution - Waste Management and Treatment. Assiut Journal of Environmental Studies. 33(1), 123,133.