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Review Paper

A literary criticism on sources and effects of Heavy Metals on plants, humans and environment around the world and heavy metal pollution status in the Buriganga River, Bangladesh

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Abstract

Heavy metal contamination has become a worldwide ecological issue, attracting substantial public attention, largely due to the growing health and environmental issues. Their numerous commercial, residential, rural, health, and technical uses have contributed to their broad environmental dissemination. The following analysis addresses the findings of the various authors past work on Pollution of heavy metals in Buriganga River, together with heavy metals source and its effect of on plant, human and environment all over the world. Concentrations of 8 heavy metals in Buriganga River water and dregs are explored in the analysis to evaluate their levels and compare them with other major Bangladesh rivers. Indiscriminate disposal and redemption of toxic waste into rivers contribute to environmental pollution that might be viewed as a potential source of impendence to the biotic community. Although certain are important, a significant number of trace elements might be noxious to all embodied soul at a severe level because of the advancement of complex mixes inside the cell. Introduction to heavy metals is related to mental hindrance, kidney harm, numerous maladies, and even mortality in occurrences of extremely high exposure.

Keywords: Burihanga river, heavy metal, impact, sources, river pollution.

Introduction

Due to its harmfulness, long term presence and ultimate accumulation in aquatic habitats, defilement of the aquatic system by heavy metals is a top-notch issue in the world. Rivers are a prevalent route for the transfer of metals and heavy metals end up becoming vital contaminants in various river in a networks[1]. Buriganga is the largest river that flows through Dhaka, an urban city of twelve million inhabitants. This is Bangladesh's largest contaminated river, which is rapidly becoming filled with massive volumes of toxic waste[2]. Numerous industries have created in Dhaka over the previous decade. Also there is a fast increment in the number of recent industries. The amount of untreated waste material released into the Buriganga has steadily increased as an instant consequence. As an instantaneous result, the quantity of untreated waste material being released into the Buriganga has risen continuously.

The Buriganga River is being slowly polluted with many manufacturing units and sewerage strains in the region which discharge massive volumes of noxious waste[3]. Tanneries, fabrics, transport, paper, and steel mills are contaminating in a large volume, which are situated next to the rivers of Buriganga, Turag, and Shitalakshya[4]. Such industries emit heavy metals and a few acids and dissolvent specially. Today, Dhaka's metropolis alone generates about 3,500 to 4,000 tons of solid waste each day. Residential, industrial, road cleaning, flammable and non-flammable wastes and building garbage disposed of huge quantities of chemical effluents, heavy river-side pollution, vessel petroleum products, releases, cargoes, vessels, untreated sewage, and many others are polluting the river[5,6].

The Buriganga is almost death biologically due to cruel human acts and the failure of the rebel to authorize rules and regulations[7].

Heavy metals, for example, Pb, Cd, Zn, Hg are graded primarily to metals over $5g/cm^3$[3,7]. Because of correlations in chemical and environmental features, metalloid such as arsenic (As) is also considered in the heavy metal class[9]. Incognito, persistent or irreversible heavy metal exposure[10]. In addition to reducing atmospheric quality, water bodies and food crops, this type of pollution also affect the health and well-being of creatures and humans through the food chain[11,12].

Pollution of heavy metals in freshwater ecosystems is of vital importance because of metals toxicity and accumulation of these in aquatic systems. Heavy metals are particularly biologically and environmentally harmful. The toxical impacts of heavy metals like these, that are not used to synthesize new materials are beneficial to the organisms is their capacity to store and displace chemically similar elements in enzymes. In some cases, Heavy metal toxicity is related to many human illnesses, including developmental delay and malformation, miscarriage, cognitive and behavioral effects, kidney damage, hypertension, and even death at very high concentrations[13]. Global contamination of heavy metals has transcended the acceptable limit and is harmful to all life forms[14-16]. Heavy metal prevention and control is an international issue[17].

The current investigation was directed with the accompanying objectives: i. Understanding the current condition of the presence of heavy metal in water and sediment Buriganga River; ii. Understanding the impact of heavy metal pollution in plant, humans and environment.

Status of heavy metal in Buriganga River

A few researchers have conducted extensive studies (Table-1 and Figure-1) on the presence of heavy metalin the water and sediment of Buriganga River. Levels of Pb, Cd, Ni, Cu, Cr in the water and sediments were analyzed by Ahmed et al.[18]. Samples were gathered from three sites of Buriganga, named, Balughat, Shawaryghat, and Foridabad in three different seasons to check heavy metals. The water samples were collected in bottles and instantly applied 2mL of HNO_3 for every liter of water and kept for laboratory testing in the refrigerator at 4°C. Cr concentration, 645.26, was the highest of all metals analyzed, while Cd concentration, 9.21, was the lowest. The two concentrations were reported from the station in Balughat. There has also been a study of the amount of heavy metals[19].

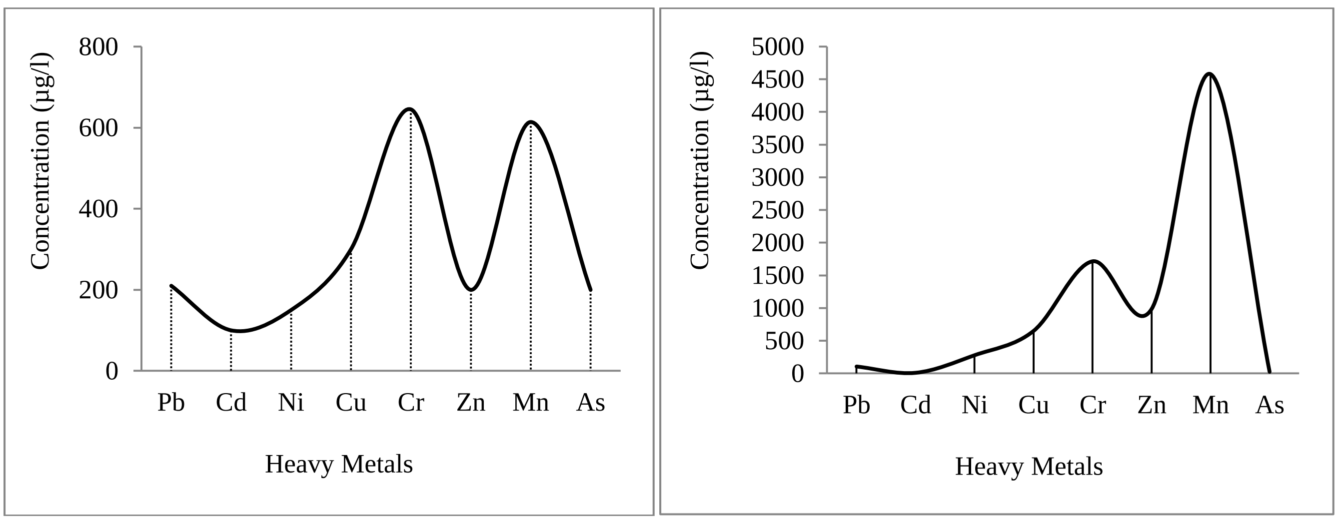
Cd, Zn, Pd, Mn, and As concentration in the river water was determined with the help of atomic absorption spectrophotometer (AAS, UNICAM 969)[20]. Even carried out a similar study which collected 5 samples from multiple Buriganga River stations and considered the highest was Mn and As the lowest in concentration[19,21]. Near the SSMC Hospital station, Mn has its highest value of 614.1. Another specialist acquired 15 samples of river water per 2km from Rayer Bazar to Pagla[21]. The mean metal concentrations (mg/l wt.) was 0.012-0.18; Mn, 0.06-0.31; Ni, 0.09-0.4; Cu, 0.1-0.99; Zn, 0.11-0.9; As, 0.005-0.22; Pb, 0.01-0.21; and Cd, 0.005-0.09. In Hazari bag and Lal bag areas, Cr, As, and Cd have the highest concentration.

Table-1: Concentration of heavy metal (µg/l) in the water of Buriganga.

Stations	Pb	Cd	Ni	Cu	Cr	Zn	Mn	As	Reference
Balughat	70.19	9.21	10.05	175.27	645.26	…	…	…	18
Shawaryghat	71.09	12.33	9.05	201.29	605.87	…	…	…	18
Faridabad	72.45	10.15	10.32	189.57	613.25	…	…	…	18
Near Sadarghat (IWTA) Terminal	1.8	9	…	1.7	…	8	24.6	1	19
Near SSMC Hospital	3.2	8	…	3.3	…	48.7	614.1	2	19
Lalbag area	2.2	18	…	6.1	…	19.2	45	3	19
Near Hazaribag tenary	2.3	15	…	11.5	…	9.8	27.3	30	19
Buriganga, Kamrangirchar area	4.3	16	…	9	…	7.9	44.5	2	19
Mohammadpur (S2)	210	90	120	300	12	200	80	150	21
Hazaribagh (S5)	140	90	140	140	150	130	140	140	21
Kamrangirchar (S6)	110	90	110	200	140	110	190	200	21
Lalbagh (S10)	100	90	150	190	130	110	180	90	21
Sutrapur (S11)	160	80	130	200	100	150	290	100	21
Shyampur (S13)	120	100	100	90	90	150	220	90	21
Mean	76.25	45.54	86.6	122.65	276.26	85.78	168.68	73.45	
Highest	210	100	150	300	645.26	200	290	200	
Lowest	1.8	8	9.05	1.7	12	7.9	24.6	1	
SD	67.749	40.233	59.466	100.184	262.168	69.367	172.187	70.616	
Water quality guideline									
DWSB	50	5	…	…	50	…	…	50	22
TRV	3	2	…	…	11	…	…	150	23
WHO	0.01	0.003	0.07	2	0.05	3	0.05	0.01	24

Table-2 presents the matrix of the correlation coefficient of Pearson among the selected Buriganga river water heavy metals. Most of the contaminants are positively correlated with each other, especially with the Pb. But the scenario with Ni and Cr is little bit different. Except Cu all other contaminates are negatively correlated with Ni and this same with Zn and Mn are only positively correlated with Cr.

Several researchers also determined the heavy metal content of the Buriganga River sediment (Table-3)[5,13,18,21]. One of them collected 5 individual samples and registered concentrations of Pb, Cd, Cu, Cr, Zn[13]. The mean content of metals in this region from higher to lower as Zn > Cu > Cr > Pb > Cd. Zn's highest value was registered from Badamtoli Ghat at 984.9. Sediment samples from 14 Buriganga River locations were taken[5]. A standard protocol was used to acquire composite sediment samples at each stage[25]. The total Cr concentration contained in Islambag Alirghat was 650.3. The concentration of Cr in other Buriganga river sites is also very high Nobabgonj Bara Masjid was observed to have a peak concentration of Mn. There is additionally an exceptionally high concentration of Mn in different regions of the Buriganga[18]. The lowest monsoon concentration was 3.87 of the five metals examined in the soil, while the highest concentration was 258.17 in Foridabad during the pre-monsoon. The difference in heavy metal concentration from location to location can correlate with river flow and industrial position and waste disposal network[7]. The concentrations range of metals (mg/kg) present in sediment were as follows: 1019-1884, 368-692, 35-59, 39-85.2, 45.45-60.50, 11.82-19.25, 50.12-80.2, and 4.2-11.28 Cr, Mn, Ni Cu, Zn, As, Pb and Cd respectively. The majority of the metals were maximum in Hazaribag and Lalbag areas.



(a) (b)

Figure-1: Concentration of heavy metal in water (a) and sediment (b) of Buriganga River.

Table-2: Pearson Correlation of heavy metals in the water of Buriganga.

	Pb	Cd	Ni	Cu	Cr	Zn	Mn	As
Pb	1							
Cd	0.818893	1						
Ni	0.695346	0.944936	1					
Cu	0.859702	0.533335	0.023159	1				
Cr	-0.80779	-0.98145	-0.94362	-0.07761	1			
Zn	0.977371	0.912159	-0.30123	0.896974	-0.94126	1		
Mn	0.048473	0.045144	-0.10513	0.013101	0.374086	0.199412	1	
As	0.849061	0.883806	-0.28229	0.871951	0.070595	0.811698	0.004942	1

Comparison of heavy metal concentration of Buriganga River with some major rivers of Bangladesh: Concentration values of different heavy metals in Buriganga River are considerably higher than others (Table-4). Only in the Dhaleswari river, copper and chromium concentration is higher than the Buriganga. Figure-2 graphically represents the comparison in heavy metal concentrations among river water of Bangladesh.

Table-3: Concentration of heavy metal (mg/kg) in the sediment of Buriganga.

Stations	Pb	Cd	Ni	Cu	Cr	Zn	Mn	As	Ref.
Wachpur Ghat	82.3	0.4	…	107.7	129.95	329.6	…	…	13
Kolatiya Para	70.4	0.5	…	85	57.9	276	…	…	13
Kamrangir char (end)	60.3	0.4	…	70	52.8	245	…	…	13
Kamrangir char (North)	80.6	1.2	…	313.4	125.8	675.8	…	…	13
Badamtoli Ghat	105.6	1.6	…	346	139.6	984.9	…	…	13
Hazaribag	13.1	0.7	79.5	144.9	196.5	148.4	2727	…	5
Nobabgonj Bara Masjid	18.3	1.3	96.6	141.8	110.3	473	4578	…	5
Shohid Nagar Beribadh	24.6	1.8	243.2	225.6	269.1	557.8	3452	…	5
Kellarmor Truck Stand	51.2	1.2	159.1	648	106.9	801.9	…	…	5
Islambag Alirghat	13.6	0.6	119.3	650.3	279.8	300	4338	…	5
Raghunathpur	85.6	7	221.6	609.2	187.2	803.8		…	5
Borishur Lonch Terminal	14.1	1.0	130.7	115.5	198.2	397.5	2257	…	5
Kamrangirch / Tara Masjid	52.7	0.8	126.5	565.7	137.3	721.1	3622	…	5
Swarighat	16.7	0.8	128.5	419.3	275.1	413.1	3157	…	5
Razarghat	38.7	1.2	96.6	560.9	130.5	539.8	3732	…	5
Badamtoli Bridge	23.5	1.2	233	336.9	108.4	480	3672	…	5
Nowab Barir Ghat	22	0.5	85.2	88.3	114.5	238.7	3777	…	5
Sadar Ghat	25.1	0.5	147.7	140,0	126.1	317.3	4193	…	5
Mererbag	40.7	2.9	278.4	172	187.3	552.7	3197	…	5
Mohammadpur (S2)	50.12	8.01	42.11	45.5	1256	51.17	368	13.21	21
Hazaribagh (S5)	62.5	9.58	53.41	48.5	1565	58.25	639	20.5	21
Kamrangirchar (S6)	68.08	8.8	49.21	47.2	1620	57.5	590	25.5	21
Lalbagh (S10)	80.2	8.78	56.5	47.4	1715	55.6	614	21.1	21

Sutrapur (S11)	79.3	6.6	53.4	44.5	1456	54.45	555	20.8	21
Shyampur (S13)	7.5	5.5	47.61	44.5	1110	52.5	507	17.5	21
Mean	50.256	3.115	136.405	218.248	436.916	383.434	2988.85	19.7683	
Maximun	105.6	9.58	278.4	650.3	1715	984.9	4578	25.5	
Minimum	7.5	0.4	42.11	29.18	52.8	51.17	368	13.21	
SD	28.347	3.076	76.929	216.396	552.607	272.621	1556.65	4.108	
Sediment quality guideline									
CUC (continental upper crust)	17	0.09	47	28	92	…	…	5	26
TEL (threshold effect level)	35	0.59	18	26	37.3	…	…	5.9	27
ASV (average shale value)	20	0.3	68	45	90	…	…	13	28
TRV (toxicity reference value)	31	0.6	16	16	26	…	…	6	23
LEL (lowest effect level)	31	0.6	16	16	26	…	…	6	29
SEL (severe effect level)	250	10	75	110	110	…	…	33	29
USEPA (United States Environmental Protection Agency)	<40	…	…	<25	<25	<90	…	…	30

Table-4: Concentration of heavy metals in the water of some rivers of Bangladesh.

River	Pb	Cd	Ni	Cu	Cr	Zn	As	References
Buriganga	76.25	45.54	86.6	122.65	276.26	85.78	73.45	This study
Karnafuly	12.49	9.53	…		84.38		37.98	31
Turag	2.1	13.6	…	4.2	…	19.1	2	19
Balu	1	13.7	…	10.1	…	24.9	1.3	19
Meghna	1.3	8	…	5.7	…	20.4	2	19
Shitalakshiya	1.1	11	…	5.1	…	24.3	2	19
Khiru	10.7	54.2	…	4.9	…	8.3	…	32
Dhaleswari	50.05	6.49	7.21	154.69	441.34	…	…	33
Passur	20	11	3.6	43.4	41	13.1	1.75	34
Korotoa	35	11	39	73	83	…	46	35

Table-5 and Figure-3 indicate the comparison between Buriganga and other major rivers in respect to the presence of heavy metal. In the Buriganga River, the concentration of Cu, Cr and Zn is considerably in high rate than others. But Pb, Cd and Ni level of the Dhaleswari River are higher than that of the Buriganga.

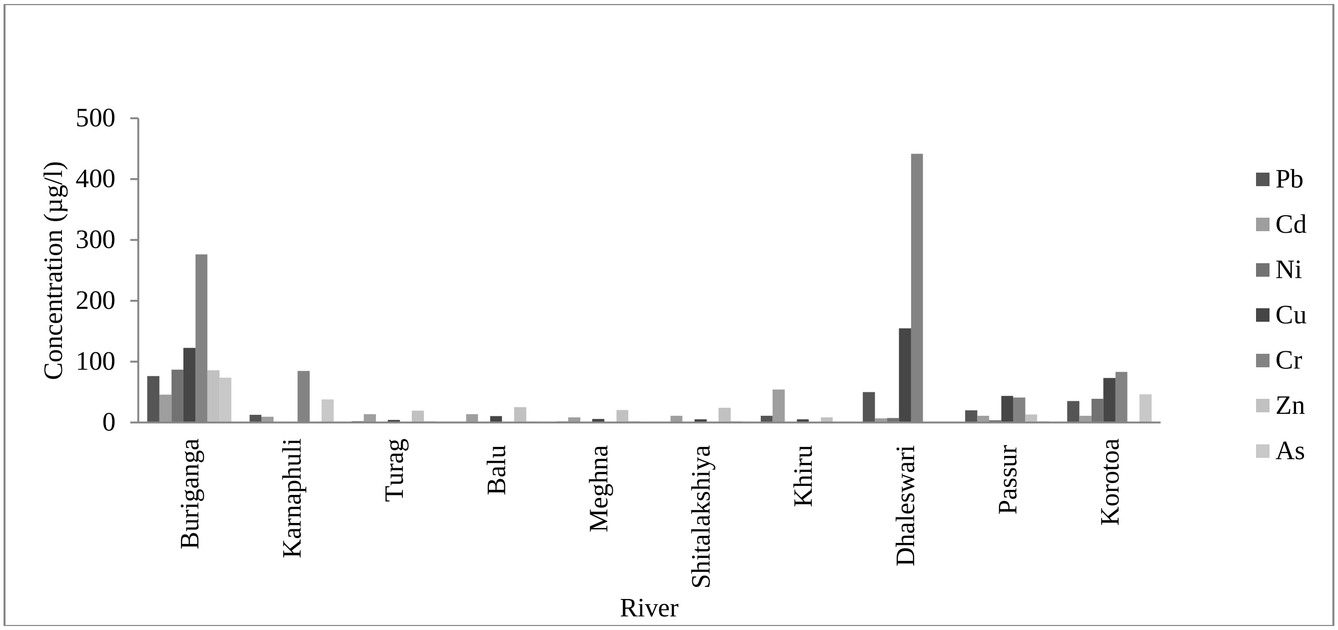


Figure-2: Comparison graph of Heavy metals (water) in some major rivers of Bangladesh.

Table-5: Concentration of heavy metal in the sediment of some rivers of Bangladesh.

River	Pb	Cd	Ni	Cu	Cr	Zn	As	Reference
Buriganga	50.256	3.115	136.405	218.248	436.916	383.434	19.768	This study
Bangshi	60	0.61	…	…	98	…	1.93	18
Paira	25	0.72	34	30	45	…	12	35
Korotoa	58	1.2	…	…	109	…	25	36
Padma	17	…	28	25	97	…	…	37
Jamuna	19	…	…	…	110	…	…	37
Bangshi	59.99	0.61	25.67	31.01	98.1	…	1.93	34
Khiru	6.15	1.86	…	31.02	…	103.23	…	32
Dhaleswari	64.22	3.23	181.06	44.05	117.56	…	…	33
Pashur	11.83	2.7	45	26.36	31.9	71.93	…	38
Shitalakhya	…	…	…	143.69	74.82	200.59	14.02	39
Karnaphuli	49.04	2.5	…	…	92.1	…	23.81	31
Turag	32.7	0.28	…	…	43.02	139.48	…	30

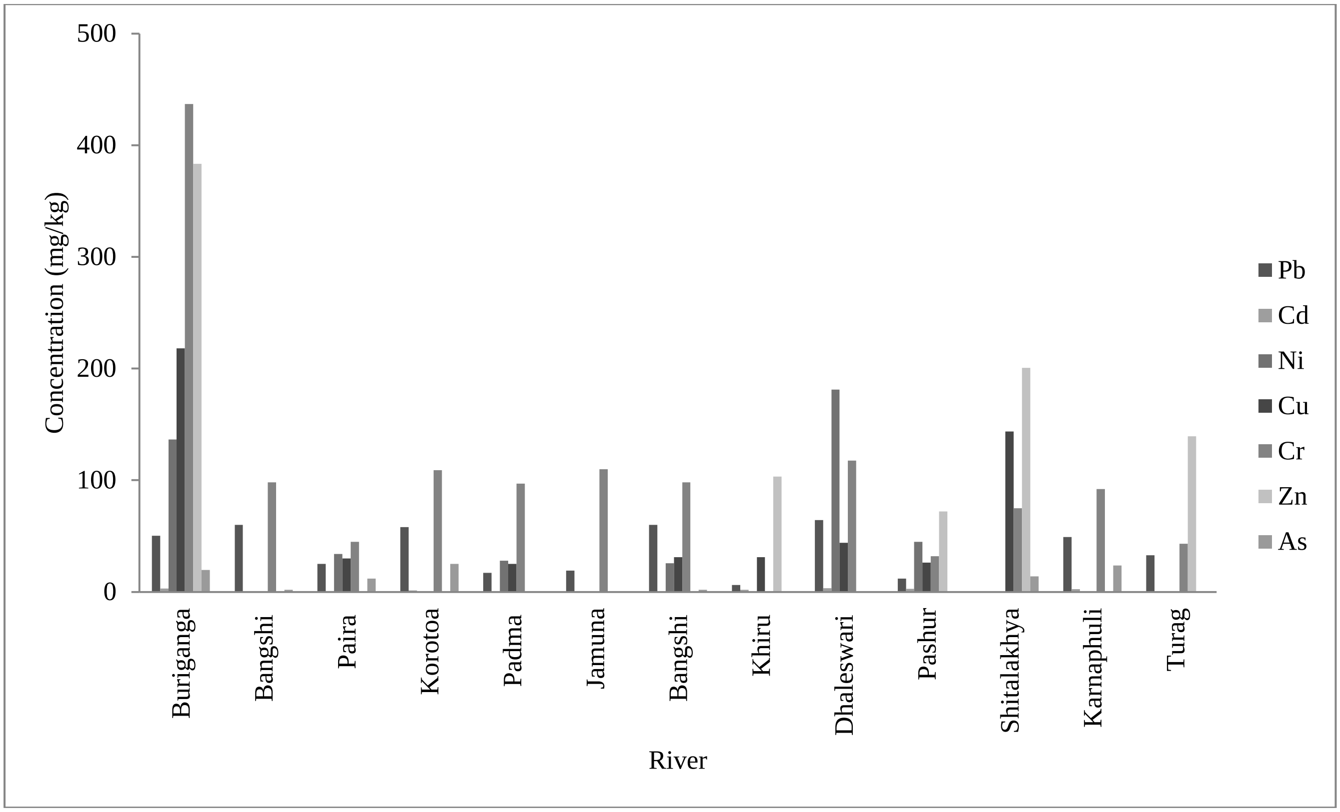


Figure-3: Comparison graph of Heavy metals (sediment) in some major rivers of Bangladesh.

Sources of heavy metals

A huge number of anthropogenic compound substances have been incorporated for endless utilizations since the advent of industrialization. Natural and anthropogenic (Table-6) are the two main heavy-metal origins that end up in various natural compartments.

Natural processes: Volcanic activity, soil erosion, runoffs and airborne particles are the main industrial sources of toxins from heavy metals in the environment. It is understood that volcanic ejections have dangerous effects on the environment, weather and safety of people[40]. In the shape of hydroxides, oxides, sulfides, sulfates, phosphates, silicates and organic compounds, heavy metals can be stored. Volcano event is responsible for the release of most common heavy metals like As, Al, Pb, Mg, Cu etc.[41]. Because of natural forms such as fleeting, biogenic, earthbound or volcanic structures, heavy metals embedded in rocks may penetrate the ground environment; disintegration; leaching; and surface winds[42]. Soil erosion also acts as a cause of contamination from heavy metals in soil. Wind and water are the two primary drivers for soil erosion[43].

Anthropogenic processes: Heavy metals are used in a wide range of consumer goods and are long-term stored as waste[44]. Anthropogenic practices such as extraction and purification[45], combustion of fossil fuel processing, metropolitan waste transfer[46], pesticide application[47], drainage system[48], and pesticide application[49] results in growing heavy metal presence in the agriculture sector. Metal finishing or electroplating requires the application by electrochemical methods of thin protective sheets onto metal surfaces. Tank cleaning and wastewater treatment can create substantial volumes of muddy sludge, and large amounts of hazardous metals[50,51]. This is shown that significant amounts of toxic metal compounds are present in their water, dirt, crops and vegetables in environments where mining exercises take place[52]. Throughout nuclear plants, when huge amount of water are used to operate the radioactive effluent comprising heavy metals are dumped onto soils or water bodies after the process, which contaminates the land and aquatic systems[53,54]. Several important anthropogenic factors that add to the heavy metal defilement in the atmosphere comprise automotive exhaust that discharges lead; mining which discharges As, and Zn; insecticides that discharge As and fossil combustion that discharge Ni, V, Hg, Se, and Au[55,56].

Case of manmade pressures that lead to environmental decay in the Arab Gulf include cleansing and recovery, chemical and wastewater flow, saline water releases from desalination plants and oil generation[58,59]. Mining or recovery operations are normally connected with short-or long haul natural, physical and compound effects. Such behaviors can trigger the coastal and sub tidal environments to be physically smothered and the underlining sediments to be deoxygenated[59,60].

Table-6: Environmental Heavy Metal sources.

Heavy metals	Sources	References
Lead	Coal combustion, electroplating, mining, painting, pigments, antiknock agents, glassware, ceramics, plastics, alloys, boards, wire sheathings, valves and tubing, equipment for the production of lead-acid batteries, ammunition and X-ray shielding.	62 61 63 64
Cadmium	Pesticide, mining, plastic, refining, welding, Ni / Cd batteries, dyes, anti-corrosive metal coatings, chemical stabilizers, fuel combustion, neutron absorbents from nuclear plants.	65 66
Nickel	Electroplating, non-ferrous metal, enameling porcelain, Ni / Cd battery, arc-welding, paint and ceramic dyes, dental and surgical protheses, ceramic and glass jar, computer parts, catalysts.	67 63
Copper	Copper polishing, mining, painting, painting, water pipes, kitchenware, pesticides and medical machinery.	61
Chromium	Dyeing, electroplating, manufacturing of paints, manufacturing of steel, tanning, textile manufacturing of ferro-alloys, pigments, passivation of cooling circuits oxidation, processing of wood, audio video and data storage.	68 69 70
Zinc	Brass processing, mining oil refinery, piping, anti-corrosion coating, battery tubes, Polyurethane stabilizers, Au precipitating, rubber processing of narcotics and chemicals, soldering paints, and welding fluxes.	71 63
Manganese	Manufacture of ferromanganese steels, manganese dioxide electrolytes, alloys, substrates, pesticides, antiknock chemicals, dyes, stoves, timber preservatives, coating rods.	63 70

Impacts of Heavy Metals

Metals perform a critical part in the cycles of creature life. Certain minerals such as Co, Cr, Cu, Fe, K, Mg, Mn, Ag, Ni, and Zn are required[72]. Many elements, similar to silver, cadmium, gold, zinc, and mercury are superfluous, also possibly life-threatening. Non-essential metal toxicity arises from dislodging heavy metals from their region or from encounters with ligands[73,74].

Impact on the plants: In Florida, it was observed that if soil copper is more than 50 mg/kg, that affects citrus seedlings and in 200 mg/kg, wheat would be wipered[75]. The productivity of the cabbage and bean seed plant at a Cd concentration of of 30 µ mol / L has curbed the bated root volume and also limited the crop and leaf area[76]. The photosynthesis of grain and soybean contracts with additional Pb[77]. Compounds with the highest heavy metal use is undesirable for rhizobium and legumes[78]. This impairs the viability of rhizobium and impact the cycle of Mesorhizobium-chickpea symbiosis[79,80,81]. The metals toxicity for microorganisms of in vitro and legume crops fluctuates greatly. Cd and Zn block the reaction of spinach chloroplasts by photosynthetic CO2 fixation[82,83]. Zn, Cd, Hg, Pb and Cu hamper the substance of chlorophyll, because it interferes with the biogenesis of pigments[77,84]. Cd interacts with plant photosynthesis and macromolecule synthesis and affects the membrane[85,86].

Soil in low heavy metals concentration will not influence the development of plants over a particular range. With the high concentration of heavy metals those plants reaches the edge of the sensitivity and therefore it dies[87]. These metals in soils are accounted for inhibiting shoot and root development, impacting nutrient absorption and also homeostasis. Such metals join the food chain with the ability to affect the well-being of both animals and people. Nevertheless, materials depend on the kind of minerals and soil properties for the present moment and longer-term impacts[88]. As a result, heavy metal deposition in plant tissue contributes to degradation and transformation of the plant, animal s and humans[89,90].

Impact on humans: Most low content-heavy metals are toxic to humans. Again several of them, including copper and zinc, are vital components needed in minute amount. Its impacts arise when the control system of the body breaks off due to either deficient or excessive metals. Existing analyses have demonstrated that heavy metals in the urban environment can penetrate biology of human by absorbing skin or inhaling dirt, etc., and in this way the health of children is directly affected. Heavy metals again threats urban environment and indirectly assault on public wellbeing by food, water, and atmosphere[91,92]. The result may be hazardous (acute, persistent and sub-chronic), damage in nerve, cancerous, mutagenic or teratogenic[93,94]. There is assumption that the hazardous conditions in Upper Silesia were responsible for 15 percent higher circulatory issues, 30 percent higher cancer cases, and 47 percent higher respiratory diseases in inhabitants of this area relative to those in the rest of Poland[95].

Cd can influence the metabolism of Ca, which can induce deficiency in calcium leading to cartilage failure and bone fractures, bone softening; cracking and skeletal deformations with a significant reduction of up to 30 cm in body height etc[96]. At incredibly low levels cadmium is toxic. Prolonged exposure to tubular proteinuria ends up in human renal failure. High exposure can cause pulmonary disease, pneumonitis of cadmium-induced by inhaled dust and fumes. Cadmium also has a link to bone deficiencies and random fracturing, higher blood pressure, and myocardial failure. Extreme introduction may result in aspiratory necrosis and end of life[97].

Lead is the most predominant heavy metal toxin[98]. This typically reaches the human body by the gastrointestinal and respiratory tract and then activates the flow of blood as solvent salts, complexes of proteins and ions, etc. This damages or kills many of the body parts, including the heart, liver and also vital cell and gene expression physiological procedures. Lead poisoning often contributes to hemoglobin production disruption, serious and permanent harm to the kidney, joint and active heart, peripheral nervous system as well as the heart and central nervous system[99,100]. Pb affects children resulting in poor brain gray matter growth and thus low intelligence quotient[101,102]. Acute and persistent effects of lead end in psychosis.

Cu, Ni and also Zn are important heavy metals for the physical body, still it will affect human health if the body takes these from outside. Ni and Cu are influenced by fostering tumors whose impact on carcinogenesis has drawn fears around the world[103]. Zn, especially when taken orally, is thought to be moderately non-lethal. Excess amounts, however, may cause malfunctions in the process that results in inadequate development and reproduction[104]. Breath of heavily oxidized (IV) and (VI) Cr-containing dirt is consistent with cancer cell development in respiratory tract and painless perforation of the nasal septum[105]. Given its high solubility, its capability and its heavy oxidizing power to infiltrate cell membranes, hexavalent chromium is known to be the greatest threat.

Mercury is dangerous, and in human natural chemistry or physiology, it has no known importance. Spontaneous miscarriage, congenital malformation, or GI disorders caused by inorganic sources of mercury. Problems by its natural state, includes monomethyl and dimethylmercury, along theerethism (organ or body segment pain or sensory sensitivity), acrodynia (rash-marked pink infection), gingivitis, stomatitis, neurological disorders, complete brain, and CNS trauma, as well as congenital. Arsenic toxicity properties, including lead and mercury, depending on the type of chemical used[98]. This helps coagulate insulin, creates coenzyme clusters, and increases adenosine triphosphate (ATP) production when breathing. It is stated to be carcinogenic of all its oxidation forms and cause death in excessive ingestion[106]. Most of it is retrieved as a by-product[107].In comparison, arsenic toxicity is frequently related with Guillain-Barre's disease[108,109].

Impact on the Environment: Soil microbial biomass is a significant soil contamination marker and that soil microbial biomass differentiated heavy metals are completely different[110]. Low heavy metal concentrations could promote microbial development and increment of the microbial biomass but high amount would significantly reduce biomass in the soil[111]. Variations may also exist in populations with different soil microorganisms[112]. Microbial development and enzymatic actions can convey responsive soil quality[113]. The degree of heavy metal exposure in biological and environmental resources leads to the reduction in soil biological activity, also allows bacterial species to lose some of their degradation potentials, soil enzymatic activity. The function of all enzymes within the soil was drastically attenuated by using 10 to 50 times increased amount of heavy metals[114,115]. Elemental degradation and acidification declining soil fertility and diversity and shift the ratio of soil biota species and impact soil fauna energy budgets[116]. If heavy metal quality decreased, soil species assorted variety turned out to be fundamentally lower, particularly on account of minuscule fungi. With high convergences of these metals in the soil, extent of minuscule organisms diminishes[117]. Besides, all these have an impact on populations and lead to food chain contamination. Soil particles on plants contribute to sufficiently high rates of animal toxic pollutants that consume them[23].

In comparison to other organic pollutants that ultimately decay the air, heavy metals are non-destructible and therefore coagulate in the atmosphere, particularly in rivers, inlet and marine sediments and soils. It is possible to transfer metals from one compartment to the next[72]. Metal pollution is a obstacle to maintain the environment of aquatic ecosystems. In aquatic ecosystems, both anthropogenic and natural stresses account for heavy metals[118,119]. Due to their presence in the atmosphere, heavy metals in aquatic biological systems are viewed as serious poisons for their harmfulness and capacity for penetration into food chains[120,121].

Conclusion

In this review, most of the heavy metals have lower levels than appropriate standards for drinking water, surface water, and aquaculture. This indicates to the pollution of Buriganga with high amount of heavy metal and that the water and sediment are not completely out of danger for human wellbeing and the environment. It is detrimental to healthy crops and aquaculture in that way. Enormous application of pesticides and the release of untreated local sewage can additionally fuel the circumstance in the future with the gradual development of the industry.

While some metals are important to life processes with an integral role, others are non-essential or potentially toxic. Both significant and insignificant metals can affect the membranes of cells; modify the specificity of enzymes; interrupt cellular functions, and change high concentration DNA. However, if heavy metals may accumulate in levels of water that harm the environment and affect people and plants. While heavy metal focus studies have been given more accentuation lately, the environmental impacts of these metals and various living organisms have been given less thought. Based on the present findings, we suggest that predominantly industrial and sewage water containing dangerous metals ought to evade such polluted water being released into the river. It is therefore essential that action is taken now to lessen future discharges and arrival of heavy metals to the most extreme degree conceivable to forestall pollution of the aquatic system and to prevent poisonous impacts on plants, humans and other organisms.

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