

Soil Contamination & Impact on Human Health: A Review

Pooja Bhatia, Research Scholar, Department of Mathematics, Maharishi Dayanand University, Ajmer
(Rajasthan)

Dr. Deepak Raj Jain, Associate Professor and Head, Department of Mathematics, Government College Tonk,
Rajasthan

Abstract

Studies on soil fertility status of Sri Ganganagar district were undertaken at Soil Testing Laboratory, Sri Ganganagar (Rajasthan). It was observed that on average soils were not problematic with respect to salinity and alkalinity. Soils were low in organic carbon and medium to high in available phosphorus and available Potash. These studies were initiated so that rational schedule of manurial treatments and other cultural practices could be followed. The nutrient status with respect to N, P and K has been distinguished on Panchayat Samity basis and fertilizer recommendations for various fertility groups have been given.

Introduction:

The assortment of land, soil and atmosphere in Rajasthan makes the state an enormously particular one in India. The state economy is mainly agricultural and pastoral. Sugarcane, pulses, oilseeds, cotton and tobacco are the major crops of the region. Rajasthan is also the largest producer of marble and sandstone. These minerals are excavated at Makrana near Jodhpur. Rajasthan has rich salt deposits at Sambhar and copper mines at Khetri and Dariba. In principal seasons Kharif and Rabi, development inside the state underneath ordinary circumstances of precipitation develop all around oats, oil seeds and pulses, be that as it may, conceivable outcomes of a standard yield year is much of the time defaced by methods for discontinuous dry spell as the chance of each extraordinary year changing into a dry spell year has been imagined as extreme as 0.5. Besides, Rajasthan represents 70 levels of the full arid and semi dry zone in India and those dry zones are centered ordinarily inside the western part of the state. A top notch distinction amongst Kharif and Rabi gathers is that Bajra is the fundamental product in Kharif while Wheat goes up against different yields in zone all through Rabi season. Soils of the Rajasthan state are not healthy. Inadequacies of nitrogen, Phosphorous, sulfur, zinc and iron are very normal. Distinctive soil types are found in the diverse region of Rajasthan. In view of the sort of the soils can be grouped under 14 categories. Mathematical modeling is essential to understand the controlled-release mechanism and gives an insight in the factors that affect the CRF properties. Detailed understanding of the modeling techniques helps in designing improved, efficient CRFs. Mathematical modeling has been very important in the related field of controlled release of pharmaceuticals from coated materials [24], [25], [26], and many of the same modeling approaches are transferable to CRFs. To make a mathematical model for CRFs, it is very important to have a clear understanding of the chemical and physiological processes related to the release phenomenon [24], [25], [26]. Some of the important factors that significantly affect the mechanism of controlled release include mechanical properties and biodegradability of coating materials, coating thickness, nutrient density, soil physiology, and soil water content. The step-wise procedure for the development of an example mathematical model to predict the release of nutrients. The physical and chemical phenomena of nutrient release from a coated granule are converted to a mathematical equation by applying transport theory. The solution of the mathematical model is given by numerical or analytical methods. The model results are compared with experiments for

validation of the reliability of the model.

Soil Contamination: Impact on Human Health:

Soil pollution will affect the human very badly. In agriculture field we use pesticides and chemical fertilizer for better crops. But these causes soil pollution. In industries toxic and chemicals also fall in soil and get polluted. The crops and plants that grown in polluted soil. And it absorbs these toxic and chemicals. After Photosynthesis it produces food and we use it. The plant which grown in polluted soil will cause dangerous disease to human. There are numerous causes of soil pollution that occur every day or even every minute.

1. **Man-made** soil pollution originates in several types of processes, some deliberate and some accidental. Human-caused soil pollution can work in conjunction with natural processes to increase the toxic contamination levels in the soil.
2. **Accidental spills** and leaks during storage, transport or use of chemicals for e.g. leaks and spills of gasoline and diesel at gas stations, several of which goes unreported in Indian Urban warehouses
3. **Foundry activities** and manufacturing processes that involve furnaces or other processes resulting in the possible dispersion of contaminants in the environment.

Literature Review:

“Chandra Prakash (NGO **kheti Virasat Chairman**)”, a researcher in milieu science at Punjab Procedural Academy (PPA), Kapurthala told, “When fertilizers are used in soil with mix of uranium gratified arrives the soil and then sullies groundwater. The govt. should order to maintain for fertilizer components to approve sanitization procedure to eliminate uranium from the produce. Our next study will cover ‘Haryana’ and ‘Rajasthan’ someplace sharecroppers do not be contingent as copious on pesticides and fertilizers as their counterpart in Punjab do. The publics of Punjab are overriding the chief elements of uranium. Cancer patients are made by this uranium element in the soil (Heavy Metal). In compare to European’s peoples the 23% uranium is more in punjabi’s people bodies.

Expert believe, if not blame, that the green revolution of the 1960's has its own side effects. Farmers living in the Malwa region are exposed to toxins because of the excessive use of pesticides over the eons. There is high content of cancer-causing agent in soil and water in this region as compare to Rajasthan.

Richards and Jaben (2010). The Significant relationship ($p < 0.01$) were found between DTPA-extractable Cu, Zn, Fe, and Mo and total P applied in the bio solids amended plots and they were reported the long-term application of organic amendments increased micronutrient availability, but long-term application of inorganic P had no effect on micronutrient availability. Trace element concentrations varied in Oklahoma soils. The trace elements Cd, Cr, Cu, Ni, Pb, and Zn were significantly correlated with clay content while Mn was correlated with Alox.

Objectives

The main objectives of our study were:

- ✓ To evaluate the Physico-chemical analysis testing parameters in soil at different sampling sites and study of concentrations of micro and macro nutrients.
- ✓ To study the comparison between observed test results and BIS standard values.
- ✓ To estimate the extent of availability of soil chemical properties in the selected districts of Punjab and Rajasthan.

- ✓ To evaluates the risks of adverse effects to the human health that may result from the contamination of soil in the selected research study area.
- ✓ To statistically evaluates the degree of influence of soil properties on the soil nutrient status in the selected areas of Punjab and Rajasthan.

Research Methodology:

Soil testing is a useful tool that can help to estimate the available nutrient status of the soil. The present study was planned to investigate the agricultural soils of Punjab and Rajasthan under paddy, wheat and cotton cultivation area. The study also covered the view of various Physico-chemical parameters like soil Ph, EC, OC, Ferrous, Potassium, Magnesium, Molybdenum, Calcium, and Sulphur, Phosphates, Sodium and metals viz. Copper, Manganese, and Zinc. Estimation of heavy metal contents plays a major role to assess the quality of soil and helps to set stringent regulatory limits by the government agencies. The level of Phosphorous, Magnesium, Sulphur and PH values from soil collected from different regions of Punjab and Rajasthan.

Abohar

Abohar, a tehsil headquarter of fazilka district, is an vital town positioned in south western part of Punjab and is positioned at the interstate boundary of the country. Its barriers touch the mounds and desolate tract plains of Rajasthan. Abohar is a fertile vicinity. Typically regarded for Kinnow, a hybrid citrus fruit. The kinnow is a high yield mandarin hybrid cultivated drastically within the wider Punjab region of India and Pakistan. The location has a excessive yield of cotton, mustard and many legumes. The weather of the abohar, at the complete, dry and is characterized through a completely heat summer, a brief rainy season, and a restorative winter. The cold season is from November to March. That is observed by way of the summer time which lasts until approximately the cease of June. The period from July to mid- September constitutes the south-westerly monsoon season. Abohar town and its nearby planning vicinity is nearer to Thar desolate tract of Rajasthan and quiet far from the most important river basin that run thru the state. Besides this, area lies in south - western vicinity of the state and far away from Shivaliks which has excellent impact on its temperature and rainfall. consequently, climatically this area has a totally heat summer time. For the duration of the month of June which is a top duration of summer season, the mercury sometimes touches over 47° C. The dust storms are normal feature in summer. Very small spell of rainy season is experienced through the vicinity because the monsoons nearly remain very scanty and meager. The common rainfall is set 410mm per annum. The wintry weather season is broadly speaking dry with minimal temperature touching to 0° C. The prevailing wind route of this area is North-West to South-East. Abohar region has mostly sandy soil. Huge sand dunes can nevertheless be seen in many rural regions whereas the topography area experienced a huge change with the various project connected with green revolution. The effect of this is that a large number of sand dunes formerly present inside the rural areas were leveled by way of the farmers to place as lots as land below cultivation.

Sri Ganganagar

Sri Ganganagar is a planned city and the Northern-maximum city of the Indian kingdom of Rajasthan, located near borders of Rajasthan and Punjab states and the interstitial border of India and Pakistan. It is known as after Maharaja Shri Ganga Singh Bahadur, Maharaja of Bikaner, it's also known as “the food basket of Rajasthan”

and “inexperienced district of Rajasthan”. The climate of Sri Ganganagar varies to excessive limits. Summer time temperature reaches 50° C and winter temperature dips just around zero° C. The average annual rainfall is only 200 mm. Average most temperature in summer is 41.2 °C and common minimum in winter is 6 °C. Barren region land become converted to a inexperienced metropolis through the efforts of Maharaja Ganga Singh, who introduced the gang canal. Which consists of the extra waters of Punjab and Himachal Pradesh to the location, making Ganganagar district known as "the food basket of Rajasthan". The economy of the town is primarily based on agriculture, its primary plants are wheat, mustard and cotton. other plants are guar, bajra, sugar cane and grams. In current years, farmers also are diverting toward horticulture. Kinnow is a popular horticultural product; other end result of the citrus own family also are grown. Industries in Sri Ganganagar District are based on agriculture. Main industries are cotton ginning and pressing factories, mustard oil mills, wheat flour generators, Rajasthan country Ganganagar Sugar mills, which is thought for its Royal history Liqueurs.

Studied Chemical Parameters

Chemical analysis were done the determine the following

- Soil PH
- Electrical conductivity
- Available Phosphorous
- Organic carbon
- Available potassium
- Boron
- Calcium
- Copper
- Ferrous
- Magnesium
- Manganese
- Sulfur
- Zinc
- Molybdenum

Statistical Analysis of Soil Parameters

Statistical analysis is very fast programming to develop the comparative study we are using the following methods to compare the data's. The use of standard statistical analysis techniques is both time consuming and expensive. Statistical tests are used in the analysis of these time series data to arrive at a deeper understanding of the fundamental method that generated it. A soil test is the analysis of a soil

sample to determine nutrient contents, compositions and other characteristics. The soil testing laboratories are provided with suitable technical literature on various aspects of soil testing's, which helps farmers to decide the quality and quantity of soil nutrients in soil at various stages of the crop. Statistical methods are extremely helpful in formulating and testing hypothesis and to develop new theories.

RESULT AND DISCUSSION

The present work was undertaken to analyze the soils for their PH states, their chemical nutrients present in the soils. The analysis of the soil types of some regions of Punjab and

Rajasthan states is therefore undertaken for the present work with the objective to obtain the detailed information regarding the soil types of this region. It was also attempted to compare the results of Punjab and Rajasthan soils. The results have been reported in Table.

The analysis of the soil types in the present study was therefore undertaken for the some region of Punjab and some region of Rajasthan state, with the objective to obtain the relevant and desired information regarding soil types of the two states Punjab and Rajasthan. The results obtained in the present study will not only be of theoretical importance but will also be of genuine use to all the farmers as well as the Scientists/ Research Scholars interested in this field.

Then t-test and chi square test was conducted to examine whether there was a significant difference in the soil nutrients of different locations of Punjab and Rajasthan.

Ph of the Soil

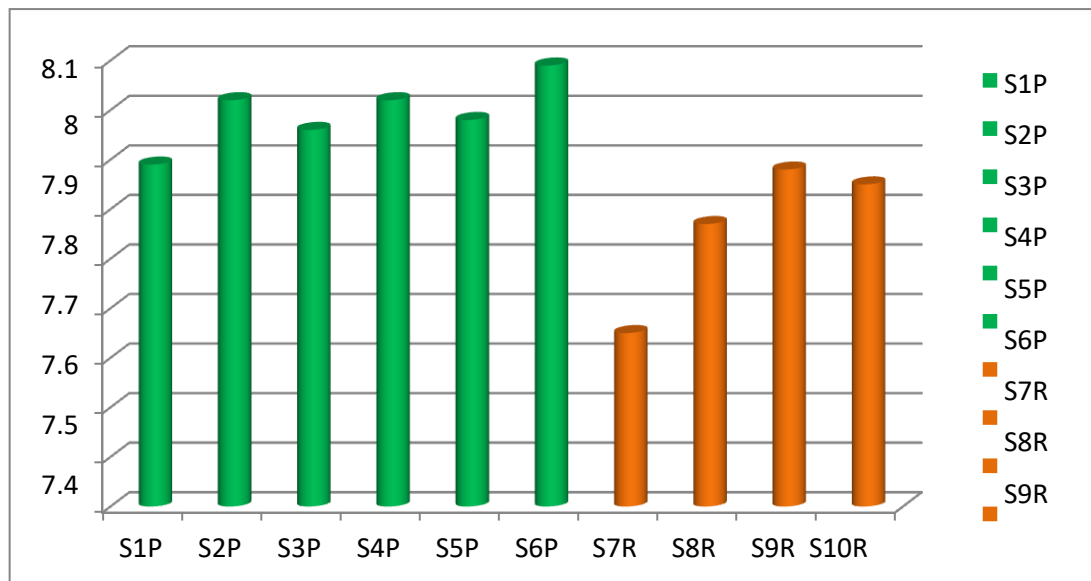
Soil Ph is very important parameter which represents the nature of soil either acidic or basic. The total essential nutrients are 17 the availability of nutrients is depend upon Ph of the soil. Ph of the soil samples was determined by the microprocessor based Ph meter (Model: Sytronics μ-Ph-362). The Ph of the soils of each of the samples selected have been given in TableIn above table Ph of most of the soil samples varied from 7-8 except few where Ph range more than 8.

Ph	Available nutrients
Low Ph	Cu, Fe, Mn, Zn
High Ph	Mo, S, K, Ca, Mg,
Neutral Ph	P and B

Table: PH value in soil from different locations of Punjab and Rajasthan

Sample no.	P	P	P	P	P	P	R	R	R	R
Ph	7.89	8.02	7.96	8.02	7.98	8.09	7.55	7.77	7.88	7.85

Fig. Ph of different agricultural soil samples under paddy/wheat/cotton cultivation of Punjab and Rajasthan (India).



CONCLUSIONS

The effectiveness of soil is going to very low in their efficiency of growing crops and the effectiveness of crops by using pesticides is very harmful so that we conclude that all though pesticides makes highly production of crops but quality of crops looking gorgeous but dangerous for our health in order to exactly scenario can be seen in the thesis but a little bit overview of sides effects of eating this kind of crops causes cancer.

So pre hypothesis are taken is very highly non significant and it is very dangerous level is already occurred by Rajasthan and Punjab the scenario is given by. Overall conclusion is avoid pesticides to grow crops and if the desert soil can be mixed in these soils then production and quality of crops can be prevent and cancer can be stopped.

The present work was undertaken to analyze the soils for their PH states, their chemical nutrients present in the soils .In our study, the mean value of soil nutrients in Punjab soils is significantly higher than Rajasthan soils. It means in Punjab soils more fertilizers was used which enhance nutrients level in soils usually fertilizers were basic in nature it increases.

The data analysis of the chi square test it is very high it shows that significant relation every year showed not acceptable condition for living organism. In our study soil nutrients especially Phosphorous is very dangerous to our health. The range of the Phosphorous is between 5-9 and it is very well owned in 2013. But it is going to high in order to 2014-2015 and very dangerous level in 2017. Which concludes that the scenario of farms is related to Phosphorous is worst means the level of Phosphorous is going to very high. Although the coefficient of correlation is negative

between in 2013 and 2017 approximately zero or neutral in 2013 and 2017, but positive relation in 2015 and 2017 hence the relation between 2015 and 2017 are similar but it is very dangerous level given by chi square test. We found that it seems to above 700 in compare to 5-9 level. It is approximately 100 times more than the dangerous level. Copper is not good for living organism if it content is high in soil. In laboratory analysis in 2013 the range of copper 86.75

but it was increased year after year. But it is going to high in order to 2014-2015 and very dangerous level in 2017. Which concludes that the scenario of farms is related to copper is worst means the level of copper is going to very high.

BIBLIOGRAPHY

1. Jain, AK (2012) : "water management strategies in Punjab", India in 'Perspectives on water' Powell and Mitra.
2. Kalkat GS, KS Pannu, Karam Singh and PS rangi (2006): "Agriculture and Rural Development of Punjab: Trasforming from Crisis to Growth" PSFC, Government of Punjab, May 'Reprinted along with a brief of initiatives of the PSFC : July 2005 to Dec 2010'. (2011)
3. Mehta D et al : "Uranium in Ground Water in Malwa Region : Scientific opinion and Fact sheet", available at <http://Physics.puchd.ac.in/dmehta/>
4. Singh, Karam (2003) : "Punjab Agriculture Policy Review", Report for the world Bank, NDO july.
5. Benbi, et al (2006), " The Green Revolution in Punjab: Impact on Soil Health", Indian Periodical of Fertilizers val. s (4).pp 57-66.
6. Chandy, K.T. (1999), *Soils of Punjab - Soil science Agriculture and Environmental Education series*, 365(13)
7. BASSEY UDOH, T., IBIA TRENCHARD, O., UDO BASSEY, U. AND EDEM STEPHEN, O., 2008, Assessment of Micronutrient Status of Inland Depression and Floodplain (Wetland) Soils in Akwa Ibom State South- Eastern Nigeria. *Agro-Science Journal of Tropical Agriculture, Food, Environment and Extension*, 7(2):156-161.
8. Begum khadiza, israt jahan, m., hasibur rahman, shahjahan chowdhury and syed fazle elahi, 2009, Status of some Micronutrients in Different Soils of Gazipur District as Related to Soil Properties and Land Type. *Bangladesh J. Sci. Ind. Res.*, 44(4):425-430.
9. Behera, S. K., shukla, A. K. And Singh, M. V., 2008, Relationships Between Ph and Organic Carbon Content with Extractable Zinc and Total Zinc in Acid Soils of India. *Ecological Society of America*, 19(8):2228–2241.
10. Bhaskar, B.P., Mishra, J.P., Baruah, U., Vadivelu, S., Sen, T.K., Butte, P.S and Dutta, D.P. (2004). Soils on *Jhum* cultivated hill slopes of Narang-Kongripara watershed in Meghalaya. *J. of the Indian Soc. of Soil Sci.*, 52(2): 125-133.