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Characterization of agricultural soil used for rice production of Lakhimpur District of Assam, India with special Emphasis on few selected anions

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ABSTRACT

The food production is very much important and rice is one of the major food grains in the world. Increasing population is demanding more and more food production. But various natural and manmade factors are obstructing in getting the desired production of rice food grain. Thus in order to get the factors associated with not getting the desired product, it is essential to characterize the soil associated with the rice production including other food grains.

Key words : *Rice, Production, Characterization etc.*

Introduction

Rice is not only the staple food of the Assam but also of the entire other north eastern states including other parts of the India. India takes a lead in the production of rice in the world. Assam contributes to the total rice production of India in a significant way. But sometimes it is observed from the various data that the production of rice in India always not upward leading to think about the factors responsible for such irregular nature of rice production. Climate change is evident and other anthropogenic factors for pollution of the environment is also well noted.

Study Area

The Lakhimpur district is selected as a study area for the current research work. The economy of the district is agricultural based and primly depends on rice production.

The literacy rate of the district is 78.4% (2011 census). The total population is 1042137 out of which 529674 are male and 512463 are female (2011 census). The census of 2011 shows the sex ratio as 965. 457 per square kilometer is density of population. The samples are collected from the each of the nine blocks namely Narayanpur, Bihpuria, Karunabari, Nowboicha, Telahi, Lakhimpur, Boginodi, Ghilamari and Dhakuakhana under the districts of North Lakhimpur and Dhakuakhana. The sampling locations are indicated by sampling codes s shown in Table 1. The map of the study area is shown in Fig 1.

Materials and Methods

A total of half kilogram of soil samples from each block of the Lakhimpur district were collected in polythene bag and brought to the to the laboratory for the assessment of the all the parameters as stated

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Table 1. The sampling code

SL No.	Sample CODe
1	ASNL
2	ASNB
3	ASG
4	ASB
5	ASN
6	ASB
7	ASD
8	AST
9	**ASK**

below. The following parameters were tested in order to check the status of the agricultural soil used for rice production in the Lakhimpur district of Assam.

1. pH
2. Electrical Conductivity (EC)
3. Organic Matter (OM)
4. Phosphate ($PO_4$3-)
5. Sulphate ($SO4_2^-$)
6. Chloride (Cl^-)
7. Nitrate (NO_3^-).

The pH and EC of the samples were tested by using digital pH meter and conductivity meter. The organic matter and chloride of the soil content were tested by using titrimetric method. UV spectrophotometer was used to calculate the amount of phosphate, sulphate, and nitrate in the collected soil samples.

Results

The average value of the parameters as stated in the materials and methodology section is shown in Table 2. The variation of the average values of all the parameters as cited above is shown in Fig. 2. The Fig. 2 predicts that the values changes with the change of the locations. The pH values indicate that the majority of the sampling locations witnessed acidic nature of the soils. The high EC value of sampling location indicates the presence of higher number of various cautions and anions in the collected soil samples. The lowe value of organic matter (OM) represents the lower fertility status of the soil samples. Although the phosphate values are not

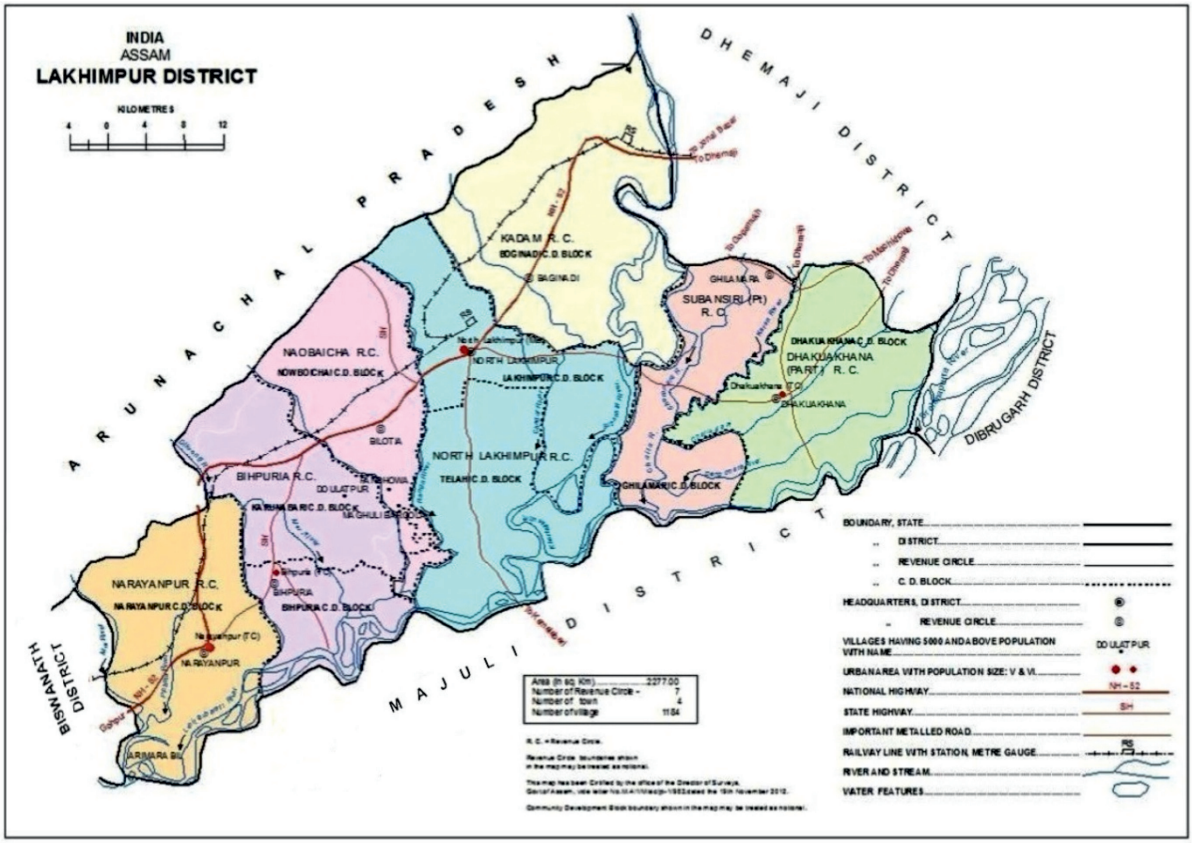

Fig. 1. The map of the study area

Table 2. The average value of various parameters

Sampling Location↓ / Parameter!→	pH	EC (µS)	OM (%)	PO_4^{3-} (ppm)	SO_4^{2-} (ppm)	Cl^- (ppm)	NO^{3-} (ppm)
ASL	7.73	84.92	3.12	35.96	56.02	21.62	22.84
ASN	7.72	9.19	4.48	34.84	52.52	28.84	16.34
ASG	7.33	9.30	3.58	40.00	59.66	20.72	19.24
ASB	7.05	9.19	3.2	34.20	54.44	26.06	21.22
ASN	6.56	10.18	6.34	38.26	60.96	30.14	13.54
ASB	6.44	9.71	4.98	39.22	58.14	34.16	15.68
ASD	6.49	9.63	5.86	32.86	55.46	22.42	13.58
AST	6.90	10.13	4.72	31.12	58.58	22.50	18.58
ASK	6.71	10.24	5.64	28.58	57.58	27.76	18.36

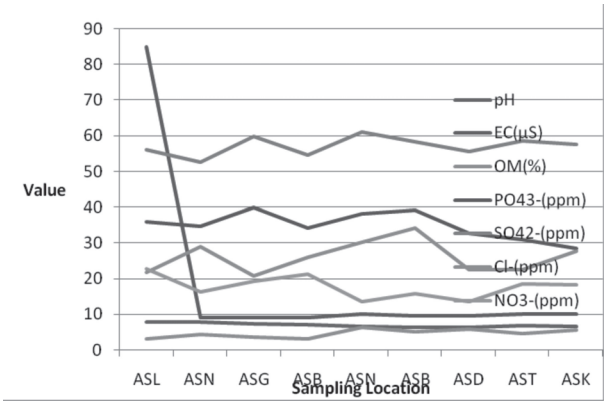

Fig. 2. The trend of variation of average values of various parameters

adequate for soil fertility but in a moderate stage. The higher sulphate values shows the receipt of the component from other sources. The lower nitrate value may be due to reduced natural fertility capacity of the sampling locations.

Conclusion

The sampling locations are witnessing the well established impact of environmental pollution. Besides other factors, the environmental pollution component like acid rain, global warming etc. and anthropogenic factors may be responsible for the non uniformity soil quality index. A well documented guideline may be helpful for the farmers to get the desired rice production along the years.

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