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Title:	TRACE METAL CONTENT IN SOIL, WATER AND CROPS GROWN IN SUBARNAREKHA COMMAND AREA OF GHATSILA (EAST SINGHBHUM)
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Abstract:	Ghatshila is situated on the banks of river Subarnarekha at a distance of approximately 45 km from district headquarter Jamshedpur. The average rainfall of the district varies from 1150 to 1250 mm. Majority of area of East Singhbhum covered by very strongly acidic, followed by strongly, extremely acidic , slightly and in soil reaction . Much of ground water pollution is caused by human activities specially mining. Toxic substance carried out by rain water into nearby water resources, alters their chemistry and often makes the water unfit for irrigation purpose and human use. To study the impact of trace metals in water, soil and plant continuum, thirty water resources were selected in between, longitude 86015.446’ to 86027.377’,latitude22032.676’ to22o41.839’ and altitude 95 to 138m from Subarnarekha command area of Ghatsila. Fifty nine soil samples and seventy seven plant samples were collected from adjoining area of the selected water resources for the research study. Following research findings were observed after completion of research work as per objectives. 1. Iron content in water of canal (0.543 mgL-1), tank (0.626 mgL-1) and river (0.339 mg L-1) found higher than well and bore well. Similar trend was also found in Mn & B content in water, while Cu content was varied in narrow range from 0.107 mgL-1 (Canal) to 0.123 mgL-1 (Bore well) in

water of different selected water resources. 2. Lead content was found higher in tank (0.056 mgL-1), while well water showed higher Ni content as compare to other resources of irrigation water. 3. In all five sources of irrigation water content of Co and Cd was found high to its permissible limit 0.05 and 0.01 mgL-1 to irrigation purpose respectively. 4. BOD and COD was found higher in tank, river and canal as compare to rest two sources(well and Bore well) of irrigation water indicates more organic matter load in these water bodies. 5. pH varied from 7.05 (Bore well) to 8.48 (River) in water collected from different water resources, while EC was found in decreasing order 0.66, 0.44, 0.43, 0.32 and 0.22 dS m-1,respectively in well, bore well, canal, river and tank indicate more salt concentration in underground water as compare to surface water due to high leaching in coarse texture. 6. Content of Zn, Cu, Fe & Mn in soil varied from 0.77 to 1.74, 3.61 to 5.87, 18.73 to 24.82 and 14.70 to 16.06 mg kg-1, while content of Pb, Ni, Co and Cd varied from 2.31 to 2.87, 1.30 to 2.51, 1.30 to 1.60 mg kg-1 respectively in soil around different water resources of Ghatsila. 7. pH and EC in soil varied from 5.83 to 6.81 and 0.04 to 0.41 dS m-1 around different water resources. Phosphorous content around well was found much higher (64.48 kg ha-1) as compare to other water resources due to the intensive cropping of vegetables. Similarly potash content also found higher in soil around well and bore well water resources. ii 8. Content of Zn, Cu (Well), Fe, Mn (Tank), Pb, Ni (River), Co (Well) & Cd (River) in plant was observed higher 57.03, 64.50.448.14, 197.20, 56.28, 54.02, 47.66 and 11.54 mg kg-1 when grown around the water resources of Ghatsila. 9. In different family groups Zn and Cu content in plant was found higher in Allianceae, while Fe and Mn content was found higher in Rubiaceae and Gramineae family, respectively. In respect of heavy metals content in plant Alliaceae family shown higher Pb and Ni content and in Rubiaceae family Co & Cd was observed high. 10. Trace metal content in edible part of vegetable showed a wide variation and Zn (64.80 mg kg-1), Cu (64.20 mg kg-1), Fe (304.8 mg kg-1) and Mn (94.75 mg kg-1) were found higher in radish, brinjal, radish and khira, respectively. Lower content of Zn, Cu, Fe & Mn was found in tomato (10.60 mg kg-1), radish (32.70 mg kg-1), brinjal (93.40 mg kg-1) and bodi (77.65 mg kg-1), respectively. 11. Lead content among different vegetables showed a wide variation with higher content in potato (82.40 mg kg-1) and lower value of Pb in Bodi (0.30 mg kg-1). On the contrary nickel content variation was found in narrow range among all tested vegetables cultivars varied from 42.30 (radish) to 56.26 mg kg-1 (Lauki). Similarly Co and Cd content variation in different edible part of vegetable showed not much variation and content was varied from 27.30 (Radish) to 48.50 (Potato) mg kg-1 and 8.90 (Radish) to 11.68 (Lauki) mg kg-1, respectively. 12. All the water resources situated in 95m to 135m altitude (in between 40m height differences). So, there is no any significant variation was recorded due to altitude differences in content of trace metals in water soil and plant. While result reflected a close relationship with uptake of Zn, Cu, Fe and Mn to availability of these four elements in soil. Similar result was also noticed with heavy metal content in plant. 13. Very interesting result in respect of plant uptake of Zn, Cu, Fe and Mn was observed in water resource cluster fall in between longitude 860 24.158’ to 860 27.377’, where uptake by plant was comparatively higher as compare to others cluster of longitude. In same cluster of longitude Ni and Co availability in soil also found higher. 14. On the basis of Fe, Zn, Cu and Mn analysis report in edible part of vegetables, it was calculated that if farmers of study areas intake 100g and 200g fresh vegetable in their diet per day, it only fulfil about 15% and 30% requirement of Iron and 3.5 and 7.0% requirement of Zn that have been prescribed for a healthy human diet per day respectively, while Cu & Mn requirement in human body per day for all the age groups almost supplement through the same amount of fresh vegetable in Ghatshila.

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