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## **Impacts of coal bed methane co-produced water on agricultural soils and experimental restoration technologies**

**Utpal Majee, Chattopadhyay G N and Chaudhury S**

Centre for Earth Sciences, IISc. India

**H**uge quantity of coal bed methane (CBM) has been identified in coal bearing belts of the eastern part of India. Good quantity of coal bed water (CBW) is also being released along with the CBM. Contamination of this water with the nearby agricultural lands frequently damages the soil and consequently the production of agricultural crops. This situation called for some specific management which would allow safer release of this CBW to the nearby lands. In this study, general properties of CBW were assessed and the values of different parameters were compared with irrigation water criteria. The outcomes revealed that the quality of CBW was largely dominated by different salinity and alkalinity attributing properties. CBW affected soils with regard to nearby non-affected soils were also analysed. The electrical conductivity (EC) as well as exchangeable sodium percentage (ESP) of the contaminated soils increased significantly owing to highly saline and alkaline nature of CBW. However, alkalinity was prominent. Organic carbon, N and P showed a declining trend in the CBW affected soils. Reverse osmosis (RO) has been used for partial reclamation of CBW with EC values up to 2 ms cm<sup>-1</sup>. The study revealed steady improvement of salinity/alkalinity attributes. Major plant nutrients viz.

N, P and K were influenced by variations in the degree of reclamation of CBW through RO. In view of the severity of this problem in CBW affected soils, three soil amendments viz. gypsum, organic matter (vermicompost) and Sulphur in reclamation of these CBW affected soils of varying grades were assessed under laboratory condition. Use of gypsum improved ESP, SAR and pH significantly over no amendment treatments. In view of the outcomes, an on-farm trial was conducted. Combined use of gypsum and vermicompost resulted in considerably higher crop yields which was 66.66% higher than current average yield of West Bengal.

### **Biography**

Utpal Majee has completed his PhD from Visva Bharati (founded by Nobel laureate Rabindranath Tagore), Santiniketan, India. Currently, he joined as National postdoctoral fellow at Indian Institute of Science (IISc.), Bangalore. Dr. Majee secured first position in his M.Sc. and received reputed INSPIRE Fellowship for Ph.D. from Department of Science and Technology, Govt. of India. He also has qualified National Eligibility Test (NET) conducted by University Grants Commission of India. Along with that these, he also contributed a good number of researches in reputed international journals.

e: utpalmajee89@gmail.com