

# Analysis of Groundwater Quality Parameters and its Remediation using Graphene-based Nanocomposites in Bisoi Block, Mayurbhanj District, Odisha

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## 1. Abstract

“Water” being the most important component of mankind and the biosphere to survive has various forms of availability. Still, it is well known that this society's present requirements completely depend on groundwater available on the earth's crust. Groundwater is utilized for drinking and has wide importance in agriculture and industries. The present study has focused on the quality of groundwater in the Bisoi block of Mayurbhanj district, Odisha. Groundwater samples were assemblage from different Tube wells of the Bisoi block of Mayurbhanj district for determining its utility quality and for assessing the levels of varying contamination by analyzing different physical parameters like pH, electrical conductance (EC), Total dissolved solids (TDS), total hardness as CaCO<sub>3</sub> (TH), turbidity, Chloride (Cl<sup>-</sup>), Fluoride (F<sup>-</sup>), Nitrate (NO<sub>3</sub><sup>-</sup>), Dissolved Iron, Free Chlorine, and Alkalinity using the Water-kit and compared with the standard values recommended by World Health Organisation (WHO, 1993) and Indian Standards Institution (ISI, 1991). These analyses will be Carried out for the Physico-chemical Parameters, in the presence of Heavy Metals (HM) in groundwater by both conventional and instrumental methods using Flame Atomic Absorption Spectroscopy (AAS) for cation analysis and Ion Chromatography (IC) for both cations and anions and Further Membrane Technology (Available at BARC) will be implemented to separate the contaminants. Contrarily, various GO-based oxides, rGO-based oxides, and mixed-oxides nanocomposites as adsorbents were planned to install contaminants by the adsorption-desorption method.

## 2. Introduction

- The present investigation ground water quality of 13 different tubewells or different sites of Bisoi block, district Mayurbhanj.
- The water sample was analyzed for physical and chemical parameters. The physical parameter includes, pH, conductivity, TDS, and Turbidity. The chemical parameters include Alkalinity, Total hardness, Chloride, Fluoride, Nitrate, Dissolved iron. All the parameters were analyzed as per standard methods.

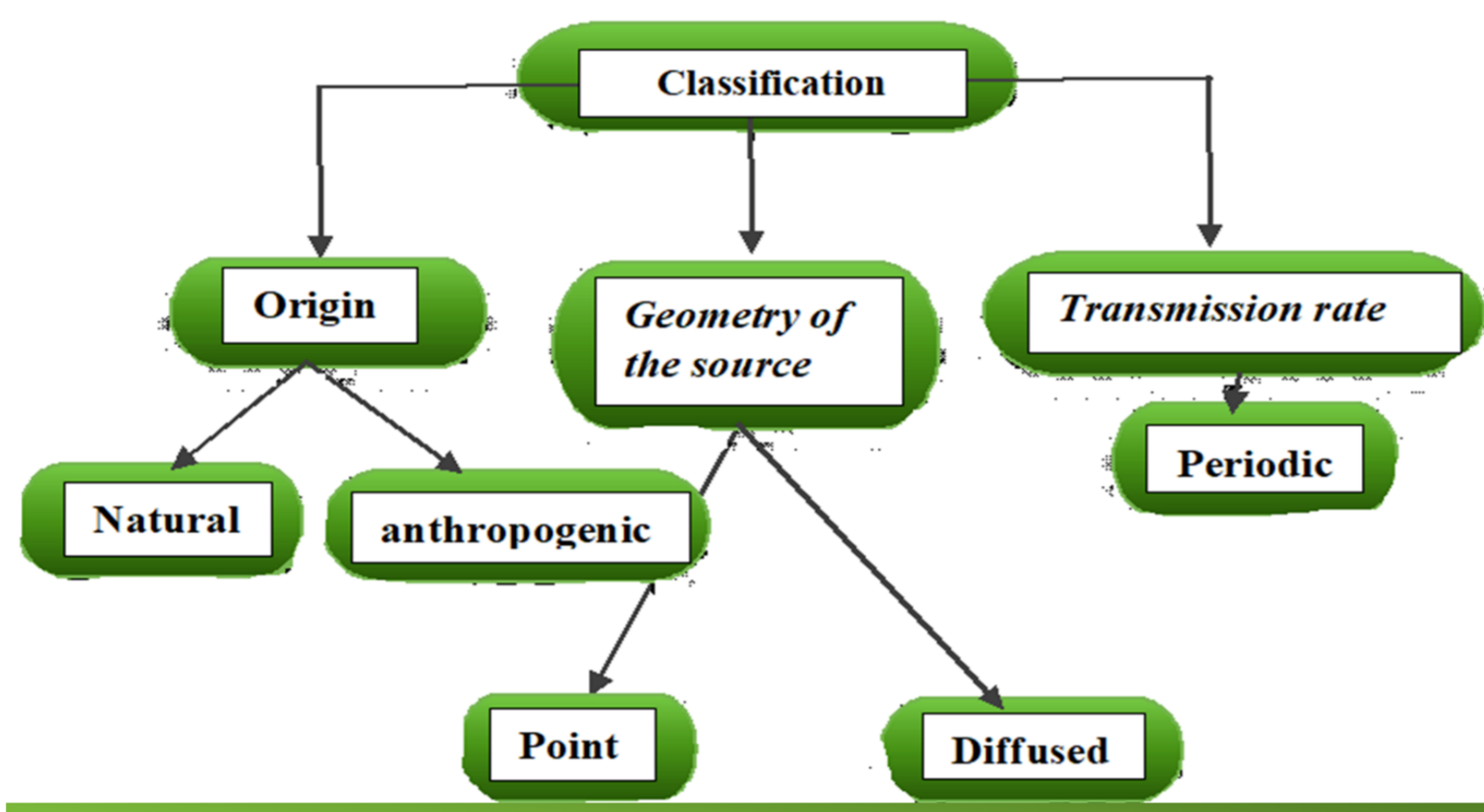


Fig 1: Sources of Groundwater Adulteration

## 3. Analysis Data Of Groundwater

Table 1: Analysis of Basic Chemical Parameters

Sample No	Pachayat names	pH	Turbidity (in NTU)	TH	Chloride	Fluoride	Nitrate	Dissolved Iron	Free Chlorine	Alkalinity	TDS	EC
1	Badmanda	9	5	200	10	0.5	1	0.05	0	250	423	0.655
2	Nuagaon	7.5	20	550	250	0.9	0	0.5	0	400	1396	1
3	Baneikala	7	20	200	70	2.1	5	1	0	150	819	1
4	Jagannathpur	8	10	200	10	1.1	0.05	0	0	250	824	1.28
5	Sanpurunapani	8	25	550	50	1.1	10	0	0	400	758	1.17
6	Bautibeda	7.5	20	90	10	0.7	0	0	0	140	615	0.69
7	Asana	6	25	40	10	0.6	0.5	0.3	0	80	1441	1
8	Jodia	7	5	150	10	0.5	0	0	0	190	1000	1
9	Khadambeda	5.5	20	50	10	0.6	0	2	0	70	1000	1
10	Luhakani	7.5	25	250	70	0.9	5	0.1	0	200	1000	1
11	Bisoi	6.5	20	50	10	0.4	0	0.4	0	130	1000	0.49
12	N. B Pokharia	7	20	120	20	0.4	0	0.3	0.1	110	1213	1.8
13	Bhatchhatar	6.5	5	70	20	0.3	50	0	0	80	1000	1

## 4. Results

## 5. Future prospective design

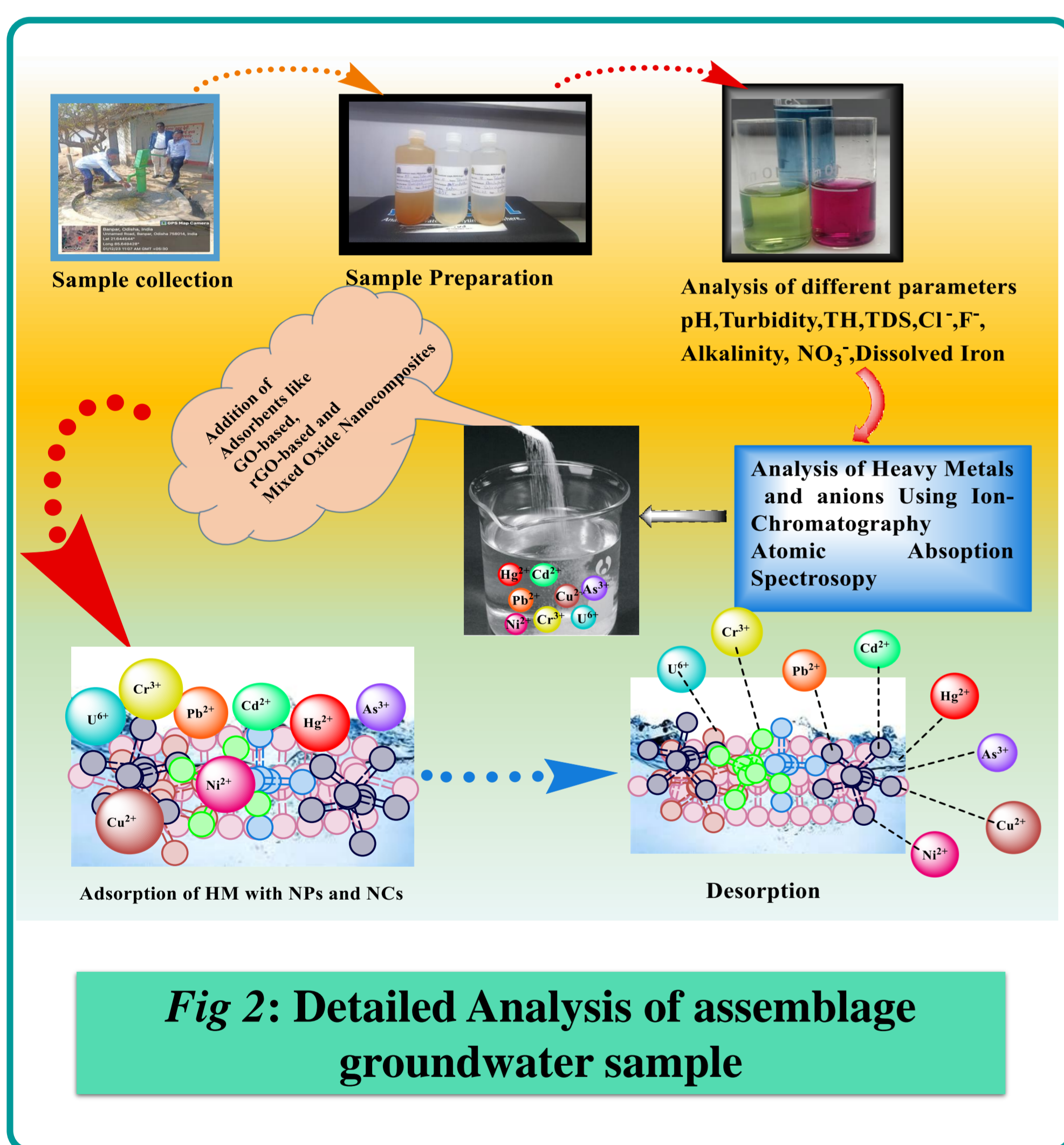


Fig 2: Detailed Analysis of assemblage groundwater sample



## 6. Conclusions

1. The maximum pH value was observed 9 at Badmanda while minimum value was observed 5.5 at Khadambeda panchayat.
2. The collected samples highest total hardness were found in Nuagaon and sanpurunapani which is 550 ppm.
3. The maximum Alkalinity value was observed 400 ppm at Nuagaon and sanpurunapani.
4. The maximum Nitrate value was found in more than 50 ppm at Bhatchhatar.
5. Fluoride value was observed 2.1 ppm at Baneikala which is not acceptable and can cause fluorosis.
6. Dissolved iron also be found in 2 ppm at Khadambeda which not acceptable for consumption.
7. The maximum value of total dissolved solids were found in 1441ppm at Asana, 1396 ppm at nuagaon and 1213 ppm at N.B.Pokharia which can lead to kidney disfunction.
8. The permissible total Conductivity was found ranged from 0.49 mS cm<sup>-1</sup> to 1.28 mS cm<sup>-1</sup>, the maximum value was observed 1.28 mS cm<sup>-1</sup> at Jagannathpur.
9. The radio active Uranium Analysis was Performed at BARC, Mumbai which results that among the 13 samples only nuagan and sanapurunapani has 5 ppb and 2 ppb of uranium ion concentration.

## 7. Acknowledgement



ମହାରାଜା ଶ୍ରୀରାମଚନ୍ଦ୍ର ଭଞ୍ଜଦେଓ ବିଶ୍ୱବିଦ୍ୟାଳୟ