The Analysis of Agricultural Land nearby Indira Gandhi University, Meerpur (Rewari)

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Abstract— For sustainable land use planning of natural resource base as well as implementation of reclamation measures in problem soil, characterization and classification of soil resources are essential. For this purpose, 70 samples were collected from depth of 0-25cm from 10 villages nearby Indira Gandhi University, Meeerpur (Rewari) in Haryana State. This paper is based on the secondary research and the survey of the farmers which are using chemicals as fertilizer. The research offers deep knowledge about the various techniques and methods by which they can improve the fertility of the soil without using the synthetic fertilizer; it also provides the important data about the quality of the soil.
Keywords: Soil testing, Agricultural Land

I. INTRODUCTION

Soil testing is now an intrinsic part of modern farming in the West, as well as in many developing countries. Tests primarily focus on the elements in most demand by crops which are supplied by fertilizers: nitrogen (N), phosphorus (P), and potassium (K). Depending upon the soil types, in some regions tests are also conducted for secondary nutrients: calcium (Ca), magnesium (Mg), and sulfur (S). In drier areas, micronutrients such as iron (Fe), zinc (Zn), manganese (Mn), copper (Cu), and boron (B) are often measured, since deficiencies of these elements are more frequently associated with calcareous soils. Indeed such areas may also have excessive or toxic levels of some elements, such as B, and high levels of elements such as Na and Mg, which can adversely affect soil physical properties. As nutrient behaviour in soils is governed by soil properties and environmental conditions, measurement of such properties is often required. These include pH, salinity, organic matter (OM), calcium carbonate (CaCO3), and texture and aggregate stability. In drier areas, the presence of gypsum (CaSO4.2H2O) is also of concern (Allison et al 1965).

The idea that one could test or analyse a soil and obtain some information about properties especially its acidity or alkalinity and its nutrient status is long established, and can be traced back to the beginning of scientific inquiry about the nature of soil. Analyses of plants to reflect the fertility status of the soil in which they grew is more recent, although visual crop observations are as old as the ancient Greeks, if not older. In the last few decades, spurred on by commercialization of agriculture and the demands for increased output from limited and even diminishing land resources, both soil and plant analysis procedures have been developed, and are still evolving. The main issue in recent is, losing the fertility of the soil by using the chemicals as fertilizer. It is true that by using the synthetic fertilizer, the crop production is much more as compared to crop production by using organic fertilizer.

Salinity and alkalinity affect approximately 6.5% of the world land area and salt- affected land comprised 19% of the 20.8 billion hectares of arable land on earth .In India, about 6.74 million ha area is salt-affected, out of which saline and alkaline soils account for approximately 2.95 and 3.79 million hectares, respectively (CSSRI Vision 2050, 2015) (Gates T, Burkhalter J et al 2002). Salinity and alkalinity hinder growth and productivity of crop plants to variable extent, resulting in annual losses of 230 billion INR in India alone. The losses are likely to increase, manifold with projected increase in salt affected soils to 16.2 million ha by 2050. In India, population is increasing at 1.7% per year but the net cultivable area remains more or less constant (Bates, T.E et al 1990). Therefore, to feed the burgeoning population of the country, these soils should be reclaimed and brought under productive cultivation. Moreover, global warming with projected climate change will also significantly influence the crop productivity in rain-fed areas of dry semiarid regions. Soil salinity and alkalinity again complicate the situation.

Soil alkalization and salinization is a serious concern for optimum crop production and maintenance of long-term sustainability of the system. Detection, monitoring and mapping of salt-affected soils is difficult due to its dynamic nature. These soils are formed either geo-genically or a result of secondary salinization. The arid, semiarid regions and canal command areas are mainly affected by soil salinity thereby limiting plant growth, leading to poor yields and drastic reduction in crop production (Gates T, Burkhalter J et al 2002).Many studies have shown the efficiency of the remote sensing and GIS tools for delineation of salt-affected soils.The main purpose of soil survey and mapping is to characterize and make an inventory of soil resources for sustainable land use planning and provide the suitable way for preventing the soil pollution. The steps for updating the status of salt-affected environments are database collection, inventory and information gathering by using a combination of image processing techniques, GIS and ground truth.

Careful monitoring of the soil salinity is required because area under salt-affected soils increased considerably in spite of considerable reclamation efforts resulting in about 20% of salt- affected irrigated land. In areas where salinity is a major problem it is rather difficult to monitor the required ground information therefore, multi- temporal analyses might be effective in detecting salt dynamics in those areas and thereby assessing the degree of damage on both crops and yield. For extraction of surface information about soil salinity, the capability of the remote sensing data such as LANDSAT ETM+, airborne visible/ infrared imaging spectrometer (AVIRIS), colour infrared aerial photos (CIR) [11]. In India, the various agricultural colleges and state agricultural department have not so far adopted uniform method of soil analysis. When a questionnaire was issued, the replies received even from dozen of the laboratories, showed the wide diversity of techniques employed. For example, there were 9 different methods for soil dispersion, 7 methods of lime reserve, 3 methods for total nitrogen, etc. This has led to some confusion in interpreting and drawing conclusions on the behaviour of similar soil in the different parts of the study area.

Therefore, in 1954, The Indian Council Of Agricultural Research, New Delhi, initiated a scheme to study the existing method of soil analysis, test them with Indian soils and recommended those suitable to Indian conditions for universal adoption by all the agricultural laboratories in the country[14]. The suitability of any method is to be judged by the following criteria:

1) The method should be based on sound scientific principles without being too empirical.
2) The method should be simple in operation, and easily reproducible in the hands of different workers.
3) As far as possible, the method should have a universal application for the variety of soil of the country.
4) Quick and fairly accurate methods should be devised for routine work to deal with large number of samples

II. Results and Discussion

The area nearby the Indira Gandhi University and the village were Meerpur and Tatarpur. The agricultural land from where the samples were collected upto the depth of 25cm below the ground ,labelled by using the certain perimeters and are given in the table below :-

Sample no.
Village / Location
1.
Tatarpur
2.
Behind Indira Gandhi University
3.
Turkiavas
4. 5. 6. 7. 8. 9. 10.
Istmarpur
Gokalgarh
JaantSarivas
Ramgarh
Budana
Between Gokalgarh&Budana Kumbhavas

Table 1: Sampling station

Nitroge Sample n
site (kg/acr e)
Phosphor Potassiu us m pH (kg/acre) (kg/acre)
1. 25 40 2. 10 5 3. 10 45 4. 20 43 5. 15 20 6. 10 45 7. 25 40 8. 10 37 9. 10 40 10. 25 45
55 6.0 155 6.0 160 5.3 100 6.0 100 6.0 150 5.5 100 6.0 25 8.0 150 7.0 100 6.5

Table 2: Concentration of macronutrients

- Computation of Mean of Phosphorus concentration= =36 kg/acre "Below 30 kg/acre Phosphorus and above 50 kg/acre build up the soil less fertile, so in this case the concentration of the Phosphorus is optimum for the crops which are grown by the farmer''.
- Computation of Mean of Potassium concentration= =109.5 kg/acre "Most counties have average soil K values on the upper end of the optimum level (71-140), so the level of K is optimum in the soil of study area".
- Computation of Mean of pH concentration= =6.5 "The optimal pH range for most plants is between 5.5 and 7.0, the pH range is optimal of the soil of the study area".
- Computation of Mean of Nitrogen concentration==15 kg/acre "The concentration of Nitrogen in the soil should be 25 kg/acre, so the soil shows the low concentration".

Sample Chlorin Boro No. e n
- 11.5 1.05
- 9.6 0.79
- 10.1 1.54

Molybdenu m
0.020 0.013 0.067
4.
12.7
1.00
0.022
5.
5.5
0.76
0.025
6.
13.0
1.36
0.018
7.
9.0
0.73
0.051
8.
9.9
1.22
0.029
9.
7.3
0.75
0.011
10.
6.2
1.36
0.056

Table 3: Concentration of Micronutrients

III. Survey results

- According to the survey of the farmers shows that, the soil problem in their field is about 40% do not have any soil problem as indicated in the chart by the red colour, and 60% farmers having problem in their soil as indicated by the yellow colour.
- About 12% farmers do not have any effective idea for increasing the fertility of the soil, and 11% farmers recommended the Gypsum for increasing the soil fertility and 77% farmers use cows, buffalo's dung as traditionally.
- About 86% farmers belief that using of synthetic fertilizers cause serious diseases related to lungs and skin,
- 12% have self-observed the negative effects of synthetic fertilizers, 2% farmers do not observed any kind of negative effects.
- There are 32% farmers use only 50kg synthetic fertilizers, and about 68% use 100kg or above for the better production of crop.

- There are 72% farmers aware about the Organic Farming, Even 28% farmers do not know about it.
- About 98% salinity problem is observed in the survey as well as laboratory test based.
- 80% farmers aware about the law and regulations of using the Synthetic fertilizer, and 20% are not aware about it.
- 68% farmers have not tested soil for their field and even do not know about the Soil Health Card, and only 32% farmers have tested their soil.

Table 4: Diagrammatically representation of the data received by the survey from farmers 5.

IV. CONCLUSION AND RECOMMENDATIONS

In the present study, in total 70 soil tests (including micronutrients and macronutrients) were subjected to the soil macronutrients as well as micronutrients. The analysis showed that, soil of the study area is highly affected by salinity problem and lowering in the concentration of the nutrients. From all the samples which are tested in the laboratory showing the deficiency of macronutrients as well as micronutrients, but the Nitrogen in the sample no.1 from the Tatarpr village showing the high concentration of Potassium.

Sample no.2, behind the I.G.U Meerpur showing the worse condition of the soil, because the concentration of the Nitrogen and Potassium is very low, and from the sample no.3 and 6 showing the very low concentration of the Nitrogen. Laboratorial testing showed that, the soil is highly salinized.

The soil of Rewari district is affected mostly by alkalinity rather than salinity (et al. Ashin-Datta, MadhurmaSethi, Anil R. Chinchmalatpure. Jan, 2016). In the soil of the study area, the concentration of Nitrogen is very low (15kg/acre), which indicates the continuously decreasing fertility of the soil. The agricultural land nearby Indira Gandhi University, Meerpur (Rewari) namely (Meerpur, Istmarar, Tatarpur, Ramgarh, Budana, Gokalgarh, Jaant Sarivas) are severely salt affected.

It is clear that, by using of synthetic fertilizers for increasing the crop production we are making the soil toxic as well as infertile. It is true that, by the using the synthetic fertilizer the crop production increase, but it is not good for the sustainable agriculture. By the following recommendations, we can protect the soil from such anthropogenic hazard.

- Crop replacement
- By using of organic fertilizer
- Traditionally using manure
- Better management of husk (do not burn)
- Using of Gypsum
- Leguminous crop irrigation
- Genetically modified crop irrigation
- Properly camping by the “KrishiVigyan Kendra” for the awareness of farmers about the negative effects of the synthetic fertilizers.

